

Learning Media Development Using Educandy Games to Improve Digital Literacy of Grade V Students of Citra Bangsa Kupang Christian Elementary School

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Abstract

This research uses the ADDIE model in making games which consists of 5 steps, namely the stages (Analysis) Analysis, (Design) Design, (Develop) Development, (Implement) Implementation, and (Evaluate) Evaluation where this research produces learning media in the form of games with the Educandy application which consists of 5 games, namely: Noughts & Crosses, Crosswords, Match-up, Memory, and Multiple Choice which were developed by each fifth grade student of Citra Bangsa Kupang Christian Elementary School and proven to be effective in increasing students' digital literacy with a very feasible category. The use of learning media with Educandy Application to improve digital literacy shows that the games made by researchers are effective to use with a final score of 87% and a very feasible level of achievement as ICT learning media in improving digital literacy of grade V students of Citra Bangsa Kupang Christian Elementary School. Educandy as a means of making test instruments that are very suitable for the development of this all-digital era has proven to be able to encourage the development of literacy of fifth grade students of Citra Bangsa Christian Elementary School.

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1. INTRODUCTION

Technological developments in the 21st century have driven an increasing need for digital literacy, namely the ability of individuals to access, manage, analyze, and utilize technology-based information effectively. In the context of education, digital literacy has become a crucial competency because various information sources are now available in digital format via the internet and technological devices. Students, as information users, are required not only to be able to use digital devices but also to understand how these technologies work to support their learning.

However, in many elementary schools, the implementation of digital literacy is still suboptimal. Learning is still dominated by print media, and the variety of learning assessments is often limited, leading to learning boredom. This situation also occurs at Citra Bangsa Christian Elementary School in Kupang, where digital facilities are not being fully utilized, and students lack the freedom to access information resources.

In line with the characteristics of Generation Alpha, who are familiar with digital technology and are more interested in interactive learning, innovative learning media that

are engaging, adaptive, and developmentally appropriate are needed. One alternative is the use of ga, a p

Based on these conditions, this study was conducted to develop and analyze the effectiveness of Educ game-based learning media in improving the digital literacy of fifth-grade students at Citra Bangsa Kupang Christian Elementary School.

A. Instructional Media

The success of a learning process cannot be separated from the teacher/educator and school facilities. However, the role of media also significantly influences the teaching and learning process in schools, as educational tools and media are an integral part of supporting the educational process. The role of teachers is needed to produce innovative learning that can increase student motivation to learn optimally (Wahyono, 2019).

The word "media" comes from the Latin word "medius," meaning "intermediary" or "transmitter" (Mustofa Abi Hamid et al., 2020). Meanwhile, according to the 2020 Big Indonesian Dictionary (KBBI), media can be defined as a communication tool or medium such as newspapers, magazines, radio, television, films, posters, and banners; an intermediary; a connector.

According to the National Education Association/NEA, in a book by Arief Sadiman et al., media are forms of communication, both printed and audiovisual, and their equipment. Media should be manipulable, visible, audible, and readable. The definition of media is anything that can be used to convey messages from sender to receiver, thereby stimulating students' thoughts, feelings, attention, interests, and attention in such a way that the learning process occurs.

Learning media has a conceptual framework for inquiry and understanding (Davison & Scarratt, 2012: 33). This aligns with Sudjana & Rivai's (2011: 2) argument that the presence of learning media can improve student learning outcomes. According to Kemp & Dayton (Arsyad, 2017: 23), learning media can fulfill three main functions when used by individuals or groups.

Learning media plays a crucial role in the learning process. The use of learning media can assist educators in delivering learning materials. Learning media is a crucial component that determines the success of delivering learning materials to students. Another equally important component related to learning media is the learning method.

B. Game Educandy

Educandy is a web-based application with the slogan "making learning sweeter." Educandy can be used to create fun games. These games are still within the context of learning but are not boring. Educational games make learning more varied and engaging. Students can log in directly without creating an account, and teachers can design lessons by creating questions.

Educandy can be played in several game forms, including: Multiple Choice, Word Searches (finding words among random letters), Noughts & Crosses (choosing the correct answer by crossing the letters), Crosswords (crossword puzzles), Match-up (matching), and Memory (choosing the answer in the specified order).

