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Improving the Green Economy Utilizing ReadCharge Solar Literacy Technology at SMP Arrihlah

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ABSTRACT

The empowerment of this community partnership involves implementing a program to enhance the green economy by increasing reading interest among Arrihlah Islamic Junior High School students through the use of solar-based ReadCharge technology. The initiative aims to encourage literacy in schools and introduce renewable energy to students as part of sustainable environmental solutions. With the use of environmentally friendly technology, it is hoped that awareness of the importance of green technology in supporting the community's education and economic development will be created. The program started with designing and building a solar-powered stand-up ReadCharge, then making the design, making the standard operating procedure for its use, providing reading books with a variety of interesting options, and providing training on the use of ReadCharge to students, teachers, parents, and community leaders around Arrihlah Junior High School in several trainings. The training is organized systematically, from the introduction of ReadCharge and its use to its maintenance. The training evaluation provided an overview that ReadCharge delivers an in-depth understanding of the use of solar power to preserve the environment and increase reading interest for students, teachers, and the community by 100%. The practical implications of empowering community partnerships funded by grants from the Ministry of Education and Culture are part of the government's program that encourages people to develop and utilize renewable energy, namely energy sourced from solar heat.

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INTRODUCTION

Arrihlah Islamic Junior High School, located in RT. 03 RW. 01, Duren Seribu, Bojongsari District, Depok City, Prov. West Java, is one of the schools towards

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development and has become an integral part of the social and economic transformation in Indonesia. As a reflection of national development, Arrihlah Islamic Junior High School faces unique challenges and opportunities in the era of digitalization and increasing literacy. Arrihlah Islamic Junior High School has 12 teachers and education staff, 23 students, learning carried out five days from Monday to Friday, does not have internet access, uses 1500 watts of electricity from PLN, has a land area of 2,210 square meters, only has three classrooms, does not have a laboratory, and has a library room that is far from adequate. This school is a private school that assists the government in the field of improving human resources, although the infrastructure has not met the set standards, because the limited number of students comes from families receiving government assistance, namely the Smart Indonesia Program (PIP), while teachers receive an honorarium from School Operational Assistance (BOS). Most of the teachers are auxiliary teachers who voluntarily teach without being paid, while the rest, including school operators, get an honorarium far below the regional minimum wage, which is Rp. 200,000 to Rp. 300,000 per month.

From this profile, it can be seen that this junior high school has the potential to be developed because it is located in a densely populated area and not far from the center of government. However, the condition still requires the development of facilities and infrastructure to be considered an educational institution with digital quality and environmental friendliness. <Lack of internet access and a diverse collection of reading books negatively impact students' interest in reading and literacy (Fuadi et al., 2020). The problem of Arrilah Junior High School is the lack of literacy facilities, where Arrilah Junior High School does not have an adequate library or literacy corner. This results in difficulties for students and the surrounding community in accessing quality reading materials. The lack of literacy facilities is the main obstacle to increasing reading interest and the quality of education in schools (Nusraningrum, 2023). Limited access to books and other technology-integrated reading materials leads to low interest in reading. Low interest in reading harms students' intellectual and academic development. Limited use of electricity sources in Arrihlah Junior High School and its surroundings; access to renewable energy sources, such as solar energy, is still very limited. The use of renewable energy is essential to support environmentally friendly and sustainable teaching and learning activities. Limited Electronic Charging Sources: Students often have difficulty charging their electronic devices, such as mobile phones and tablets, which are used for learning activities. These limitations impede the digital learning process and diminish the efficacy of technology in education.

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Figure 1. The Library of Arrihlah Islamic Junior High School before the programs

Survey data conducted by the Central Statistics Agency shows that around 63% of Indonesia's total population has been actively using the Internet in 2023, with significant growth, especially in rural areas. Although technological advances have reached rural areas, there are still gaps in access and utilization that need to be considered to ensure wider digital inclusion (Nusraningrum, 2021), including Arrihlah Islamic Junior High School. Previous research shows that reading interest among the people of Indonesia has increased significantly (Shoimah, 2020). Interestingly, this data also occurs at the local level, including the Depok area, which indicates public awareness of the importance of literacy as capital to face the changing times (Naufal, 2021). In line with the global trend, "The Role of Technology in Economic Development" (Magomedov et al., 2020) highlights the close relationship between the use of technology and economic growth. He emphasized that technology integration can be a catalyst to increase people's productivity and creativity, especially in the creative industry.

