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Volta Drive Connect: Science Kit to Stimulate the Elementary Students in Sustainable Development

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Abstract
The goal of this research is to develop the Volta Drive Connect science kit to increase energy literacy and inspire students to play a role in sustainable development. Volta Drive Connect consists of three levels with different components and levels of assembly difficulty. The research methodology uses developmental research with the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The analysis phase involves the identification of learning needs and student characteristics. Instruments used are performance rubrics, observations, interviews, and documentation. The evaluation of the effectiveness of the teaching kit was carried out using a paired samples test comparing student learning outcomes before and after using Volta Drive Connect. The test results show a significance value of 0.000 ($p < 0.05$), indicating a significant difference between the pre-test and post-test. Students' energy literacy increased significantly between before and after implementing Volta Drive Connect. Qualitative analysis of observation and interview data revealed increased learning motivation and student engagement during the use of the kit. Minor technical challenges identified during implementation were noted for improvement in future iterations of the kit. The development of Volta Drive Connect was successful in creating a learning medium that is effective in increasing energy literacy, and aligned with the goals of the SDGs.

Keywords: *Volta Drive Connect, SDGs, Energy literacy, Science KIT*

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1. Introduction

One of the Sustainable Development Goals (SDGs) is the objective of achieving a "Golden Indonesia," which includes the increase of renewable and clean energy sources [1]. A solution to energy problems in Indonesia has yet to be proposed or adopted. The utilization of fossil fuels and coal is perceived to have a detrimental impact on the environment and to result in a reduction in the quantity of available energy sources [2]. The realization of the SDGs can be facilitated through educational initiatives. One of the learning outcomes of natural science subjects in learning energy transformation in elementary grade 4 is that students can recognize sources and forms of energy, as well as explain the process of energy changes that occur in everyday life. It is expected that students will be able to identify the process of changing states of matter and energy and use the appropriate tools and materials to collect accurate data.

Indonesia is currently experiencing an energy crisis, which can be attributed to a number of factors, including high energy consumption, a decline in resources, and a reliance on fossil fuels. The crisis is the result of a confluence of factors, including excessive consumption, pressure on natural resources, and limited fossil energy [3]. To address the energy crisis, the deployment of renewable energy sources, including sunlight, wind, and water, represents a crucial approach. Indonesia has considerable potential for the development of solar energy sources, yet the utilization of solar energy has not been fully realized [4]. Consequently, the rapid adoption of renewable energy sources, coupled with the advancement of energy efficiency measures and the development of energy storage technology, represent pivotal strategies for effectively addressing the energy crisis in Indonesia [5].

The concept of energy conservation has not yet been fully comprehended by the general public in Indonesia. The instilling of values pertaining to energy conservation awareness in the school environment represents a promising avenue for initiating energy-saving activities. Teachers can facilitate the acquisition of informed knowledge, positive attitudes, and appropriate behaviors regarding energy consumption [6]. Energy-saving education and the utilization of renewable energy can be accomplished through the enhancement of students' energy literacy. A possible approach to be implemented in educational institutions is the development of science kits, which can be utilized as independent student projects.

A number of studies have been conducted to investigate the development of educational resources focused on renewable energy. Firstly, the energy experiment teaching kit at SDN Ajung 01 Kalisat was developed in the form of various renewable energy kits designed by teachers to introduce alternative types of energy interactively. The findings of the research indicate that the energy kit facilitates the comprehension of concepts and knowledge related to renewable energy. It should be acknowledged that the development of this kit still has shortcomings, given that it is still in the demonstration phase [7]. Secondly, the development of the Solar Cell Teaching Kit (SOCET), which is a teaching tool for energy conversion materials. The demonstration is presented in the form of a kit, which the teacher uses to demonstrate energy conversion. One limitation of this research is that the demonstration is still in prototype form [8]. Third, the development of renewable energy teaching aids for high school students in the form of a miniature house with a solar and mechanical energy source on the roof. The objective of this teaching aid is to facilitate students' comprehension of the "energy harvesting" process, encompassing the conversion of electrical energy, storage of electrical energy, and its utilization in everyday life [9]. Among the outcomes of this research, there has been no evidence of the development of project-based teaching kits designed by students, either independently or with guidance. The development of teaching kits at the elementary school level is also still limited. Consequently, the development of teaching kits that encourage students to assume an active role is of great importance.