Of course, using Educandy will make the grading process more enjoyable and less tedious than the traditional method of collecting grades using paper and pen. It's also very easy and simple to use.

The advantages of Educandy as an educational game in learning Communication and Information Technology are:

1. Has many types of games.
2. Makes it easier for educators to create varied quizzes.
3. Effective for reviewing student understanding;
4. Makes practicing questions more fun.

The downside of Educandy is that quiz authors cannot see the results of their quiz takers, and it requires a stable internet connection. (Ulya, 2021)

C. Digital Literacy

Digital literacy is not only related to the ability to use technological devices, but also includes the ability to understand, manage, and utilize digital information wisely and responsibly. In the era of digital transformation, individuals are required to have digital skills to adapt to the ever-evolving technological developments. In the context of education, teachers need to master digital literacy and digital ethics to be able to manage technology-based learning professionally and healthily. In line with the views of Gilster, Eshet, and Bawden, digital literacy includes the ability to understand various digital information sources, use digital media effectively, and navigate a dynamic information environment. Martin emphasized that digital literacy consists of the ability to access, integrate, broadcast, and analyze digital resources to build knowledge, communicate, and participate in social life.

Contextually, digital literacy is also seen as part of media literacy, which has evolved alongside advances in information technology. Digital literacy emphasizes not only mastery of digital tools but also the cognitive and emotional aspects of receiving, evaluating, and producing digital information. Thus, digital literacy plays a crucial role in ensuring that society is able to respond positively and critically to the flow of information, not only as consumers but also as responsible producers of information.

The goals of digital literacy include improving individuals' ability to understand, select, and appreciate digital information wisely; fostering a culture of literacy; developing good character in the use of technology; and improving reading and writing skills in digital media. Furthermore, digital literacy offers various benefits, such as time efficiency, cost savings, expanding social networks, assisting in decision-making based on reliable sources, being environmentally friendly, and enriching user skills.

Digital literacy is influenced by several important factors: functional skills in operating digital devices, the ability to communicate and collaborate through digital media, and critical thinking skills in disseminating and interpreting information. This third factor plays a role in helping individuals filter information accurately and develop the collaborative skills necessary for digital learning.

Furthermore, digital literacy encompasses four core competencies, as proposed by Gilster: internet information search skills, hypertext navigation, critical evaluation of digital content, and the ability to compile knowledge from various digital sources. These competencies require users to assess the clarity of information, understand the characteristics of web pages, and integrate digital information into real-life contexts.

Overall, digital literacy is an essential competency for facing the challenges of the digital era. Strengthening digital literacy through education and training will help the public, especially students, utilize technology effectively, critically, and productively, enabling them to use digital information for beneficial and constructive purposes.

2. RESEARCH METHODS

The research design used by researchers in the research and development of learning media using the Educandy application to improve digital literacy in ICT learning is the

Research and Development (R&D) method, which has the same meaning as development research. According to Borg and Gall (1983: 772), Educational Research and Development (R&D) is a process used to develop and validate educational products. This type of research produces a product in a specific field of expertise, which is followed by certain by-products and has the effectiveness of a product.

The method used was research and development (R&D). Researchers directly observed all classroom activities during the learning process. Researchers interviewed ICT teachers at Citra Bangsa Kupang Christian Elementary School to gather information about the development of learning media using the Educandy game. Research and development (R&D) is a basic research activity to obtain information on user needs (needs assessment), followed by development activities to produce products and assess their effectiveness (Sugiyono 2009: 297).

In the product development stage, researchers used the ADDIE model. ADDIE stands for Analysis, Design, Development or Production, Implementation or Delivery and Evaluation, developed by Dick and Carry. This model can be used for various forms of product development, such as models, learning strategies, learning methods, media, and teaching materials. The ADDIE model is a systematic learning design model; this model is developed or arranged in a programmed manner with a systematic sequence of activities in an effort to solve learning problems related to learning resources that are appropriate to the needs and characteristics of students (Tegeh & Kirna, 2013: 220).

