



## Educandy assisted as learning media to improve critical thinking skills on light material in elementary school

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### ABSTRACT

The low critical thinking skills of students in science education serve as the primary background for this study. Therefore, this research and development aims to produce and test the effectiveness of an Edu-Game-based learning medium on the Educandy platform for the topic of Light in 5th-grade elementary school. This study employed the RnD method using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model. The research involved media and material experts for feasibility testing, as well as 5th-grade students from three different elementary schools. The validation results from the experts indicated a feasibility rating of "Very Feasible". The effectiveness test, using the non-parametric Mann-Whitney U test, demonstrated effective results at SDN Batu Ampar 08 and SDN Dukuh 01. In contrast, the results at SDN Kebon Pala 11 were not effective. Thus, it is concluded that this learning medium is feasible for enhancing students' critical thinking skills, although one school showed a non-significant difference in N-Gain scores.

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### ABSTRAK

Rendahnya kemampuan berpikir kritis peserta didik pada pembelajaran IPA menjadi latar belakang utama penelitian ini. Oleh karena itu, penelitian dan pengembangan ini bertujuan untuk menghasilkan dan menguji efektivitas media pembelajaran interaktif berupa Edu-Game pada platform Educandy untuk materi Cahaya di kelas V SD. Penelitian ini menggunakan metode RnD (Research and Development) dengan model pengembangan ADDIE (Analysis, Design, Development, Implementation, and Evaluation). Penelitian ini melibatkan ahli dalam media dan materi sebagai penguji kelayakan, serta peserta didik kelas 5 SD dari 3 Sekolah Dasar yang berbeda. Berdasarkan hasil uji validasi oleh ahli, menunjukan kategori kelayakan "Sangat layak". Hasil uji efektivitas dengan uji non-parametrik Mann Whitney U pada SDN Batu Ampar 08 dan SDN Dukuh 01 menunjukkan hasil efektif sedangkan SDN Kebon Pala 11 menunjukkan hasil tidak efektif. Dengan demikian dalam pengembangan media pembelajaran ini dalam meningkatkan critical thinking skill peserta didik dinyatakan layak meskipun terdapat satu sekolah yang menunjukkan hasil beda (N-Gain) yang tidak signifikan.

**Kata Kunci:** Educandy; kemampuan berpikir kritis; pengembangan media pembelajaran; sekolah dasar

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## INTRODUCTION

Education is a process of an individual's development in terms of mindset, attitudes, character, language, and how they contribute to social life, all of which are determined by their education (Pratomo & Herlambang, 2021). Meanwhile, the curriculum as a system within a country's education is understood as a mandatory framework that serves as a reference or guideline in the implementation of education and the learning process in schools (Mahrus, 2021). Indonesia, as a developing country, adopts Kurikulum Merdeka, within which there is an important grand design known as the Profil Pelajar Pancasila; this grand design can be considered significant because its development encompasses the character and competencies required to become good global citizens, and it should have been introduced from an early age (Mulyani *et al.*, 2023). One of the aspects emphasized in this grand design is critical reasoning, which is translated as critical thinking skill in this study.

Critical reasoning, as one of the values in the Profil Pelajar Pancasila, is believed to serve as the foundation of students' critical thinking skills. Based on this, it can be said that one indicator of the success of Kurikulum Merdeka can be assessed from the quality of the critical thinking skills possessed by students. Critical thinking skill is a thinking process that enables students to acquire knowledge and new insights through problem-solving processes and collaboration. The ability to think focuses on the learning process rather than merely acquiring knowledge (Hakim *et al.*, 2018). Critical thinking skill is the ability of students to think with the aim of obtaining new knowledge or solving a problem. Critical thinking skill is one of the essential abilities that humans must possess in order to survive and continue developing in life; however, it is unfortunate that the critical thinking ability of Indonesian students can be categorized as low (Pradana *et al.*, 2020). This then becomes a serious issue because critical thinking skill, or the ability to think critically, is one of the competencies that must be possessed by individuals in this era.

The learning process can be defined as a set of planned actions based on instructional principles that regulate the interaction among students, teachers, learning materials, and the environment (Aprilia *et al.*, 2022). The learning process plays a very important role in achieving the goals of the curriculum; when linked to the previous statement, it is this learning process that will shape and enhance students' critical thinking skills when carried out appropriately. Referring to the view that the science learning process emphasizes providing direct experiences to improve competencies so that students can understand and explore the natural environment scientifically, and is conducted through scientific inquiry to foster the ability to think, work, and act scientifically, as well as to sustain these as important aspects of life skills (Ritonga *et al.*, 2020).

The science learning process (now IPAS), particularly the topic of the properties and characteristics of light, can be an appropriate option for enhancing students' critical thinking skills. In the IPAS learning process, media are certainly needed as a bridge that connects various elements entering students' minds or reasoning; moreover, in order for learning to improve students' learning outcomes, one effort that can be made is selecting appropriate instructional media so that students' competencies and abilities can be enhanced optimally (Handayani *et al.*, 2024). In the context of learning, students can be considered successful when there is willingness, desire, and motivation to learn; this statement aligns with the improvement of the quality of instructional media, as students will be encouraged and directed toward positive attitudes and behaviors in the learning process (Muhamad *et al.*, 2023).

The use of digital media in teaching and learning activities represents a major innovation in the field of education. Although it is considered a significant innovation, the practice or implementation of digital media remains relatively limited, and its development has not been particularly substantial, even though the use of digital media in learning allows teachers and students to interact more flexibly. The advantages of using digital instructional media such as PowerPoint, videos, digital board games, and other visual media can

have a positive impact on improving the quality of students' learning (Rosmana *et al.*, 2023). In addition, the implementation of interactive digital media greatly enables students to engage in constructive learning, in which they can actively build their understanding through interaction with the learning materials (Pitriyana & Razali, 2024; Rosyiddin *et al.*, 2023).