Today, schools rarely use kits especially in science learning. The existing kits are science kit packages produced in the 90s that are outdated and never used. The Volta Drive Connect is the result of a project-based science kit designed for use in the context of science and technology learning about energy transformation. The kit contains several toy car components that are powered by solar energy. Students must then assemble the available components into a toy car that can be driven by solar energy. The objective of the Volta Drive Connect development is to enhance students' energy literacy, assess the efficacy of the kit, and engage students in the pursuit of sustainable development. It is anticipated that the implementation of Volta Drive Connect will enhance students' comprehension and understanding of solar energy utilization, cultivate creativity, and motivate students towards academic achievement and engagement.

In the long term Volta Drive Connect is designed to facilitate the achievement of the Sustainable Development Goals (SDGs) with regard to the provision of clean and affordable energy. In more specific terms, the development of Volta Drive Connect can stimulate students in several ways. These include: a) increasing energy literacy, namely students can understand the concept of renewable energy and its use in sustainable development; b) introducing the concept of solar energy-based technology; c) improving practical skills through hands-on activities, namely assembling the Volta Drive Connect; d) increasing environmental awareness, students understand the benefits of using renewable energy in reducing carbon footprints; and e) increasing students' interest in science and technology. It is anticipated that the research findings will provide information, theoretical insight, and factual evidence that can inform policymakers' decision-making regarding the development of energy literacy education at various educational levels.

2. Methods

This research is included in development research with the ADDIE model design. Volta Drive Connect represents a novel approach to developing science kits at the elementary school level. The development of Volta Drive Connect was implemented with the objective of enhancing energy literacy among elementary school students, thereby providing support for the realization of Indonesia's SDGs goals by the year 2030. The ADDIE model comprises five phases: The five phases of the ADDIE model are as follows: 1) Analysis; 2) Design; 3) Development; 4) Implementation; and 5) Evaluation [10]. The research stage is comprised of five phases. The subsequent research stages are as follows.

2.1. Analysis (Analyse)

One of the materials in grade 4 elementary school is material on energy sources. The initial observations conducted with a sample of elementary school students from various schools revealed the following: a) 80% of students expressed a preference for project-based activities; b) 53% of students demonstrated a lack of understanding regarding the use of alternative energy; c) 90% of learning about energy was found to be still theoretical; and d) the development of teaching kits at the elementary school level was found to be still limited. The findings of these preliminary observations served as the foundation for the subsequent analysis of students' learning needs in the context of energy transformation. It is evident that students require project-based activities to enhance their understanding of renewable energy.

2.2. Designs (Design)

a. Volta Drive Connect Level 1 (Low)

The principal component of Volta Drive Connect Level 1 is a solar panel, which is capable of movement only when exposed to direct sunlight. The Volta Drive Connect Level 1 prototype is described in Figure 1.

Figure 1. Volta Drive Connect Level 1

The Volta Drive Connect level 1 product is designed with a simplest design and components. The toy agency employs the use of second-hand goods in order to facilitate the achievement of the SDGs goals of responsible consumption and production.

b. Volta Drive Connect Level 2 (Medium)

In addition to the previously described components, Volta Drive Connect level 2 includes a storage battery. At this level, the toy car is capable of movement indoors due to the storage of solar energy in the battery. The Volta Drive Connect level 2 prototype is explicated in Figure 2 as follows. Similarly to the Volta Drive level 1, at this level the toy body also employs recycled materials. The selected items for reuse should be robust and substantial, such as shampoo bottles, lotion bottles, powder containers, and so on.

