

Development Of Educaplay-Based Educational Game Media in Ipas Subject On Energy Around Us for Grade 3 SDN Bulang 1

Fitri Yuliatin¹, Didit Yulian Kasdriyanto^{2*}, Faridahtul Jannah³

¹Elementary School Teacher Education Study Program, Universitas Panca Marga, Indonesia;
e-mail: fitriyuliatin05@gmail.com

²Elementary School Teacher Education Study Program, Universitas Panca Marga, Indonesia ;
e-mail: didityulian@upm.ac.id

³Elementary School Teacher Education Study Program, Universitas Panca Marga, Indonesia;
e-mail: faridahtul@upm.ac.id

* Corresponding Author: didityulian@upm.ac.id

Abstract. This study aims to develop an Educaplay-based educational game for the Natural and Social Sciences (IPAS) subject specifically the topic of "energy around us" for third-grade students at SDN Bulang 1, and to determine the validity, practicality, and effectiveness of the developed media. The study was motivated by low student learning outcomes, a lack of instructional media usage, and a teaching process that remained teacher-centered. The research employed the Research and Development (R&D) method using the ADDIE model, which comprises five stages: Analysis, Design, Development, Implementation, and Evaluation. Data collection instruments included expert validation sheets, practicality questionnaires, and learning outcome tests. The results indicate that the developed Educaplay-based educational game achieved a very high level of validity, with validation scores of 92% from the subject matter expert and 95% from the media expert. The media's practicality was also rated very highly, with a 100% score from the class teacher and a 94.8% positive response from students. Furthermore, effectiveness testing showed an improvement in student learning outcomes; the average pretest score rose from 61.12 to 90.54 in the posttest, yielding an N-Gain score of 0.76, which falls into the high category. Based on these results, the Educaplay-based educational game is deemed highly valid, highly practical, and effective for use in third-grade IPAS instruction on the topic of energy around us.

Keywords: Educaplay; Educational Games; En-ergy Around Us; IPAS (Natural and Social Sciences); Learning Media.

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1. Introduction

Education is a process aimed at transmitting knowledge, skills, and values from one generation to the next. This process unfolds through various means, including formal classroom instruction, out-of-class learning experiences, and social interactions. The focus of education extends beyond academics to encompass the development of personal ethics and social skills,

as well as preparing individuals to make positive contributions to society (Putri et al., 2025). In line with educational goals, education systems across every era undergo continuous renewal and development to meet the demands of the times. In the digital era, the quality of education must be enhanced to ensure easy accessibility for all segments of society.

Rapid technological advancements in the 21st century have significantly impacted the educational landscape, driving the emergence of educational technology as a tool to address various challenges within the learning process. The evolution of digital technology has profoundly influenced numerous aspects of life, including education (Kasdriyanto et al., 2025). Today's students grow up in an environment saturated with digital technology, making them accustomed to accessing information quickly across a variety of channels. This reality necessitates that the education sector and teachers in particular adapt to these changes. Teachers face increasingly complex demands in the digital era; they are required to

continuously enhance their technological capabilities and skills, not only to facilitate learning but also to create innovative, interactive, and engaging educational experiences for their students (Andi Sadriani et al., 2023).

Learning media encompasses the various tools and resources used in the teaching-learning process to convey messages and information, thereby helping students understand the subject matter. These media serve as a bridge between educators and learners, making lessons clearer, more engaging, and less monotonous. Through the use of such media, complex concepts can be presented in a simplified manner, enabling students to grasp the core of the lesson more effectively (Nurhidayati et al., 2023). In the era of Society 5.0, the use of digital learning media has become essential to align the learning process with the characteristics of Generation Alpha students. One relevant example is educational learning media classified as interactive media which can enhance student engagement in learning (Hafizah, 2023).

Under the Kurikulum Merdeka (Independent Curriculum), a new learning method has been introduced for the Natural and Social Sciences (IPAS) subject. IPAS encompasses a field of study that integrates natural sciences (IPA) with social sciences (IPS). This subject examines living organisms and their relationships with the environment and the universe, as well as the existence of humans as social beings. IPAS instruction aims to help students understand natural and social phenomena in an integrated and contextual manner, enabling them to recognize the interconnections between the natural world and social conditions within their daily experiences (Donna Meylovvia, 2023).