According to Rusdi (2018), the ADDIE model encompasses five steps in product development: Analysis, Design, Development, Implementation, and Evaluation. The product development in this study involved learning media in the form of the Educandy game. The data analysis methods employed in this study were qualitative and quantitative. Qualitative data analysis was used to analyze data obtained through observations during the media's use, as well as input from subject matter and media experts.

This research was conducted at Citra Bangsa Christian Elementary School, Jalan Manafe No. 17, Kayu Putih Village, Oebobo District, Kupang City, East Nusa Tenggara Province. The reason for choosing this location was that there had never been similar research conducted there, and based on the researcher's observations, there had been no development of learning media using the Educandy Game at Citra Bangsa Christian Elementary School, Kupang.



Figure 1: Model *ADDIE*

1) Analyze

The analysis stage aims to analyze a problem that necessitates the development of new media. At this stage, researchers analyze teachers, school facilities, and their suitability for learning objectives. At this stage, researchers analyze the need to develop learning media using the Educandy game and collect information that will be used as material for

creating a product, namely, learning media using the Educandy game.

2) Design

At this stage, researchers begin collecting data, including lesson plans/teaching modules, syllabi, and ICT textbooks. They also develop research instruments to be used for data collection.

The following is a prototype in the form of a design interface (UI/UX Design).

a. Application Slash Screen View

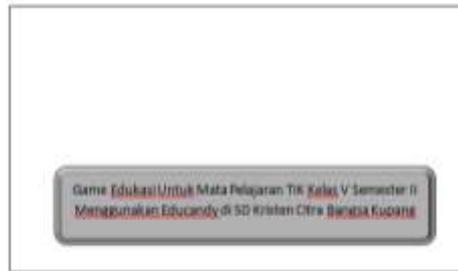


Figure 2 Application Slash Screen Page

The image above shows the introductory menu for entering the menu page. Click the button to enter the menu page.

b. Main Menu View



Figure 3 Main Menu Display

On the main menu display, there is a RPP/Teaching Module menu, a user guide menu, a material menu, a game/quiz menu, author profile menu.

c. RPP/Teaching Module Menu Display



Figure 4 RPP/Teaching Module Menu Display

d. User Guide Menu View



Figure 5 User Guide Menu Display

In the user guide menu display, there are instructions/instructions for playing the Educandy game.

e. Material Menu Display



Figure 6 Material Menu Display

The material menu displays sub-chapters for each ICT topic. There's also a Back button to return to the main menu.

f. Game/Quiz View



Figure 7 Game Menu Display

The Game/Quiz menu displays five types of Educandy games. There's also a Start button to begin the game and a Back button to return to the main menu.

g. Author Profile Menu View

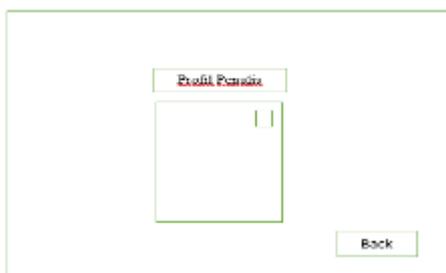


Figure 8 Game/Quiz Menu Display

The author profile menu displays the researcher's biodata. There's a Back button to return to the main menu.

3) Development

This stage is the product realization stage. The final product will be validated by media and content experts. During the validation process, the validator uses instruments developed in the next stage. This stage also includes lesson plans/teaching modules, ICT materials, student worksheets, and evaluation sheets. In the development stage, the conceptual framework is realized into a product ready for implementation. Researchers compile the prepared materials and ingredients into the Educandy game.

4) Implementation

At this stage, implementation takes place at the school designated as the research site. The developed media is applied to actual conditions, specifically to students. The researcher applies the developed learning media and records everything on an observation sheet to improve the learning media.

5) Evaluation

The evaluation phase is the next step after implementation. At this stage, quantitative data analysis is performed, which is used to analyze obstacles/difficulties, efforts to overcome obstacles in implementing learning media, and teacher and student responses. Then, quantitative data analysis is conducted based on student pre- and post-test scores.