Figure 2. Volta Drive Connect Level 2

c. Volta Drive Connect Level 3 (High)

The Volta Drive Connect level 3 is more challenging than the preceding levels due to its incorporation of applications and programming. In addition, the components are more complicated and numerous. The Volta Drive level 3 prototype is elucidated in Figure 3 as follows. The Volta Drive Connect level 3 requires the input of an expert to facilitate the programming process, which is necessary for the device to connect to the designated application.

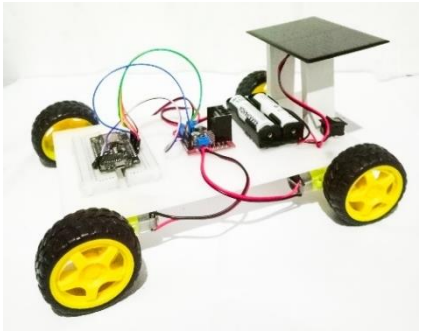


Figure 3. Volta Drive Connect Level 3

2.3. Development

The components included in the kit can be assembled and constructed according to the instructions and video tutorials provided. Additionally, each kit is furnished with a worksheet designed to enhance students' comprehension of energy literacy. To facilitate the achievement of the SDGs, one of the principal components of the kit is the utilisation of reused materials. The kit includes a variety of reusable materials, such as milk cartons, bottles, and other items. The item is utilized as a toy car body.

Prior to its implementation in the field, Volta Drive Connect underwent rigorous testing by experts in both substance/material analysis and media analysis. The substance/material expert is Firdaus, M.Pd., a lecturer in Physics Education at the Al-Qur'an Science University. The media expert is Nugroho Prasetyo Adi, M.Pd., a lecturer in Physics Education at the Al-Qur'an Science University.

2.4. Implementation

The implementation process comprises several stages, namely: a) product/ prototype draft testing, feasibility and practicality testing; b) revision of the product draft; c) small-scale field tests; d) product revision; and e) manufacturing of the final product. . The prototype trial was conducted at Kakuka National Elementary School with 14 students. The results of the prototype trial indicate that Volta Drive Connect is a feasible and practical implementation with a score of 26 in the very good category. Following the testing of the prototype, several improvements were identified. These include: a) The material is too broad, resulting in a lengthy time duration; b) The size of the instructions for use is too small; and c) The question items in the worksheet lack sufficient systematic organization. Following the revision, a small-scale field test was conducted at SD N Simbarejo with a total of 21 students. No further improvements are required at this stage; therefore, the project can be continued at the next stage, namely the production of the final product.

2.5. Evaluation

The evaluation is based on input and suggestions provided by substance/material experts, media experts, teachers, and students. Periodic evaluations are conducted in accordance with the established stages. Prior to its use with children, Volta Drive Connect was found to be safe by substance and learning media experts. The data collection techniques employed in this research include: a) performance assessment in the form of a project-based worksheet to measure the increase in students' energy literacy; b) structured observation to analyze product practicality; c) field notes, to record all findings that are not included in other instruments; and d) documentation, in the form of photos and videos.

This research comprises two data analyses: quantitative and qualitative. Descriptive quantitative analysis was employed to examine data pertaining to the enhancement of energy literacy in fourth-grade students and the practicality of Volta Drive Connect. The data is presented in the form of diagrams, histograms, tables, central tendencies (mean, mode, median), maximum and minimum values. The analysis process comprises the following steps: a) data validation; b) data editing; and 3) data coding. In parallel, qualitative data analysis techniques were employed to examine the findings pertaining to the utilisation of energy-saving kits and behavioural patterns. The analysis steps include: a) Data reduction, which involves the selection of pertinent data, brief descriptions, and the classification of these data into broader patterns; b) data presentation, which is presented in graphic form and narrative text; and c) Drawing conclusions/review.