The Educandy platform, as one of the interactive and user-friendly digital learning media, is present to address these issues; with its ease of use, it greatly enables every teacher to explore and develop this digital medium, thereby having a positive impact on efforts to improve the quality of teaching and learning for both teachers and students in schools. Previous related studies have been identified as considerations for the use and development of educational game-based learning media using the Educandy platform. Educandy media has been proven in classroom action research to improve students' vocabulary (Maryani, 2024). Another finding from quantitative research indicates that Educandy media can enhance students' cognitive learning outcomes (Ferdianti & Anwar, 2023). Based on these findings, this study continues and develops previous research by incorporating the variable of critical thinking skill. This study aims to develop digital learning media using the Educandy platform as an effort to enhance students' critical thinking skills.

## LITERATURE REVIEW

### Digital Learning Media

Learning encompasses everything—whether people, objects, tools, or events—that enables the creation of conditions that assist students in acquiring skills, information, and attitudes (Dewi *et al.*, 2022). Digital learning media refers to instructional media that integrates the use of science and technology with learning content, and one of its benefits is enhancing critical thinking skills (Salam *et al.*, 2024). The use of digital learning media such as interactive programs, instructional videos, and 3D simulations can significantly increase students' motivation and interest in learning (Manihuruk & Sutabri, 2024). Digital learning media is described as any form of instructional aid that integrates technological aspects with learning materials. The purpose of digital learning media is none other than to assist teachers in delivering lessons that attract students' interest while also promoting the development of certain aspects of students' abilities.

### Critical Thinking Skill

Critical thinking skill is a fundamental ability required to solve a problem (Firdausi *et al.*, 2021). Critical thinking ability is an intellectual potential that can be developed through the learning process (Setiana & Purwoko, 2020). The purpose of thinking critically is to analyze ideas in a more specific direction, distinguish matters or problems sharply, select, and carry out identification (Anugraheni, 2020). Based on these statements, it can be concluded that critical thinking skill is an individual's potential to examine an idea or concept in a detailed and precise manner.

There are six indicators used to assess critical thinking skill, namely: 1) Interpretation, the ability to understand and express the meaning of situations, data, judgments, rules, procedures, or various standards; 2) Analysis, the ability to explain conclusions and pose relevant questions based on the relationship between information and concepts; 3) Evaluation, the ability to assess the credibility of a statement or another person's opinion, or the ability to evaluate conclusions based on the relationship between information and concepts with related questions; 4) Inference, the ability to identify the factors required to draw logical conclusions by examining information related to a problem; 5) Explanation, the ability to present arguments and provide justification based on evidence, concepts, methodology, and logical criteria derived from information or data; 6) Self-Regulation, the ability to be aware of and examine one's own cognitive activities, the factors used in those activities, and the results of applying analytical and

evaluative skills with the aim of identifying, verifying, and correcting previous reasoning outcomes (Triwulandari & Supardi, 2022).

### **Educational Games (Edu-Game)**

Educational games (Edu-Game) are games created and specifically designed to be used as instructional media for students (Khoiri *et al.*, 2023). These games include materials containing audio, text, images, and animations, with the main content focusing on particular topics. The purpose of Edu-Game is to broaden concepts and provide a deeper understanding of the subject matter; this view is supported by the statement that educational games are intended to generate children's interest so that they become more enthusiastic about learning (Suryani *et al.*, 2021). Another objective of Edu-Game is to enhance students' critical thinking skills through varied and interactive game models or formats. It can be concluded that Edu-Game is a game created or designed to support the learning process by integrating elements of enjoyment and educational content within it.

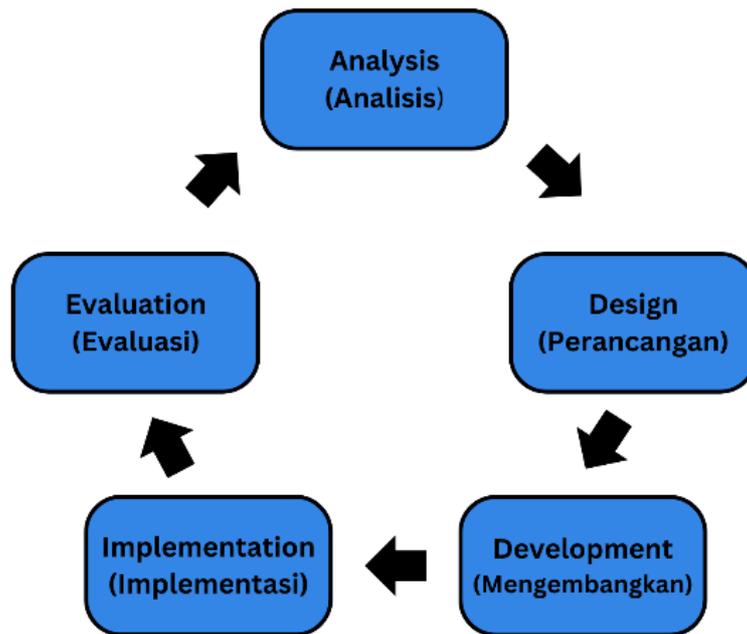
Game-based learning using educational games is one of the innovative and up-to-date learning solutions. Educational game-based learning combines game elements with educational objectives, creating an interactive, challenging, and enjoyable learning environment for students (Khairani *et al.*, 2023). One of the benefits of using Edu-Game in learning is the creation of a pleasant learning atmosphere; educational games can be used by teachers as a medium for delivering instructional information to students (Hikmah *et al.*, 2023). In addition, the benefits of educational games also provide students with relief from the boredom of the academic burden they bear. Information technology in the field of education is essentially aimed at supporting the learning process and the delivery of knowledge by educators by optimizing educational outcomes (Masjudin, 2020). The use of Edu-Game is fundamentally a form of adaptation of the education sector to the rapid development of science and technology, as well as a means of balancing the positive and negative impacts of such advancements.