3. DATA COLLECTION TECHNIQUES

This study used several data collection techniques, namely questionnaires, interviews, literature studies, and documentation. The questionnaire was used to obtain data, for validation, and to respond to teachers and students. The needs questionnaire was given to identify the needs of the Educandy game product development on ICT material for grade V, containing 18 questions related to learning media, infrastructure, school technology systems, and student responses. The questionnaire validation was aimed at media experts and material experts to assess the appearance, design, and suitability of the material with synchronization. Data at this stage were analyzed using a Likert scale. Furthermore, the questionnaire was administered to teachers and students, given after the product trial, to determine the level of feasibility and user acceptance.

Interviews were conducted with ICT teachers to explore learning conditions, potential problems, and digital media needs in more depth, as well as to gauge their responses to the product information being developed. Furthermore, a literature review was conducted to gather relevant theories and references related to digital literacy, learning media, and educational applications.

Documentation techniques were used to collect data in the form of photographs and videos of the learning process, which served as supporting needs analysis and evidence of product trials. This documentation helped provide a realistic picture of the learning conditions and media use during the research process.

4. DATA ANALYSIS TECHNIQUES

The data analysis technique used to test all questionnaire instruments was a Likert scale. Validators were given two response options with different scores for each. The score represented a response ranging from negative to positive. Neutral responses were removed to assess respondents' attitudes and opinions toward the questionnaire and to avoid errors in the Likert scale method, namely the error of moderate tendency.

Table 1 Likert Scale

No	Quantitative Analysis	Score
1.	Strongly agree (SS)	4
2.	Agree (S)	3
3.	Disagree (TS)	2
4.	Strongly disagree (STS)	1

The measurement level in this study uses intervals. Interval data can be analyzed by calculating the percentage of questionnaire responses for each item using the formula:

$$Ps = \frac{S}{N} \times 100\%$$

Information:

- Ps : Ideal percentage
- S : Number of research result components
- N : Maximum score

Table 2: Eligibility Criteria

Average score (%)	Category
0% - 25%	Not feasible
26% - 50%	Less qualified
51% - 75%	Eligible
76% -100%	Very worthy

5. RESULTS AND DISCUSSION

A. Development

1) Initial view when the application is run



Figure 9 Educandy view

2) Educandy view after login

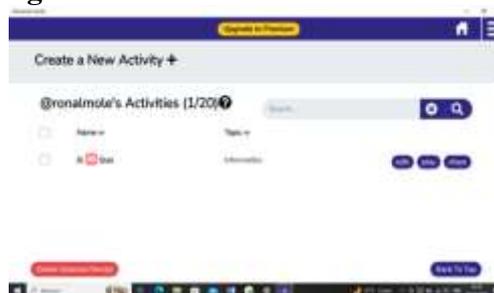


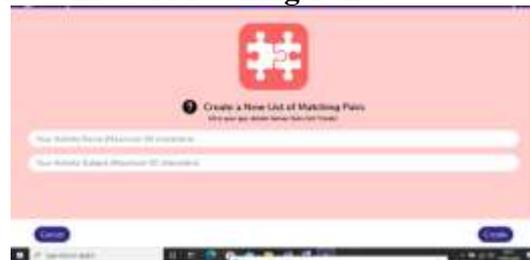
Figure 9. Educandy displays after logging in

3) Display of create a new activity +



Figure 10: Create View

4) Display of Create a New List of Matching Pairs



Gambar 11 Display of Create a New List of Matching Pairs

5) Questions and Answers Display



Figure 12 Question and Answer Display



Figure 13 Noughts & Crosses game screen



Figure 14 Crossword game display



Figure 15 Match-up game view



Figure 16 Game Memory Display



Figure 17 Multiple Choice game display

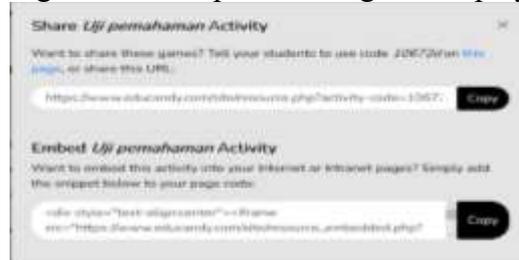


Figure 18 Image display for sharing game links

B. The Results of Using the Educandy Game on Students' Digital Literacy

The pre-test results showed that the average student score was in the moderate category, with the score distribution as follows:

Table 3: Table of Student Pretest Results

No.	Nama	Nilai Pretest
1.	AA	60
2.	GR	50
3.	JK	55
4.	EB	50
5.	KH	45
6.	AN	60
7.	Br	60
8.	GR	55
9.	AS	50
10.	PB	50
11.	JP	40
12.	KM	40
13.	SA	40
14.	AF	55
15.	AS	45
16.	CH	55
17.	G	60
18.	AM	40
19.	AH	45
20.	Ba	45
21.	AW	55
22.	AK	50
23.	CL	60
24.	EB	60
25.	SA	50

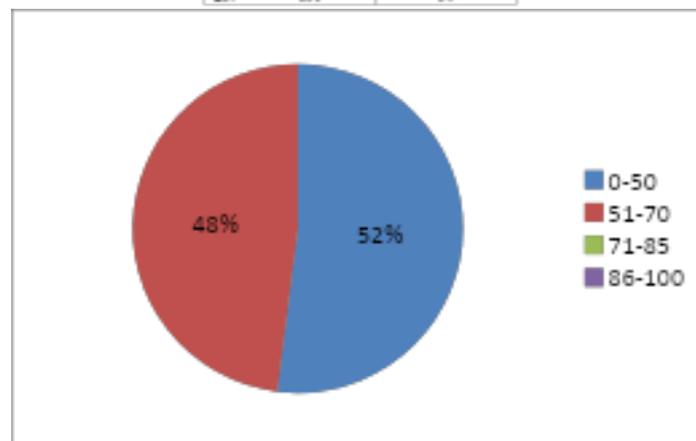


Diagram 1 Student Pretest Results Diagram

Based on the analysis results of the diagram above, namely: 0-50 score Category: As many as 52% of students are in the 0-50 score range. This shows that the majority of students have quite low scores on the pre-test, which indicates that they may have difficulty in initial understanding or mathematical problem-solving skills before being given treatment using the Educandy application. 51-70 score Category: Around 48% of students are in the 51-70 score range. This indicates that there are some students who have slightly better digital literacy skills than the first group, but still have not reached a high score category. 71-85 and 86-100 score Categories: No students achieved scores in the 71-85 or 86-100 range, which indicates that before the intervention, no students had a high level of digital literacy understanding or skills.

Validity and reliability tests have been carried out on the questions/statements in the questionnaire as follows:

- a) Instrument Validity After the experts' assessment, the instrument was tested on 25 respondents with 15 statements. Validity testing was conducted using Pearson's Product-Moment formula and a Likert scale.
- b) Reliability: A reliable instrument produces the same data when measuring the same object multiple times. If the instrument produces consistent measurement results, it can be said to have high reliability. To determine the level of instrument reliability in

this study, a metric was used.

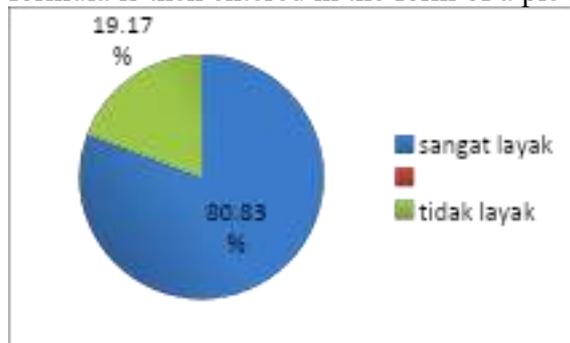
a. Media Expert Validation

The media expert validation data that has been compiled using the previous formula is then entered in a table form as shown below:

Table 4 Media Expert Validation Results

No.	Expert Validation of Media, Materials, and Teacher Responses	The ideal total value for all items	Average	Achievement Level
1.	Media Member	/120*100	83%	Good, no need to revise

Then the media expert validation data that has been translated using the previous formula is then entered in the form of a pie chart as below:



Based on the table and pie chart presented above, it can be explained that the Educandy application media was validated as an ideal learning aid in the learning process, with a validation value of 80.83% in the good category, and does not need to be revised.