Taking into account the increasing level of technology use, as well as the interest in reading among students, the "ReadCharge Solar Energy" is expected to be a strategic step in harnessing this potential to improve the economy and literacy. Through a holistic and integrated approach, this proposal proposes innovative solutions that focus on human resource development and the use of technology to create a sustainable, positive impact for SMP Islam Arrihlah. With support from various parties, including local

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governments, educational institutions, and local communities, Arrihlah Islamic Junior High School has the potential to become a center of sustainable growth and transformation in its region.

The purpose of the green economy improvement activity of Arrihlah Islamic Junior High School is to increase interest in reading and the use of technology, using solar literacy rechargeable tools (Adams et al., 2022; Hamidi et al., 2022; Mueller, 2017; UNEP, 2010; Wilkes et al., 2020): 1) Increasing interest in reading and literacy among teachers and students of Arrilah Islamic Junior High School, as well as the local community (Adams et al., 2022; Appiah et al., 2023; Goldman et al., 2018; Kumar et al., 2023). By providing easy and free access to a wide range of readings at the Read-Charge Booth, it is hoped that the public will be stimulated to read more and improve their understanding of various topics. 2) Encouraging the use of technology at Arrihlah Islamic Junior High School through the use of environmentally friendly renewable energy and environmentally friendly electronic charging facilities. 3) Improving the local economy at Arrihlah Islamic Junior High School through entrepreneurship training and small business development. Organizing entrepreneurship training, providing support in the development of small businesses, and empowering the community to develop economic potential and increase family income. 4) Expanding the accessibility of education at Arrihlah Islamic Junior High School by providing additional learning resources through bookshelves and literacy materials available at the Read-Charge Booth. Thus, the public, especially children and adolescents, will have wider access to educational materials that support their academic and intellectual development. 5) Encourage active participation of the community in social and community activities. Through various literacy activities, entrepreneurship training, and community events held at the Read-Charge Stan, it is hoped that the community will be more involved in social life and strengthen the bonds between residents around Arrilah Islamic Junior High School. 6) This activity is part of off-campus learning and teaching activities of the Independent Learning Independent Campus (MBKM) program, which aims to provide opportunities for students to learn and develop themselves through training activities outside the classroom so that the main performance indicators are achieved.

The two priority problems faced by Arrihlah Islamic Junior High School are as follows: 1) The first problem that arises is related to technological accessibility, which can be in the form of electronic devices, resources for battery charging, internet, and others. The unavailability of the internet is the main problem related to the lack of accessibility to technology at SMP Islam Arrihlah. Technology accessibility can include

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the availability of devices such as smartphones or tablets that are needed to use the Read-Charge tool, as well as stable and affordable internet access. Limited adequate access to technology can hinder the desire to read. For this reason, efforts are needed to increase reading interest by utilizing the Read-Charge tool, which forces a person who charges his electronic device to read the available books so that he can use the electric charging facilities provided. Therefore, this environmentally friendly ReadCharge is expected to help overcome the problem of technology accessibility and can encourage anyone to access technology for free. 2) The second priority problem is the limited reading interest of teachers, students, students' parents, and the community around Arrihlah Islamic Junior High School. Factors such as lack of access to intriguing reading materials, lack of awareness of the importance of reading, or a preference for other activities outside of reading can hinder the success of the program. In this case, an effective strategy is needed to increase people's interest in reading, for example, by providing relevant and interesting reading materials, as well as holding literacy promotion activities that can increase awareness of the importance of reading. Reading materials that are available for free can be used by the general public around Arrihlah Islamic Junior High School, not just students and teachers.

ReadCharge proposes solar power as a solution to address these priority problems. By integrating solar panel technology for charging and providing adequate literacy facilities, it is hoped that it can increase interest in reading and access to renewable energy and encourage creative economy activities at Arrilah Junior High School. This solar-based "Read-Charge" booth will save at least Rp. 200,000 per month in electricity costs, and in one year it will save Rp. 2,400,000.