### **Educandy Platform**

Educandy is a website-based application designed for creating quizzes (Nurjanah *et al.*, 2022). The games available in Educandy are also categorized as educational games. Another perspective regarding the Educandy application is that it is a website-based platform with the slogan "making learning sweeter," which in Indonesian means "making learning more enjoyable." Educandy can be used to create enjoyable online game models (Fitriati *et al.*, 2021). Based on the statements above, it can be concluded that Educandy is a platform that enables users to create various quizzes or questions in enjoyable game-based formats. This serves as the foundation for using Educandy in the learning process, because as previously mentioned, the positive impacts generated are capable of enhancing many aspects of students' development; moreover, its easy accessibility greatly assists teachers in saving time in the design process. The Educandy application can be used to create online educational games that allow users to design them in a short amount of time (Wahyuni *et al.*, 2022). Educandy has many advantages for use in learning, including ease of use and access, a wide and engaging variety of models, and high flexibility for both online and offline learning.

## **METHODS**

The method used in this study is R&D, commonly referred to as research and development. The research and development method employed will be supported by the ADDIE development model. The ADDIE model is an instructional model frequently used in designing educational and training programs with the aim of developing educational and training initiatives (Spatioti *et al.*, 2022). The structure of the ADDIE model can be seen in **Figure 1** below.



**Figure 1.** ADDIE Development Model  
Source: (Jian, 2023)

In the first stage (Analysis), the researcher conducted an analysis of the learning process needs related to educational game-based learning media. The analysis activities carried out included: 1) a literature review related to educational game-based learning media and issues concerning students' critical thinking skills; 2) conducting brief interviews with teachers at SDN Batu Ampar 08 regarding the use and development of educational game-based learning media. These activities were undertaken to determine the appropriate model of educational game-based learning media and to understand the actual issues related to students' critical thinking skills. The selection of Educandy as the learning media was based on the urgency of its limited development and consideration of the available facilities.

In the second stage (Design), the researcher designed the model on the Educandy platform based on the results obtained in the Analysis stage. The design process involved determining the game modes to be used and how they would be implemented in the learning process, as well as integrating the values of critical thinking skills into the content. In addition, the researcher also designed supporting materials for the learning media, namely the learning module, pre-test and post-test questions, and PowerPoint presentations.

In the third stage (Development), the researcher developed the Educandy learning media that had been designed. The development process was carried out by conducting a validation test on the Educandy media and its supporting materials, involving two validators, namely a media expert and a subject-matter expert. This activity was conducted with the aim of assessing feasibility and obtaining feedback and suggestions regarding the media to be used.

In the fourth stage (Implementation), the researcher implemented the Educandy media that had been revised and validated by experts. The implementation was carried out by conducting a trial of the Educandy media with fifth-grade students in three elementary schools, namely SDN Batu Ampar 08, SDN Dukuh 01, and SDN Kebon Pala 11. The core of this activity was the application of the Educandy media in the IPAS learning process, with light as the main topic, in the experimental class.

In the fifth stage (Evaluation), the researcher evaluated the effectiveness of the Educandy media in enhancing students' critical thinking skills. The evaluation was conducted summatively by administering pre-tests and post-tests to both the control and experimental classes to measure the improvement in critical thinking skills. This activity represents the final stage of the study and serves as the basis for the research findings.

Data analysis to determine effectiveness was conducted using a non-parametric statistical test, namely the Mann–Whitney U test. The test was carried out to measure significant differences between the N-Gain of the pre-test and post-test results in the control and experimental classes, as the data were not normally distributed. Data organization was performed using Microsoft Excel, while data calculations were conducted using IBM SPSS 25. The following is the formula used to determine the N-Gain.

$$N - Gain = \frac{S_{posttest} - S_{pretest}}{S_{maksimum} - S_{pretest}}$$

Information:

S posttest = posttest value  
S pretest = pretest value  
S maksimum = maximum value

## RESULTS AND DISCUSSION

### Preliminary Analysis

There were two activities carried out in the initial analysis of the development of this media. First, a literature review was conducted on similar studies, particularly those discussing Educandy and its influence or impact on learning. Based on the findings of the literature review, the Educandy platform has been used in various studies involving students at different educational levels; however, its use is still not as extensive as other learning media such as Quizizz, Kahoot, and Slidesgo. Therefore, when compared to other digital learning media, Educandy is still relatively rarely used, and its development has not yet been widespread. In addition, no research has been found examining the relationship between this media and critical thinking skill, making this one of the key analyses and strong considerations for incorporating the critical thinking skill variable in this study.

The next analysis was conducted by carrying out a brief interview with one of the teachers at SDN Batu Ampar 08 regarding the use and development of learning media, particularly digital-based media. Based on the results of the brief interview, it was found that their use and development are still very limited, with mostly younger teachers implementing and developing digital learning media. Based on these findings, Educandy was selected as the media to be developed; in addition, the ease of use and management of Educandy became a strong consideration for its development.

### Initial Media Design

The initial design was carried out by selecting the game models available on Educandy. As shown in **Figure 2**, there are three categories that can be created, namely "Words," "Matching Pairs," and "Quiz Questions." In this study, two categories were selected and developed into three different models, namely "Words" and "Matching Pairs." Within the "Words" category, two models were chosen: "Word Search" and "Anagrams." Meanwhile, in the "Matching Pairs" category, the "Memory" model was selected. On the Educandy platform, the selection of the model is carried out after the creator inputs the content to be presented to users; this then influences the design process, as the creator must conduct periodic testing after entering or modifying the model's content to ensure it remains aligned with expectations.