Observations conducted on November 5, 2025, at SDN Bulang 1 revealed several issues regarding the teaching of Natural and Social Sciences (IPAS) specifically the "Energy Around Us" unit for third-grade students. These issues included a reliance on the teacher as the sole source of information, the use of classroom textbooks as the only learning resource, and a lack of effective instructional media. Consequently, student learning outcomes were poor, with an average score of 40 falling short of the established Minimum Mastery Criterion (KKM) of 70. This is despite the availability of various software applications that could serve as creative and engaging educational tools. The teacher had not utilized digital media such as educational games which could actually help improve student learning outcomes and boost student interest in the "Energy Around Us" topic. In today's rapidly evolving digital era, integrating technology into learning activities has become essential. Elementary school students, particularly those in the third grade, show a strong interest in technology; they tend to be more motivated and actively engaged when lessons are presented through media that is engaging, varied, and interactive.

This is further supported by research conducted by Yustiana et al. (2021), titled "The Application of the Educaplay Educational Game on the Science and Social Studies (IPAS) Topic of 'Forms of Energy' to Improve Learning Outcomes for Grade 3 Elementary School Students." The study developed Educaplay educational media to support instruction on the topic of energy forms; utilizing a classroom action research method, learning outcomes improved from a pre-cycle average of 59.6% to 77.8% in Cycle I and 86.1% in Cycle II. The study concludes that using the Educaplay educational game as a learning medium in IPAS lessons can enhance student learning outcomes.

2. Literature Review

Learning Media

The learning process is a communicative activity between the teacher and the students. The teacher is responsible for conveying the material, while the students receive and comprehend it. This process aims to ensure the effective delivery of information and the achievement of learning objectives shared by both the teacher and the students. Similarly, Hasan (2021:27) defines instructional media as tools or resources employed during learning activities to convey teaching materials to students in a more understandable manner, thereby enhancing the effectiveness of the teaching and learning process.

Digital Educational Games

In general, educational games are designed to support the learning experience by enhancing cognitive skills, sharpening focus, and fostering problem-solving abilities. These games serve as a learning medium that integrates game elements with educational content, making the learning process more engaging and helping to expand the learners' knowledge. According to Wibawanto, educational games are activities specifically designed to integrate educational content aimed at enhancing learners' skills, thereby creating a unique, enjoyable, and satisfying learning experience. Consequently, the material presented by educators can be

conveyed through these games, facilitating students' understanding and mastery of the topics being taught (Najuah, 2022:5).

Educaplay

Educaplay is a web-based learning platform offering a variety of interactive activities to help teachers and students reinforce their understanding of the material being studied. The platform provides various features that teachers can utilize to create educational games tailored to specific learning needs. Examples of educational games available on Educaplay include quizzes, crossword puzzles, "jumping frog" games, image-based Q&A activities, and many more (Batitusta & Hardinata, 2024).

IPAS Learning

Natural and Social Sciences (IPAS) is an integrated subject designed to enhance students' analytical and reasoning skills. Instruction in IPAS focuses on providing meaningful learning experiences while simultaneously developing various student competencies. Under the Kurikulum Merdeka (Independent Curriculum), science and social studies content is combined into a single subject: Natural and Social Sciences (IPAS). Because the learning material relates directly to everyday experiences, students find it easier to grasp the concepts taught (Yustiana et al., 2021).

Energy Around Us Material

Energy is the capacity of an object or living being to perform work or engage in activity. The greater the activity, the more energy is required or consumed. Energy manifests in various forms encountered in daily life: Heat Energy, Heat energy can originate from the sun, fire, or the friction between two objects. Heat energy allows humans to warm their bodies and dry items such as clothing and foods like fish, salt, and crackers. Additionally, heat energy is used for cooking. Light Energy, Light energy originates from light sources. It plays a crucial role in human activity, as the absence of light would result in total darkness. Light energy is the only form of energy that is visible to the eye. Electrical Energy. Electrical energy is the form of energy most widely utilized by humans, primarily because it can be converted into other forms of energy. It is generated by electrically charged objects and flows through conductive materials. Examples include its use in lamps, televisions, computers, and other devices. Motion Energy. Motion energy is the energy possessed by moving objects; it is also known as kinetic energy. Examples of devices that generate motion energy include electric drills, fans, blenders, and windmills. Sound Energy. Sound energy is the energy emitted by objects that produce sound. Sound reaches our ears because it travels through the air; consequently, no sound can be heard in a vacuum. Chemical Energy. Chemical energy is abundant in food and fuels. Examples include the food we consume daily and fuels such as gasoline, diesel, kerosene, and firewood.