Following the completion of the research, several findings will be obtained. These include the level of students' energy literacy and the practicality of implementing Volta Drive Connect in learning. Furthermore, research results can serve as a foundation for the formulation of several policies pertaining to curriculum in schools, sustainable development, and related matters. The success of this research will be evaluated based on the following indicators: a) A practical prototype kit with a minimum category of Good; b) An increase in students' energy literacy by 70%; and c) An intention to use renewable energy by at least 60% of students.

3. Results and Discussion

The objective of this research is to develop the Volta Drive Connect teaching kit as a learning medium to stimulate the role of elementary school students in sustainable development. The development of the Volta Drive Connect teaching kit was conducted in accordance with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model. The detailed results are as follows:

3.1. Analysis

Initial observations were conducted on a sample of students from various schools in Wonosobo. The initial observations resulted in the identification of two main problems that require resolution. These issues are the lack of development of teaching kits and the learning style of elementary school students, which is dominated by kinesthetic learning. Currently, teachers utilize a greater proportion of technology-based media, including learning videos, YouTube, and interactive games. The types of media utilized by educators are illustrated in Figure 4.

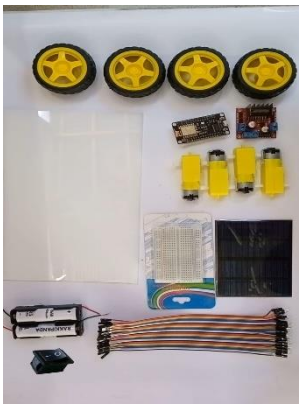
Figure 4. The Types of Media Utilized by Educators

Figure 4 shows that only a few teachers use real objects (5%) or teaching kits modified by students (3%). Teachers more frequently utilize media such as learning videos, PowerPoint presentations, and YouTube videos because they are considered more practical and easier to use. In contrast, 80% of students have a kinesthetic or combined kinesthetic learning style. Students with a kinesthetic learning style require practical learning activities that allow them to engage in hands-on learning. The utilization of learning videos as a pedagogical tool is more effective for students with an auditory learning style. It is therefore essential to develop teaching kits that focus on practical activities in order to enhance the meaningfulness of learning.

3.2. Design

Volta Drive Connect is a science teaching kit for energy transformation material in elementary school grade 4. The teaching kit consists of 3 levels with the following specifications. The Volta Drive Connect specifications for each level are explained in the following Table 1.

Table 1. Volta Drive Connect Specifications for Each Level

Volta Drive Level	Component Specifications	Figure
Volta Drive Connect Level 1	Solar panels, dynamos, wheel frames (wheels, axles, L-bends, sprockets, tire rubber), ice cream sticks, brackets, glue, used milk/beverage cartons.	 **Figure 5.** Level 1 Components
Volta Drive Connect Level 2	Solar panels, dynamos, batteries and holders, switches, ice sticks, supports, adhesives, wheel frames (4 wheels, axles, L-bends, tire joints, wheel hubs), used bottles.	 **Figure 6.** Level 2 Components
Volta Drive Connect Level 3	The advantage of Volta Drive Connect Level 3 is that it can move in the desired direction using a motor drive system connected to Arduino and an application. The Level 3 design also uses simple materials, namely used circuit boards equipped with 4 tires and 4 DC gear motors. Components in this toy car include 1 used board, 4 toy car tires, 4 DC gear motors, 12 volt solar panel, solar panel support, 2 lithium batteries and their holders, switch, WiFi modemcu Arduino, motor drive controller board, breadboard, jumper cables.	 **Figure 7.** Level 3 Components

3.3. Development

At this stage, Volta Drive Connect was developed based on input from media and substance/material experts. The results of the revision are explained in Table 2 as follows. The validation results by material experts, namely Firdaus, M. Pd. (Lecturer of Physics Education, Al-Qur'an Science University) show that the substance of Volta Drive Connect is appropriate/valid with the category Good (score 12). The kit is in accordance with the Energy Transformation material included in the Natural and Social Sciences subject for grade 4 semester 2. The energy conversion material relates to the concepts of energy conversion, alternative energy, etc. The Volta Drive Connect concept is considered systematic and in accordance with scientific principles.