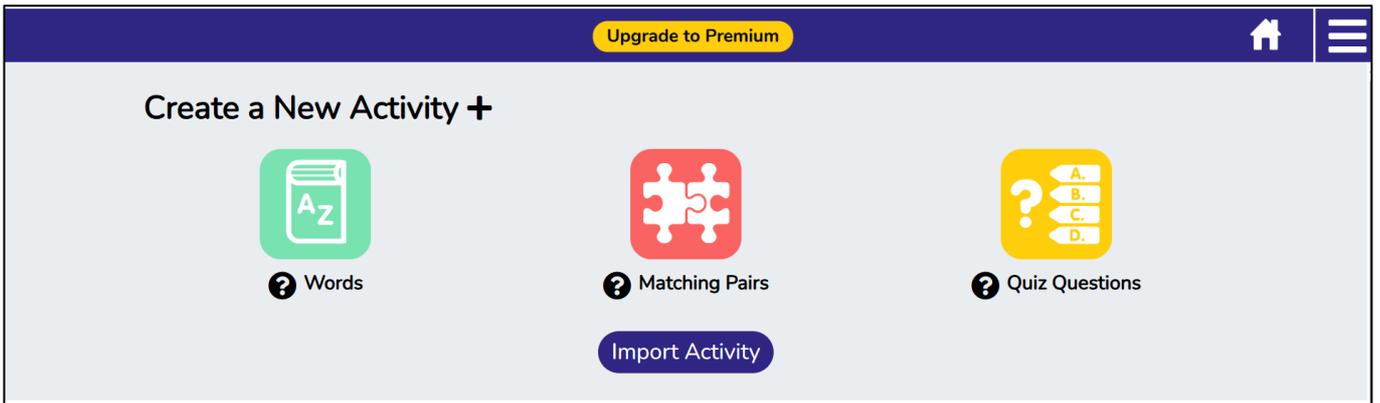


Figure 2. Display of Educandy Model Category Options  
Source: Research 2025

### Specifications of the Developed Educandy Media

The Educandy platform is a website-based application that can be accessed on various devices, either through an application or a website. The researcher developed this platform by creating three different game modes with content integrated with the values of critical thinking skills. The three game modes developed are: 1) word search; 2) anagrams; and 3) memory. The word search mode is used for introducing the properties of light, the anagrams mode is used for introducing types of mirrors, and the memory mode is used for group quizzes. The display of these three modes is shown in **Figure 3**.

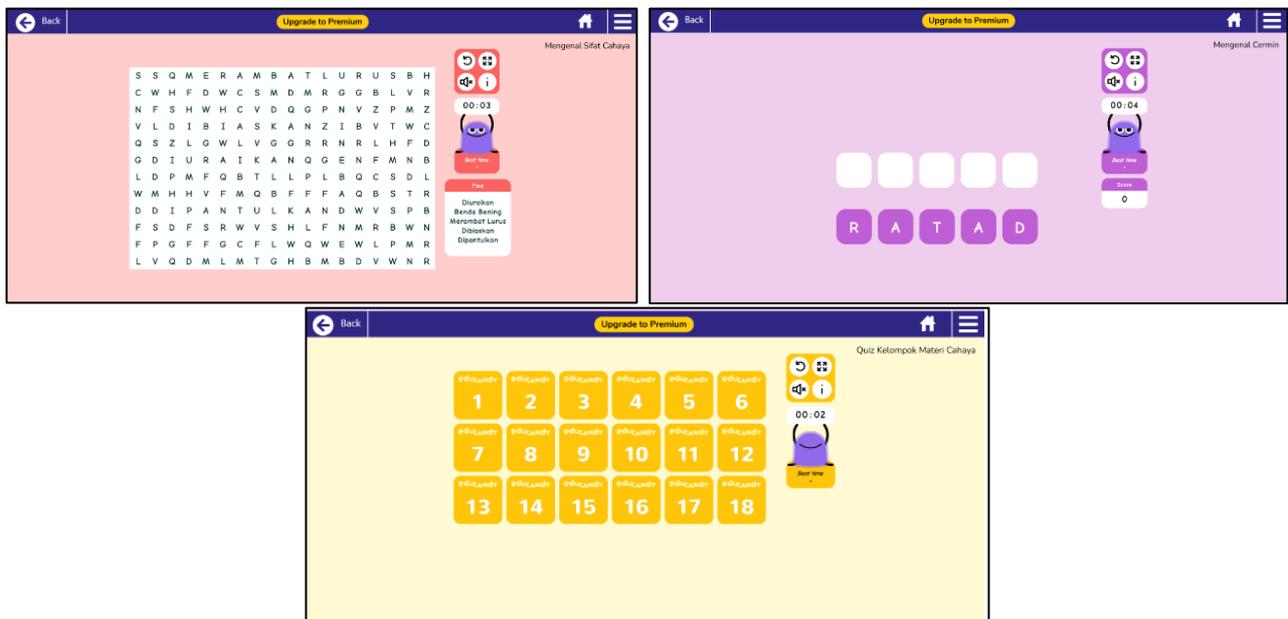


Figure 3. Display of Educandy Game Modes  
Source: Research 2025

The word search model was created by selecting the “create new activity” menu on the main Educandy page (after logging in), then choosing the “Words” category and entering the model content related to the properties of light; finally, the model was saved and could be shared using a link. To select the Word Search model, users can be directed to play the model by choosing the “Word Search” option. This model contains content introducing the properties of light, and students are required to find words related to the properties of light and then interpret them in front of the class.

The Anagrams model was created by selecting the “create new activity” menu on the main Educandy page (after logging in), then choosing the “Words” category and entering the model content related to the types of mirrors; finally, the model can be saved and shared using a link. To select the Anagrams model, users can be directed to play the model by choosing the “Anagrams” option. This model contains content about types of mirrors, and students are asked to arrange a word from several scrambled letters to form a type of mirror, such as “D-A-T-A-R,” and then explain it in front of the class.