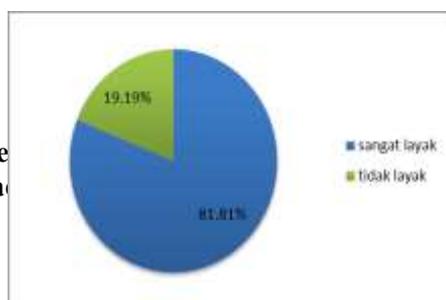
b. Subject Matter Expert Validation

The expert validation data that has been compiled using the previous formula is then entered in a table as shown below:

Table 5 Validation by Material Experts

No.	Validasi Ahli Media, materi dan respon guru	Jumlah nilai ideal untuk keseluruhan item	Rata-rata	Tingkat Pencapaian
1.	Ahli Materi	72,88*100	81,81%	Baik, tidak perlu direvisi

Then the expert validation data that has been translated using the previous formula is then entered in the form of a pie chart as shown below:



Based on the table and pie chart presented above, it can be explained that the Educandy application media was validated as an ideal learning aid in the learning process with a validation value of 81.81% in the good category and does not need to be revised.

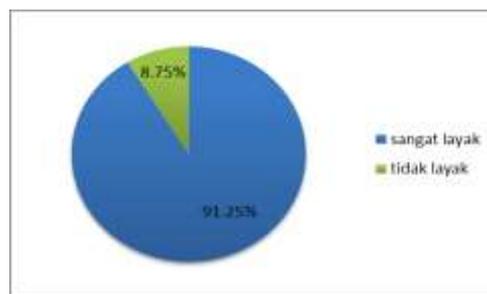
c. Expert Validation of Teacher Responses

The expert validation data for teacher responses that have been translated using the previous formula is then entered in a table form as below:

Table 6 Expert Validation of Teacher Responses

No.	Validasi Ahli Media, materi dan respon guru	Jumlah nilai ideal untuk keseluruhan item	Rata-rata	Tinggi Pencap
1.	Ahli Respon Guru	73/80*100	91,25%	Baik, tid perlu dir

Then the expert validation data for teacher responses that have been translated using the previous formula is entered in the form of a pie chart as below:



Based on the table and pie chart presented above, it can be explained that the Educandy application media was validated as ideal as a learning aid in the learning process, with a validation value of 81.81% in the good category, and does not need to be revised.

d. Validation of Class V Students of Citra Bangsa Christian Elementary School, Kupang

The student validation data that has been processed using the previous formula is then entered in a table form as shown below:

Table 4.7 Validation of Class V Students at Citra Bangsa Kupang Christian Elementary School

No.	Nama	Jumlah Nilai Ideal Untuk keseluruhan Item	Rata-Rata	Tingkat Pencapaian
1.	Alexia Amolo	64/80*100	80%	Sangat lry
2.	Giovanni Riwu	68/80*100	85%	Sangat lry
3.	Joho Koa	73/80*100	91%	Sangat lry
4.	Evandhu Baidenggan	70/80*100	97%	Sangat lry
5.	Khaafreoh Honsair	70/80*100	97%	Sangat lry
6.	Adel Nako	79/80*100	97%	Sangat lry
7.	Brio	70/80*100	97%	Sangat lry
8.	Grasiel Rassa	70/80*100	97%	Sangat lry
9.	Aurelia Soruh	70/80*100	97%	Sangat lry
10.	Paikal Bani	70/80*100	97%	Sangat lry
11.	Jebekeal Parindungan	70/80*100	97%	Sangat lry
12.	Kevin Manafe	69/80*100	86%	Sangat lry
13.	Skylar Alagra	69/80*100	86%	Sangat lry
14.	Alvaro Frans	69/80*100	86%	Sangat lry
15.	Abraham Silalahi	69/80*100	86%	Sangat lry
16.	Cheley Helle	72/80*100	90%	Sangat lry
17.	Gerviel	72/80*100	90%	Sangat lry
18.	Andronikus Malese	72/80*100	90%	Sangat lry
19.	Ardi Hetmina	72/80*100	90%	Sangat lry
20.	Bastian	72/80*100	90%	Sangat lry
21.	Angely Windy	71/80*100	88%	Sangat lry
22.	Alvaro Kore	71/80*100	88%	Sangat lry
23.	Cansia Leka	71/80*100	88%	Sangat lry
24.	Edgar Bilave	71/80*100	88%	Sangat lry
25.		62/80*100	75%	Sangat lry