In its application, students are supported by accompanying worksheets to stimulate students' logical thinking according to scientific thinking principles. Volta Drive Connect contains the substance of energy literacy because it uses renewable energy sources, recycled materials, and the principle of energy conversion.

Table 2. The Results of The Revision

Before Revision	After Revision
The connection between the cable and the dynamo remains unsecured.	The connection between the cable and the dynamo is closed, thus enhancing safety
The worksheet lacks a glossary to clarify complex terms	The worksheet includes a glossary
The kit assembly procedure is presented in the form of a procedural sentence.	Additionally, an additional video tutorial is provided to facilitate the assembly procedure

In addition to validation by material experts, validation was also conducted by media experts, namely Nugroho Prasetya Adi (Lecturer of Physics Education, Al-Qur'an Science University). The result of the media expert validation was a score of 21 with the very good category. The kit is declared safe, contains no hazardous/ toxic components and has clear safety instructions. In addition to the safety instructions, assembly instructions and video tutorials are provided. This may make it easier for students to assemble the kit. The presentation of the assembly procedure is systematic, structured, includes pictorial components and is in line with children's language development. Volta Drive Connect also appeals to students because it is a student-designed and student-built kit. Students play an active role in determining the success of the Volta Drive Connect design.

3.4. Implementation

The implementation process was divided into two stages: field trials and small-scale trials. The field trials were implemented at Kakuka National Elementary School, while the small-scale tests were implemented at Simbarejo Elementary School. The results of practical tests conducted by teachers and students on Volta Drive Connect are presented in Table 3.

Table 3. The Results of Practical Tests Conducted by Teachers and Students

Test Kit Level 1	Kakuka	Simbarejo	Test Kit Level 2	Kakuka	Simbarejo
Practically test (teacher)	20 (Very Good)	22 (Very Good)	Practically test (teacher)	19 (Very Good)	20 (Very Good)
Practically test (student)	34 (Very Good)	36 (Very Good)	Practically test (student)	32 (Very Good)	35 (Very Good)

3.5. Evaluation

Volta Drive Connect will be implemented in a classroom as both an experimental group and a control group, or a group pre-test – post-test design. The evaluation was conducted by administering a pre-test and a post-test before and after the implementation of Volta Drive Connect to measure the increase in energy literacy of the students at Simbarejo Elementary School. The pre-test and post-test data are presented in Table 4.

Table 4. Pre-test and Post-test Data

No	Respondents	Pre-test Score	Post-test Score
1	R-0001	65	75
2	R-0002	61	78
3	R-0003	68	77
4	R-0004	70	80
5	R-0005	64	76
6	R-0006	66	78
7	R-0007	72	84
8	R-0008	70	80
9	R-0009	64	77
10	R-0010	64	75
11	R-0011	71	80
12	R-0012	70	83
13	R-0013	70	82
14	R-0014	73	86
15	R-0015	66	79
16	R-0016	68	78
17	R-0017	67	80
18	R-0018	72	85
19	R-0019	72	82
20	R-0020	65	75
21	R-0021	64	75
22	R-0022	66	79
23	R-0023	69	81
24	R-0024	60	72
25	R-0025	76	85

The results of the pre-test and post-test normality test (Shapiro-Wilk test) are 0.793 and 0.695 (> 0.05), so it can be said that the pre-test and post-test data are normally distributed. After conducting the normality test, a paired samples test was conducted to test the effectiveness of implementing Volta Drive Connect. The result of the paired samples test is 0.000 (< 0.05), so it can be said that there is a significant difference between before and after the implementation of Volta Drive Connect. Students encounter a number of challenges when assembling the Volta Drive Connect (levels 1 and 2). These include: 1) Students have difficulty installing the dynamo and gear wheels with the requisite precision; and 2) the dynamo was installed incorrectly, resulting in some cars running in the opposite direction.