The Memory model was created by selecting the “create new activity” menu on the main Educandy page (after logging in), then choosing the “Matching Pairs” category and entering content consisting of matching image–word pairs related to the topic of light; finally, the model was saved and could be shared using a link. To select the Memory model, users can be directed to play the model by choosing the “Memory” option. This model combines the two previous contents, namely the properties of light and types of mirrors; students are required to divide the class into several groups and take turns guessing the pairs of boxes until they find the correct match, for example: (an image of a pencil placed in a glass filled with water) – refraction of light, after which students explain the relationship between the selected image and word.

### **Feasibility Test of the Educandy Media and Supporting Materials**

After the Educandy media and its supporting materials were designed, a feasibility test was conducted. In the aspect of content feasibility, the material expert gave a score of 15 out of a maximum score of 15 (100%); in the presentation aspect, the material expert gave a score of 14 out of a maximum score of 15 (93.33%); in the language aspect, the material expert gave a score of 10 out of a maximum score of 10 (100%); and in the critical thinking aspect, the material expert gave a score of 20 out of a maximum score of 25 (80%). The material expert also provided a suggestion to create a manual guide or user guide to ensure that the use of the media can enhance students’ critical thinking skills. The average result obtained from the material expert was 93.33%, which indicates that the Educandy media and its supporting materials are categorized as highly feasible for use. The following is a summary table of the validation results from the material expert.

**Table 1.** Results of the Material Expert Validation Test

No	Aspect	Total Score of the Material Expert	Max Score	Percentage (%)
1	Content Feasibility	15	15	100
2	Presentation	14	15	93,33
3	Language	10	10	100
4	Critical Thinking	20	25	80
<b>Total</b>		<b>59</b>	<b>65</b>	
			<b>Average</b>	<b>93,33</b>

*Source: Research 2025*

Next, the Educandy media underwent validation testing by a media expert. In the aspect of software engineering, the media expert gave a score of 15 out of a maximum score of 15 (100%), while in the visual display aspect, the media expert gave a score of 32 out of a maximum score of 35 (91.43%). The media expert suggested continuing the development of this media through to completion. The average result obtained from the media expert was 95.71%, which indicates that the Educandy media falls into the category of highly feasible for use. The following is a summary table of the media expert validation results.

**Table 2.** Results of the Media Expert Validation Test

No	Aspek	Total Score of Media Expert	Max Score	Percentage (%)
1	Software Engineering	15	15	100
2	Visual display	32	35	91,43
<b>Total</b>		<b>47</b>	<b>50</b>	
			<b>Average</b>	<b>95,71</b>

Source: Research 2025

Based on the results of the two validation tests that were conducted, the Educandy media and its supporting materials were declared feasible for use in the implementation stage, taking into account the notes in the form of suggestions and feedback from both experts.

### Effectiveness Test of the Use of Educandy Media

After passing the feasibility test, the Educandy media, along with its supporting materials, were implemented with fifth-grade students in three elementary schools: SDN Batu Ampar 08, SDN Dukuh 01, and SDN Kebon Pala 11. Subsequently, an effectiveness test of the Educandy media was conducted by calculating the significance of the difference in N-Gain between the pre-test and post-test scores, which had been integrated with 5 of the 6 critical thinking indicators (Analysis, Interpretation, Evaluation, Inference, Explanation).

**Table 3.** Results of Normality Test

School	Class	p-value
SDN Batu Ampar 08	Control	0,005
	Experiment	0,026
SDN Dukuh 01	Control	0,002
	Experiment	0,089
SDN Kebon Pala 11	Control	0,083
	Experiment	0,036

Source: Research (2025)

Based on the results of the normality test in **Table 3** using the Shapiro–Wilk, the control class at SDN Batu Ampar obtained a p-value of 0.005, while the experimental class obtained a p-value of 0.026; the results for both classes indicate that the data distribution is not normally distributed because the p-value is  $< 0.05$ . The control class at SDN Dukuh 01 obtained a p-value of 0.002, while the experimental class obtained a p-value of 0.089. The result for the control class indicates that the data distribution is not normally distributed because the p-value is  $< 0.05$ , whereas the experimental class indicates that the data distribution is normally distributed because the p-value is  $> 0.05$ . The control class at SDN Kebon Pala obtained a p-value of 0.083, while the experimental class obtained a p-value of 0.036. The result for the control class indicates that the data distribution is normally distributed because the p-value is  $> 0.05$ , whereas the experimental class indicates that the data distribution is not normally distributed because the p-value is  $< 0.05$ . By considering the results of the normality test across all classes and schools, the researcher then chose to conduct the effectiveness test of the Educandy media using the non-parametric Mann–Whitney U test.

**Table 4.** Mann-Whitney U Test Results

School	Class	n	Average N-Gain	Mean Rank	Z	p-value
SDN Batu Ampar 08	Control	30	0,077	22,53	-3,568	0,000
	Experiment	30	0,309	38,47		
SDN Dukuh 01	Control	30	0,187	25,27	-2,345	0,019
	Experiment	30	0,290	35,73		
SDN Kebon Pala 11	Control	20	0,146	17,53	-1,624	0,104
	Experiment	20	0,303	23,48		

Source: Research 2025

Based on the results of the effectiveness test in **Table 4** using the Mann–Whitney U test, SDN Batu Ampar 08 showed a significant difference in N-Gain scores between the control and experimental classes, with the experimental class having a higher average (Mean Rank) (38.47) than the control class (22.53), with a z value of  $-3.568$  and a p-value  $< 0.05$ . SDN Dukuh 01 also showed a significant difference in N-Gain scores between the control and experimental classes, with the experimental class having a higher average (35.73) than the control class (25.27), with a z value of  $-2.345$  and a p-value  $< 0.05$ . SDN Kebon Pala showed no significant difference in N-Gain scores between the control and experimental classes; although the experimental class had a higher average (23.48) than the control class (17.53), with a z value of  $-1.624$  and a p-value  $> 0.05$ , the statistical calculation results indicated that there was no significant difference.