3. Research Methods

Types of Research

This study employs the Research and Development (R&D) method. This approach is utilized to gather information serving as the foundation for the design, development, and practicality assessment of an educational product (Gustina et al., 2024). The development model adopted is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This model serves as a productive and efficient framework for fostering engagement among teachers, students, and the educational environment (Nurhikmah et al., 2023). Analysis Phase. This phase involves observing the school environment and interviewing teachers to identify current challenges. The study was conducted at SDN Bulang 1 in Bulang Village, Gending District, Probolinggo Regency. Interview results indicated that students lacked interest in lessons due to a lack of diverse learning resources, and teachers rarely utilized instructional media during IPAS (Natural and Social Sciences) lessons. Design Phase. In this phase, the researcher developed game-based learning materials using Educaplay, specifically selecting the "Froggy Jumps" game. The learning media focused on the theme of "Energy Around Us," covering definitions, types of energy, and energy transformations, accompanied by examples. Development Phase. This phase involved creating the Educaplay product focused on the "Energy Around Us" theme and validating the product through subject matter and media experts. Implementation Phase. This phase involved implementing the Educaplay-based educational game at SDN Bulang 1. The trial subjects consisted of the Grade III teacher and all 17 Grade III students at the school. Evaluation Phase. In this phase, the validated teaching materials were evaluated and refined to ensure the product was valid and effective for use.

Test Subject

The test subjects involved in this implementation were media experts, subject matter experts, a third-grade teacher, and students. The teacher and students evaluated the practicality and effectiveness of the developed media, while the media and subject matter experts evaluated the product's validity.

Data Collection Instruments

The instruments used in this study were a subject matter expert validation sheet, a media expert validation sheet, a user (teacher) validation sheet, a student response questionnaire, and pretest and posttest questions.

Data Analysis Techniques

Data analysis in this study employs quantitative and qualitative analysis methods.

Analysis of Validity and Practicality

The validity of learning media is determined using the following formula adapted from (Aulia & Mintohari, 2023):

$$P = \frac{\sum x}{\sum x_i} \times 100 \% \dots\dots\dots (i)$$

P = feasibility percentage, $\sum x$ = total sum of evaluator response scores, $\sum x_i$ = sum of maximum scores, The validity criteria are as follows: 81%–100% (highly valid), 61%–80% (valid), 41%–60% (moderately valid), 21%–40% (low validity), and 0%–20% (invalid).

Effectiveness Analysis

The effectiveness of the media is calculated using the following formula (Aulia & Mintohari, 2023):

$$g = \frac{T_{maks} - T_1 T_1' - T_1}{T_{maks} - T_1 T_1' - T_1} \dots\dots\dots (ii)$$

g = N-Gain score, T_1 = pretest score, T_1' = posttest score. Effectiveness criteria consisting of: High ($0.7 < g \leq 1.0$), Moderate ($0.3 < g \leq 0.7$), and Low ($0.0 < g \leq 0.3$).

4. Results and Discussion

Analysis Phase

The analysis phase was conducted through observation and interviews at SDN Bulang 1, Probolinggo Regency. The results indicate that the teaching and learning process for the Natural and Social Sciences (IPAS) subject is still dominated by the use of textbooks and lecture methods, resulting in limited variety in instructional media. This situation has led to low student interest, motivation, and understanding regarding the concept of energy. Therefore, it is necessary to develop more interactive educational media to help students understand various forms of energy and to improve learning outcomes.

Design Phase

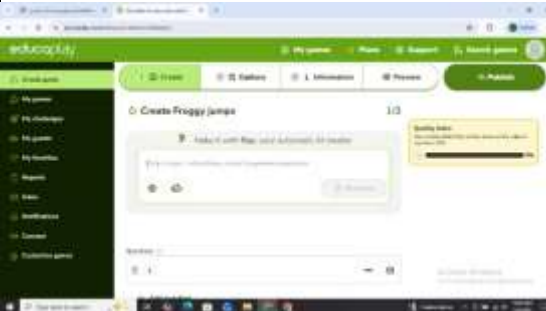
At this stage, the researcher developed learning media designed for use on the Educaplay platform by selecting the "Froggy Jumps" game. The learning media focused on the theme of energy around us, covering the definition of energy, types of energy, energy transformations, and examples from daily life.