The Volta Drive Connect (Levels 1 and 2) are considered a practical resource for fourth grade students and can be utilized as a supplementary learning tool for energy transformation material. Meanwhile, the Volta Drive Connect Level 3 is still in the product prototype phase due to the complexity of the installation process, which involves numerous components. A review of interviews and observations the findings indicated that students expressed a high level of motivation and enthusiasm in participating in learning activities facilitated by Volta Drive Connect. Furthermore, teachers expressed positive sentiments regarding the utilization of the Volta Drive Connect teaching kit. The use of teaching kits facilitates the clear transmission of material and contributes to a more meaningful learning experience for students.

Volta Drive Connect offers simple information and practices regarding renewable energy sources, namely solar energy. Students are invited to gain an understanding of the components that play a role in energy conversion, energy conservation, and the importance of using energy wisely and sustainably. The application of Volta Drive Connect helps students gain practical knowledge and skills about renewable energy. This is in line with efforts to foster energy-saving awareness and behavior from an early age, which is an important aspect of sustainable development. The development of the Volta Drive Connect teaching kit has contributed to the achievement of several Sustainable Development Goals (SDGs) [1], including the following: (1) **Goal 4: Quality Education.** Volta Drive Connect represents an innovative learning media that has the potential to enhance the quality of education [11], particularly in terms of instilling the concept of sustainable development at an early age. (2) **Goal 7: Clean and Affordable Energy.** Through Volta Drive Connect, students gain knowledge and skills that support future efforts to access clean and affordable energy, to facilitate the identification of solutions to problems associated with the utilisation of clean and sustainable energy sources [12]. (3) **Goal 12: Responsible Consumption and Production**. The Volta Drive Connect curriculum teaches the importance of consuming and producing energy in a responsible manner for environmental sustainability. The Volta Drive Connect initiative employs second-hand goods in order to advance the objectives of responsible production and consumption [13], (4) **Goal 13: Climate Change Action.** Instilling the concepts of renewable energy and sustainable development from an early age can encourage students to play an active role in efforts to mitigate and adapt to climate change. Volta Drive Connect The initiative helps to alter students' perceptions of the significance of utilising renewable energy in order to address the global climate crisis [14].

The results of the study showed that there was a significant difference between the pre-test and post-test, which shows that Volta Drive Connect is effectively applied in learning about energy conversion in 4th grade. Volta Drive Connect can help students understand the use of renewable energy in different devices, understand different types of energy conversion, and strive for ways to save energy for a better future. Volta Drive Connect can inspire students to see that using solar energy has more benefits than using non-renewable energy (such as batteries). Using solar panels is more environmentally friendly because no components are wasted. If the power runs out, all the Volta Drive Connect needs to do is dry out in the hot sun. This is certainly more environmentally friendly and will have a more positive impact in the long run. The components in the kit can also help students understand energy conversion materials. Students can learn and observe energy conversion components first hand. Using Volta Drive Connect can provide students with a better understanding of energy literacy. This increased understanding is in line with the goals of the Sustainable Development Goals, so it is hoped that students will not only understand the material for themselves, but also be able to contribute to sustainable development.

One of the fundamental aspects presented in Volta Drive Connect is the introduction of basic concepts pertaining to energy and renewable energy sources. The material is presented in a tailored approach to the characteristics and cognitive abilities of fourth grade students. The simple practical activities presented in Volta Drive Connect can facilitate the acquisition of interesting and meaningful learning experiences related to the study of energy topics. This can facilitate the enhancement of students' energy literacy, which comprises an understanding of: 1) The classification of energy sources, including non-renewable and renewable sources; 2) The fundamental principles of energy, such as energy conversion and energy use in everyday life; 3) The advantages and necessity of utilizing renewable energy for environmental sustainability; and 4) The implementation of simple measures to conserve energy in daily activities.