Overall, the effectiveness test using the Mann–Whitney U test on the Educandy media showed positive results. It was found that 2 out of 3 schools tested showed a significant difference between the control and experimental classes, which proves that the use of the Educandy media at SDN Batu Ampar 08 and SDN Dukuh 01 was effective. Nevertheless, in one other school, it was found that there was no significant difference between the control and experimental classes, which indicates that the use of the Educandy media at SDN Kebon Pala 11 was not effective.

## Discussion

The research results indicate that the Educandy educational game learning media is generally effective in improving critical thinking skills. This success is clearly seen in two of the three schools, where the experimental classes showed statistically greater improvements than the control classes. The success of developing the Educandy media is in line with the objectives of the ADDIE development model, which aims to produce a product through a process of identifying potential problems, designing, and developing a product as the best solution to a particular problem or need (Waruwu, 2024).

Although the research results show overall effectiveness, it should be noted that there was one school that did not show a significant difference in the use of this media. This finding may have occurred due to several logical possibilities, such as differences in the students' initial cognitive levels across schools, differences in the number of students at SDN Batu Ampar 08 and SDN Dukuh 01 compared to SDN Kebon Pala 11 that led to different classroom learning experiences, differences in teachers' habits or practices in using learning media at each school, and differences in the availability of supporting facilities and infrastructure for the learning process.

The developed Educandy educational game learning media has been proven to be effective in improving students' critical thinking skills; however, it should be noted that the results may vary depending on contextual factors in the field. This study also presents new findings regarding the benefits of the Educandy platform in the learning process. It has been proven that Educandy, as a supporting medium, can improve

learning outcomes as well as students' enthusiasm and learning motivation (Amir *et al.*, 2024; Rahayu *et al.*, 2023). This study also confirms that Educandy can influence students' critical thinking skills. In fact, in a more in-depth and focused manner, the Educandy platform can still be developed more broadly (Audina & Ramadhan, 2025; Permana, 2022). By combining visual and audio elements and manipulation of commands or the use of this media, it has strong potential to influence various other aspects of learning. In its implementation in schools, teachers can adjust the use of the Educandy platform to the conditions and needs of the school, and its ease of development can also help teachers become familiar with and be creative in developing educational game-based learning media (Kurniawan *et al.*, 2025; Maryani, 2024; Nurbaya *et al.*, 2025).

The results regarding the level of effectiveness of Educandy are also related to the advantages inherent in educational games (Edu-Games). When Edu-Games are implemented, learning activities become more engaging and capture students' attention, especially elementary school students, help students understand difficult material through imagination or analogies within the game, and prevent students from becoming easily bored or fatigued during learning. These games can teach many skills and can be used as an alternative form of education (Pandiangan *et al.*, 2024). In addition, this educational game can also be used as an enjoyable learning medium and can increase students' learning motivation (Haque *et al.*, 2024; Kurniawati *et al.*, 2021).

However, on the other hand, there are several limitations in the use of Educandy, including the inability to access it without an internet connection, the need for a device to access it—thus requiring battery power or electricity—and the fact that the success of its implementation is highly dependent on the availability of supporting facilities in schools (Ifliadi, 2024; Kurniawan *et al.*, 2025; Lydia & Irfan, 2022). Matters related to digitalization are indeed highly dependent on the existing conditions of science and technology.

In addition to school facility conditions, the limitations of Educandy as an Edu-Game are also related to the challenges faced by teachers. This can be seen from classroom conditions that generally accommodate a large number of students, which requires teachers to find or select types of games that are preferred or of interest to students so that the objectives of using Edu-Games can be achieved (Durisa *et al.*, 2022; Rosarian & Dirgantoro, 2020). Therefore, the successful implementation of educational game-based methods requires support in the form of training for teachers or educators, as well as improvements or optimization of the facilities needed by schools (Ningsih, 2024).

However, with the current advancement of science and technology in Indonesia, it is expected that the general limitations of Educandy can be addressed. Thus, other shortcomings can serve as considerations for teachers in deciding whether to continue using it or to switch to other models or platforms. Despite the success of this research on the development of the Educandy educational game learning media, there are still several limitations that affected the stages of the development process and the research outcomes. The first limitation is that the focus of this study was solely on measuring the effectiveness of the media in improving critical thinking skills, without assessing the practicality of its use. The second limitation is that the instruments used to determine the final research results relied only on expert content validation and did not involve empirical validity testing on samples outside the research sample. The third limitation is that the sample was limited to only three schools, making the findings of this study still small in scale and requiring broader-scale development for further and more general testing.

## CONCLUSION

The results of this study imply that the development of the Educandy educational game learning media in improving the critical thinking skills of fifth-grade elementary school students was successful and can be empirically demonstrated. Through the use of this media, IPAS learning—particularly the topic of light, which is considered difficult because it requires students to recognize new terms and phenomena related

to light—can be taught to students with fairly good results. The researchers strongly believe that the development of the Educandy platform as a learning medium can be applied to almost all subjects, and they also hope that this study will motivate the application of this platform in other subjects and grade levels. Although it is relatively easy to use, the utilization and development of the Educandy platform still require teachers' accuracy and proficiency in analyzing student characteristics, accessing technology, and managing the classroom; this is necessary to ensure optimal achievement of learning objectives rather than the opposite. One factor that may hinder the use and development of the Educandy platform is its dependence on internet access to function, which may not be a serious obstacle for learning in cities with internet connectivity but can have a drastic impact on certain areas that are not covered by internet services.