Development Phase

At this stage, the researcher creates and refines the media based on the plan using the Educaplay website. The media creation process is as follows:

Table 1. How to Make An Educaplay Game.

Number	Feature Overview	Information
1.		How teachers or users can initially visit the Educaplay website via Google. https://www.educaplay.com/resource-editor/
2.		Upon accessing the website, teachers or users will be prompted to register or log in first to facilitate easy access to Educaplay games.
3.		Then, the user/teacher clicks "Sign Up For Free" to register for a free account.
4.		Next, enter the details required for registration and login; you can sign up or log in using a Facebook account, Google account, or email. After filling in the fields, check the option below them and click "Sign Up."
5.		Once the user or teacher has logged into the Educaplay dashboard, they can start an activity by clicking "New Game".

6.		After clicking "New Game," the user—such as a teacher—is presented with 18 game types. At this stage, the user can select the type of game they prefer; here, I have chosen "Froggy Jumps."
7.		Next, the user/teacher can assign a title based on the subject and the material.
8.		Next, the user/teacher can assign a title based on the subject and the material.
9.		Then, the user/teacher clicks "Add Question" to add another question.
10.		After entering the questions and answers, click "Optimal" to set the game duration.

11.		Then, the user or teacher can publish it by clicking the top-right corner.
12.		This is a game that has already been published.
13.		Next, the game can be shared with students by distributing a link or QR code.
14.		Refer to the image on the side to view the scores achieved by the students.

Once the product has been developed, the next step is to validate it. This validation process involves submitting the Educaplay-based educational media materials to subject matter experts and media experts to assess the product's validity.

Implementation Phase

The implementation phase aims to evaluate the effectiveness of the learning materials. This phase was conducted at SDN Bulang 1. The assessment of validity is based on feedback obtained from surveys completed by teachers and students after they used the Educaplay learning tools.

Evaluasi Phase

At this stage, the previously validated teaching materials undergo evaluation and refinement to ensure the product is more valid and effective for use in teaching the "energy around us" concept within the IPAS (Natural and Social Sciences) curriculum.

Validitas Produk

Media Expert Validation. Media validation was conducted by Shofia Hattarina, S.Pd., M.Pd., a lecturer at the Faculty of Teacher Training and Education, Universitas Panca Marga.

Table 2. Media Expert Validation Result.

Validator	Percentage	Category
Media Expert	94%	Higly Valid

The validity percentage is calculated as follows:

$$P = 6057 \times 100\% = 95\% \dots\dots\dots (iii)$$

The research results indicate that the Educaplay-based educational game learning medium developed falls into the "highly valid" category and is suitable for implementation in the classroom. Subject Matter Expert Validation. Content validation was conducted by Dr. Ani Anjarwati, S.Pd., M.Pd., a lecturer at the Faculty of Teacher Training and Education, Universitas Panca Marga.

Table 3. Subject Matter Expert Validation Results The Validity Percentage Is Calculated As Follows.

Validator	Percentage	Category
Subject matter expert	92%	Higly Valid

$$P = 5046 \times 100\% = 92\% \dots\dots\dots (iii)$$

The research results indicate that the learning material contained in the media is highly appropriate and suitable for use in teaching activities. Practitioner Validation Teacher Practicality. The practicality assessment was conducted by the third-grade teacher at SDN Bulang 1.

Table 4. Teacher Practicality Results The Validity Percentage Is Calculated As Follows:

Validator	Percentage	Category
teacher	100%	Higly Valid

$$P = 5555 \times 100\% = 100\% \dots\dots\dots (iv)$$

The research results indicate that the developed learning media is highly practical and easy to implement in classroom instruction. Student Practicality The practicality of the learning media was assessed through a student response questionnaire given after the implementation of the educaplay game learning media.

Table 5. Student Practical Work Results The.