A comprehensive knowledge of energy literacy can foster awareness and concern for issues related to energy and the environment [15]. Students will be better prepared to adopt energy-saving behaviors and to support efforts to use renewable energy in the future. Furthermore, increasing energy literacy in students can provide long-term benefits in preparing young people who have the knowledge and skills needed to face global energy challenges and achieve sustainable development. It can therefore be stated that Volta Drive Connect contributes to the increase in energy literacy and the achievement of several relevant SDGs goals. In this research, fourth-grade students were involved in the process of constructing the Volta Drive Connect, a simple tool for producing electrical energy from renewable energy sources (solar energy). This activity allows students to gain direct experience with energy concepts and the functioning of renewable energy plants.

The assessment of the impact of the Volta Drive Connect on the energy literacy and energy-saving behaviors of fourth-grade students indicated positive outcomes. These outcomes were observed based on the following indicators: (1) **Conceptual Understanding of Energy.** Following the creation of Volta Drive Connect, students exhibited a notable enhancement in their comprehension of fundamental energy principles, including the classification of energy sources, the processes of energy conversion, and the advantages of renewable energy. The students demonstrated a clear understanding of the operational principles of the Volta Drive Connect. (2) **Practical Skill.** The process of constructing the Volta Drive Connect provides students with the opportunity to develop practical skills in the assembly and operation of simple energy-generating equipment. This facilitates comprehension of the operational principles of renewable energy technologies. (3) **Awareness about energy saving**. The Volta Drive Connect product enables students to demonstrate increased awareness of the importance of saving energy and using renewable energy sources. Furthermore, students are able to identify energy-saving behaviors in their everyday lives. (4) **Energy-saving behavior**. Following the creation of Volta Drive Connect, They demonstrate a greater tendency to turn off lights and electrical equipment that are not in use, and they endeavor to reduce energy consumption in both school and home environments. (5) **Motivation and Enthusiasm.** The process of developing Volta Drive Connect has been demonstrated to enhance students' motivation and enthusiasm in studying energy-related topics. The students perceive the learning process as more interesting and engaging, which enhances their motivation and understanding of the material.

It can be concluded that the activity of creating Volta Drive Connect has had a positive impact on increasing energy literacy and energy-saving behavior in fourth-grade students in science, technology, engineering, and mathematics (STEM) programs. The effectiveness of learning is enhanced, and students gain a deeper comprehension of energy concepts and the significance of energy wise and sustainable utilization. Recommendations for further research as follows: (1) It is recommended that longitudinal research be conducted. To assess the long-term impact of utilizing Volta Drive Connect.

Longitudinal studies are employed to monitor the evolution of students' energy literacy over time, even after they have completed their primary education. (2) An additional avenue for further research would be to explore the potential for integrating Volta Drive Connect with other curricula. Further research may be conducted to investigate the potential for integrating Volta Drive Connect with other subjects, such as mathematics or social studies, in order to enhance the connection between energy literacy and related fields. (3) Expanding the scope of research is a further avenue for investigation. Further research could involve schools with diverse socioeconomic backgrounds to gain a more comprehensive understanding of the effectiveness of Volta Drive Connect in different contexts. (4) It would be beneficial to develop teacher training modules. To ensure effective and sustainable implementation, research can be focused on developing comprehensive training modules for teachers. These modules should enable teachers to maximize the use of Volta Drive Connect in the learning process.
(5) It is recommended that collaboration with stakeholders be pursued. It would be beneficial to seek the support of government agencies, non-profit organizations, and energy companies in order to facilitate the broader dissemination and adoption of Volta Drive Connect. Furthermore, it would be advantageous to investigate potential avenues for aligning the program with other sustainability initiatives.

4. Conclusion

The results of this research demonstrate that the implementation of Volta Drive Connect has been effective in enhancing students' energy literacy. The Volta Drive Connect program employs an interactive and hands-on learning approach that facilitates a deeper understanding of energy conversion, renewable energy sources, and the importance of energy efficiency. The favorable outcomes align with endeavors to advance the fulfillment of Indonesia's Sustainable Development Goals (SDGs), particularly in the domains of quality education (SDG 4), affordable and clean energy (SDG 7), responsible consumption and production (SDG 12), and climate change action (SDG 13).

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