Then the student validation data that has been processed using the previous formula is entered in the form of a pie chart, as shown below:



Based on the results of the questionnaire calculations above, the table shows the results of the validation of fifth grade students of Citra Bangsa Kupang Christian Elementary School with a total of 25 students, the average results of 25 students show that 2,173 divided by the number of students, namely 25 students and get a final score of 87% and a very decent level of achievement. So, it can be concluded that, according to the results of the questionnaire from fifth-grade students of Citra Bangsa Kupang Christian Elementary School is the game is worthy of being used as a digital literacy. So, it can be concluded from the overall results obtained that the game created with the Educandy Application produces results that are worthy of being used as a digital literacy tool.

C. Discussion of Results

This research discussion explains the results of evaluations from various parties to assess the effectiveness of developing web-based learning media using the Educandy application in improving the understanding of Computer Systems material for fifth-grade students at Citra Bangsa Kupang Christian Elementary School. The evaluation was conducted by media experts, material experts, learning practitioner experts, students, and through a learning effectiveness test.

The media expert evaluation results showed a feasibility percentage of 80.83%, including the very feasible category. The material expert evaluation obtained a score of 81.81%, also in the very feasible category. The learning practitioner expert gave a score

of 91.25%, which is in the very feasible category. Meanwhile, student responses resulted in a percentage of 87%, indicating that the product was accepted and deemed feasible by direct users.

Effectiveness testing was conducted through pretests and posttests. Posttest results demonstrated improved student understanding after using web-based media, demonstrating that the Educandy application effectively improves digital literacy and material comprehension. This improvement was further reinforced by increased student motivation during the media use process.

In terms of digital literacy, the use of Educandy has been proven to encourage interaction, collaboration, and active student engagement. The engaging presentation and educational games increase student motivation and enthusiasm for learning.

The Educandy app has several advantages, including its small size, easy menu access, and separate presentation of materials so students can learn according to their needs. However, it also has limitations, such as the limited scope of the material being quizzed, the lack of user-to-user interaction features, and the need to re-export the app every time the material is updated.

Overall, Educandy has a positive impact on learning, increasing student motivation, facilitating teacher delivery, and encouraging teacher creativity in utilizing technology. The product revision process was conducted based on input from subject matter experts and practitioners, particularly regarding the addition of evaluation questions and refinement of language use. Media experts and students did not provide any suggestions for improvement, as the product was deemed highly suitable.

6. CONCLUSION

Based on the research results discussed in Chapter IV, the researcher then formulated several conclusions related to the research material as follows:

1. This study uses the ADDIE model in creating games consisting of 5 steps, namely the (Analysis), (Design), (Develop), (Implement), and (Evaluate) stages, where this study produces learning media in the form of games with the Educandy application consisting of 5 games, namely: Noughts & Crosses, Crosswords, Match-up, Memory, and Multiple Choice which were developed independently by each fifth-grade student of Citra Bangsa Kupang Christian Elementary School and proven to be effective in increasing students' digital literacy with a very feasible category.
2. The use of learning media with the Educandy Application to improve digital literacy shows that the game created by the researcher is effective for use with a final value of 87% and a very appropriate level of achievement as an ICT learning medium in improving the digital literacy of fifth-grade students at Citra Bangsa Kupang Christian Elementary School.
3. Educandy, as a means of creating test instruments that are very suitable for the development of the digital era, has proven to be able to encourage the development of literacy in grade V students at Citra Bangsa Christian Elementary School.
4. The students, in this case the fifth grade students of Citra Bangsa Kupang Christian Elementary School, were more enthusiastic in working on the questions displayed because they used different media from the usual paper and pen media because the Educandy Application as a means of developing students' digital literacy appeared by bringing a more interesting learning method with many innovative game designs to support the creation of interest and enthusiasm for learning in students.

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