Validator	Percentage	Category
student	94,8%	Higly Valid

$$P = 1020967 \times 100\% = 94,8\% \dots\dots\dots (v)$$

Product Effectiveness

Pre-test results, Before using the Educaplay-based educational game, students completed a pre-test to assess their prior knowledge of the topic "Energy Around Us." The total score obtained by the 17 participating students was 1,039. Average pre-test score = $1,039 \div 17 = 61.12$, Post-test results. After using the developed learning media, the students completed a post-test. The total score obtained by the students was 1,539.2. Average post-test score = $1,539.2 \div 17 = 90.54$

Table 6. comparison of pretest and posttest results.

Data	Pre-test	Post-test
number of students	17	17
average score	61,12	90,54
N-Gain	0,76 (tall)	

The research results indicate a significant improvement in student learning outcomes. The average score rose from 61.12 on the pretest to 90.54 on the posttest. The N-Gain score of 0.76 falls into the high category. Based on effectiveness criteria, the developed Educaplay-based learning media is categorized as highly effective in improving student learning outcomes.

The results of this study indicate that the Educaplay-based educational game, developed using the ADDIE model, meets the requirements for validity, practicality, and effectiveness. Media and subject matter experts awarded validity scores of 95% and 92%, respectively, classifying the game as highly valid. These results demonstrate that the developed material meets criteria regarding instructional suitability, design, language usage, and content quality.

Teachers and students achieved scores of 100% and 94.8%, respectively, in the practicality evaluation. These findings indicate that the learning medium is user-friendly, engaging, and conducive to learning. Student focus and engagement during learning activities were effectively enhanced through the inclusion of animations, images, and contextual challenges. Effectiveness analysis revealed a significant improvement in student achievement. The average score rose from 61.12 in the pretest to 90.54 in the posttest, yielding an N-Gain score of 0.76 (high category). These results demonstrate that students' understanding of energy in their surroundings was successfully improved through the Educaplay-based educational game. These findings align with previous research by Yustiana et al. (2021), who

found that implementing Educaplay educational games for the "forms of energy" topic in the IPAS (Natural and Social Sciences) curriculum successfully improved learning outcomes for third-grade elementary students; average scores increased from 59.6% in the pre-cycle to 77.8% in Cycle I and 86.1% in Cycle II. Research by Suryaningsih & Dahlan (2025) also indicates that the use of Educaplay interactive media has a positive impact on the science learning outcomes of fifth-grade elementary students. Therefore, it can be concluded that the Educaplay-based educational game regarding energy in our surroundings is valid, practical, and effective for use in third-grade elementary IPAS instruction, based on the results of validation, user feedback, and improved learning outcomes.

5. Conclusions And Suggestions

Based on the research and development process, it can be concluded that an Educaplay-based educational game regarding "energy around us"—designed for third-grade students at SDN Bulang 1 was successfully developed using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The developed learning medium was rated as highly valid, evidenced by validation results from media experts (95%), subject matter experts (92%), and practitioners (100%), all of whom confirmed its suitability regarding content, presentation, design, and instructional quality. Furthermore, the medium proved to be highly practical; student response questionnaires yielded a score of 94.8%, indicating that the game was engaging, user-friendly, and well-received during the learning process. Effectiveness tests also demonstrated a significant improvement in student learning outcomes, evidenced by an increase in the average score from 61.12 on the pretest to 90.54 on the posttest, with an N-Gain score of 0.76, placing it in the high category. Additionally, the Educaplay-based educational game successfully enhanced students' understanding of energy in their surroundings, stimulated their curiosity, and encouraged active participation throughout the learning activities. Therefore, the developed medium is recommended as an innovative, engaging, and effective learning tool for Natural and Social Sciences (IPAS) instruction in elementary schools.

Based on the findings of this study, several recommendations are proposed. Teachers are encouraged to utilize Educaplay-based educational games as an alternative instructional medium to create a more engaging, interactive, and student-centered learning experience, thereby enhancing students' understanding, motivation, and participation in classroom activities. Schools are expected to provide adequate technological facilities and infrastructure to support the development and implementation of innovative learning media, which can improve the quality of the teaching and learning process while encouraging teachers to develop creative learning materials. Future researchers are advised to develop Educaplay-based learning media for various subjects, topics, and educational levels, and to conduct studies with larger sample sizes and broader implementation settings to obtain more comprehensive evidence regarding the effectiveness of the developed media. Furthermore, students are encouraged to actively use Educaplay-based educational games both inside and outside the classroom as an interactive and enjoyable tool for independent learning.

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