## **AUTHOR'S NOTE**

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## **REFERENCES**

- Amir, N. F., Malmia, W., Magfirah, I., Andong, A., & Buton, S. (2024). Pemanfaatan media Educandy dalam peningkatan motivasi dan hasil belajar matematika siswa kelas V Sekolah Dasar. *Primatika: Jurnal Pendidikan Matematika*, 13(1), 1-8.
- Anugraheni, I. (2020). Analisis kesulitan mahasiswa dalam menumbuhkan berpikir kritis melalui pemecahan masalah. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 4(1), 261-267.
- Aprilia, Y., Darmiany, D., & Affandi, L. H. (2022). Analisis kesulitan guru dalam kegiatan pembelajaran pada era new normal di kelas rendah SDN 2 Beleka. *Jurnal Ilmiah Profesi Pendidikan*, 7(3c), 1892-1898.
- Audina, M., & Ramadan, Z. H. (2025). Pengaruh model game based learning berbantuan Educandy terhadap hasil belajar IPS siswa kelas IV sekolah dasar. *Cetta: Jurnal Ilmu Pendidikan*, 8(3), 457-467.
- Dewi, P. R. P. I., Wijayanti, N. M. W., & Juwana, I. D. P. (2022). Efektivitas penerapan media pembelajaran digital assembler edu pada mata pelajaran Matematika di SMK Negeri 4 Denpasar. *Jurnal Pengabdian kepada Masyarakat Widya Mahadi*, 2(2), 98-109.
- Durisa, A. I., Istiningsih, S., & Widodo, A. (2022). Menciptakan pembelajaran yang aktif, kreatif, efektif dan menyenangkan di sekolah dasar. *Elementary Journal: Jurnal Pendidikan Guru Sekolah Dasar*, 5(2), 55-63.
- Ferdianti, S., & Anwar, A. S. (2023). Pemanfaatan media pembelajaran Educandy berbasis games edukasi pada pelajaran Matematika untuk meningkatkan hasil belajar kognitif siswa kelas V SDN Cipicung. *Jurnal Lensa Pendas*, 8(1), 17-22.
- Firdausi, B. W., Warsono, W., & Yermiandhoko, Y. (2021). Peningkatan kemampuan berpikir kritis pada siswa sekolah dasar. *Jurnal Mudarrisuna: Media Kajian Pendidikan Agama Islam*, 11(2), 229-243.

- Fitriati, I., Purnamasari, R., Fitrianiingsih, N., & Irawati, I. (2021). Implementasi digital game based learning menggunakan aplikasi Educandy untuk evaluasi dan motivasi belajar mahasiswa BIMA. *Prosiding Seminar Nasional Penelitian dan Pengabdian 2021*, 1(1), 307-312.
- Hakim, M. F. Al, Sariyatun, S., & Sudiyanto, S. (2018). Constructing student`s critical thinking skill through discovery learning model and contextual teaching and learning model as solution of problems in learning history. *International Journal of Multicultural and Multireligious Understanding*, 5(4), 175.
- Handayani, N. F., Maruti, S. E., & Suprihatin, S. (2024). Penggunaan media pembelajaran Microsoft Sway untuk meningkatkan proses dan hasil belajar IPAS siswa kelas iv SDN Munggut 01 Madiun. *Populer: Jurnal Penelitian Mahasiswa*, 3(4), 13-20.
- Haque, M. I. Z. U., Fachrezi, M. A., & Hadiapurwa, A. (2024). Gamifikasi pembelajaran dan pengaruhnya terhadap motivasi belajar mahasiswa. *Jurnal Pembelajaran Inovatif*, 7(1), 58-70.
- Hikmah, N., Ilhamdi, M. L., & Astria, F. P. (2023). Pengembangan media pembelajaran monopoli pintar berbasis permainan edukasi pada mata pelajaran IPA kelas V sekolah dasar. *Jurnal Ilmiah Profesi Pendidikan*, 8(3), 1809-1822.
- Ifliadi, I. (2024). Pemanfaatan media pembelajaran Educandy di sekolah dasar. *Prosiding Seminar Nasional Keguruan dan Pendidikan (SNKP)*, 2(1), 95-101.
- Jian, C. (2023). A Study on the teaching practice of advanced English ideological and political education based on ADDIE model. *Journal of Education and Educational Research*, 2(1), 130-132.
- Khairani, P., Khadavi, M., & Salsyabillah, M. (2023). Pembelajaran berbasis game: Manfaat, tantangan, dan strategi implementasi dalam konteks pendidikan tinggi pada Akademi Keuangan Perbankan Nusantara (AKUBANK). *Jurnal Pendidikan Penggerak*, 1(1), 1-6.
- Khoiri, N., Perdana, W. A., & Wijayanto. (2023). Edu-game application based-android quantity and unit concepts using game engine constructs 2. *Jurnal Penelitian Pendidikan IPA*, 9(7), 5281-5288.
- Kurniawan, A., Feronika, A., Liandri, T. W., Puspita, T. I., Novianti, T., Sagita, T., ... & Salmainsi, S. (2025). Game-based learning with educandy to improve Indonesian language learning outcomes of grade V elementary school students. *Tofedu: The Future of Education Journal*, 4(6), 1598-1603.
- Kurniawati, L., Ganda, N., & Mulyadiprana, A. (2021). Pengembangan media pembelajaran berbasis permainan monopoli pada pelajaran IPS SD. *Pedadidaktika: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 8(4), 860-873.
- Lydia, E., & Irfan, A. M. (2022). Penerapan pembelajaran digital pada materi peralatan dan bahan las listrik untuk meningkatkan minat belajar siswa. *Jurnal Pendidikan Teknologi Pertanian*, 8(2), 179-186.
- Mahrus, M. (2021). Manajemen kurikulum dan pembelajaran dalam sistem pendidikan nasional. *Jieman: Journal of Islamic Educational Management*, 3(1), 41-80.
- Maryani, E. (2024). Pembelajaran berdiferensiasi dalam upaya peningkatan kosa kata peserta didik menggunakan media Educandy di SMP. *Jurnal Pendidikan: Edukasi Kusuma Bangsa*, 6(2), 50-58.
- Masjudin, M. (2020). Manfaat media teknologi dalam upaya meningkatkan prestasi belajar siswa pada pembelajaran pendidikan agama Islam. *Jurnal Penelitian Tarbawi: Pendidikan Islam dan Isu-Isu Sosial*, 5(2), 32-44.
- Muhamad, R., Mahmud, M., & Bahsoan, A. (2023). The use of learning media on students' learning outcomes. *Journal of Economic and Business Education*, 1(1), 30-35.

- Mulyani, S., Nurmeta, I. K., & Maula, L. H. (2023). Analisis implementasi profil pelajar Pancasila di sekolah dasar. *Jurnal Educatio FKIP UNMA*, 9(4), 1638-1645.
- Ningsih, E. P. (2024). Analisis peran pembelajaran berbasis permainan dalam meningkatkan partisipasi siswa pada pelajaran PJOK. *Journal of Salutare*, 1(1), 28-34.
- Nurbaya, N., Paida, A., & Ratnawati, R. (2025). Educandy-based media improves activeness and reading comprehension in grade V students. *Indonesian Journal of Innovation Studies*, 26(4), 10-21070.
- Nurjanah, S., Dea, L. F., & Anwar, M. S. (2022). Development of games online features Educandy to children aged 5-6 years. *Bulletin of Early Childhood*, 1(1), 1-19.
- Pandiangan, E. L., Umami, K., & Riski, M. (2024). Pelatihan penggunaan media pembelajaran berbasis permainan (digital game based learning) menggunakan aplikasi Kahoot bagi guru Madrasah MIN 3 Langkat. *Jurnal Pengabdian Masyarakat Indonesia*, 3(2), 25-35.
- Permana, N. S. (2022). Game based learning sebagai salah satu solusi dan inovasi pembelajaran bagi generasi digital native. *JPAK: Jurnal Pendidikan Agama Katolik*, 22(2), 313-321.
- Pitriyana, S., & Razali, M. (2024). Analisis penerapan media digital interaktif dalam pembelajaran Matematika untuk meningkatkan pemahaman konsep kalkulus pada mahasiswa. *AFoSJ-LAS*, 4(4), 79-85.
- Pradana, D., Nur, M., & Suprpto, N. (2020). Improving critical thinking skill of junior high school students through science process skills based learning. *Jurnal Penelitian Pendidikan IPA*, 6(2), 166-172.
- Pratomo, I. C., & Herlambang, Y. T. (2021). Urgensi keluarga dalam pendidikan karakter. *Jurnal Pedagogik Pendidikan Dasar*, 8(1), 7-15.
- Rahayu, D., Muttaqien, M., & Solikha, M. (2023). Pengaruh model pembelajaran discovery learning berbantu Educandy terhadap hasil belajar siswa. *Jurnal Edukasi*, 1(2), 234-246.
- Ritonga, N., Sakdiah, H., Gultom, B., Nazliah, R., Studi, P., Biologi, P., & Keguruan, F. (2020). Kemampuan berpikir kritis dalam proses pembelajaran IPA melalui pendekatan keterampilan. *Jurnal Pendidikan Sains dan Aplikasinya (JPSA)*, 3(2), 41-45.
- Rosarian, A. W., & Dirgantoro, K. P. S. (2020). Upaya guru dalam membangun interaksi siswa melalui metode belajar sambil bermain. *Johme: Journal of Holistic Mathematics Education*, 3(2), 146-163.
- Rosmana, P. S., Iskandar, S., Rahma, A. R., Maria, S., Supriatna, S., & Wahyuningtyas, T. (2023). Efektivitas penggunaan media pembelajaran digital pada hasil belajar siswa kelas 5 SDN 6 Nagrikaler. *Jurnal Sinetik*, 6(1), 10-17.
- Rosyiddin, A. A. Z., Fiqih, A., Hadiapurwa, A., Nugraha, H., & Komara, D. A. (2023). The effect of interactive PowerPoint media design on student learning interests. *Edcomtech: Jurnal Kajian Teknologi Pendidikan*, 8(1), 12-24.
- Salam, N., Suyanto, S., & Ningsih, S. N. (2024). Maximizing the potential of digital learning media in primary education: Insights from a systematic literature review. *Indonesian Journal of Educational Research and Review*, 7(3), 615-629.
- Setiana, D. S., & Purwoko, R. Y. (2020). Analisis kemampuan berpikir kritis ditinjau dari gaya belajar Matematika siswa. *Jurnal Riset Pendidikan Matematika*, 7(2), 163-177.

- Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A comparative study of the ADDIE instructional design model in distance education. *Information*, 13(9), 1-20.
- Suryani, D., Winardi, S., & Mas Diyasa, I. (2021). Aplikasi permainan edukasi anak mengeja dalam bahasa Inggris (spelling & fun) berbasis Android. *Scan: Jurnal Teknologi Informasi dan Komunikasi*, 16(1), 21-26.
- Triwulandari, S., & Supardi, S. (2022). Analisis inteligensi dan berpikir kritis. *Utile: Jurnal Kependidikan*, 8(1), 50-61.
- Wahyuni, N., Djonaidy, S., Miladiyenti, F., Fitria, N., & Ramadhani, A. P. (2022). Pemanfaatan aplikasi Educandy sebagai integrasi technology-based learning strategies untuk meningkatkan motivasi dan keterlibatan siswa SMK dalam pembelajaran bahasa Inggris. *Jurnal Abdimas: Pengabdian dan Pengembangan Masyarakat*, 4(1), 51-57.
- Waruwu, M. (2024). Metode penelitian dan pengembangan (R&D): Konsep, jenis, tahapan dan kelebihan. *Jurnal Ilmiah Profesi Pendidikan*, 9(2), 1220-1230.

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