METHOD

The method of implementing community partnership empowerment goes through the following stages:

1. Socialization of the solar literacy read-charge program is carried out by all team members to teachers, education staff, and students of Arrihlah Islamic Junior High School and the surrounding community under the schedule that has been agreed upon between the proposing team and partners.
2. Solar literacy read-charge program training is carried out after the read-charge booth is completed by the Community Service Team. This program is expected to stimulate reading interest and literacy among the people of Arrihlah Islamic Junior High School by providing easy access to diverse and interesting reading materials.

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3. The installation of ReadCharge's solar-powered literacy technology begins with location observation to determine optimal sun exposure and reading activity patterns at partner schools. This was followed by the design and assembly of the ReadCharge system, which includes solar panels, power storage units, LED lighting, and mobile device charging ports, all integrated into a compact reading station. During installation, the system is securely installed in an accessible outdoor area, ensuring safety, durability, and ease of use for students and teachers. Once installed, the ReadCharge station undergoes testing to verify the solar energy capture, battery charging efficiency, lighting stability, and charging port functionality for mobile devices. The testing phase confirmed that the system operated effectively during the learning hours from 7:00 a.m. to 1:00 p.m., providing renewable energy and a comfortable reading environment.
4. Assistance and evaluation are carried out for 6 months by the team.
5. Sustainability of the program by building partnerships between various parties, including local communities, educational institutions, and local governments, in supporting and developing literacy initiatives and local economic development. Sustainable Community Development Through literacy activities, community meetings, and small business development, this program is expected to create an inclusive and sustainable environment at Arrihlah Islamic Junior High School.

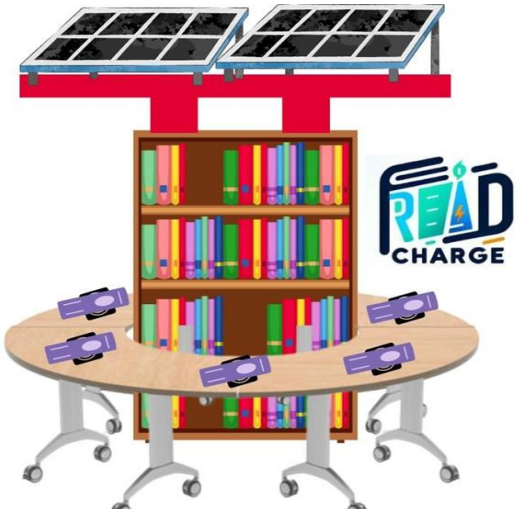

Figure 2. ReadCharge Design

RESULT AND DISCUSSION

The introduction and training method of ReadCharge are specifically designed to address the following problems faced by Arrihlah Junior High School. The first problem

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is access to technology, overcome by the availability of devices such as smartphones or tablets needed to use the Read-Charge tool, as well as stable and affordable internet access. Without adequate access to technology, efforts to increase reading interest and utilize Read-Charge tools may be hampered.

The second problem is the limitation of public reading interest, overcome by increasing people's reading interest, for example by providing relevant and interesting reading materials and holding literacy promotion activities that can increase awareness of the importance of reading.

Partners are actively involved in the program's execution, offering a venue for solar literacy read-charges, granting local communities access to utilize these read-charges, assigning officers to oversee the solar literacy read-charge, and incorporating the solar literacy read-charge into the community events at Arrihlah Junior High School.

Community partnership activities that empower the community are carried out through the following stages:

1. Socialization of the introduction of ReadCharge Solar Power to the community, teachers, students, and parents about the program's objectives, the importance of literacy, and the use of renewable energy on Sunday, June 16, 2024, with 10 participants.

Figure 3. FGD ReadCharge Programs

2. Install ReadCharge booths in schools, by involving the community in the installation process so that they understand how to use them. Starting the use of Read-Charge technology by students and teachers in daily activities, especially to support reading activities on Monday, August 11, 2024, with 20 participants.

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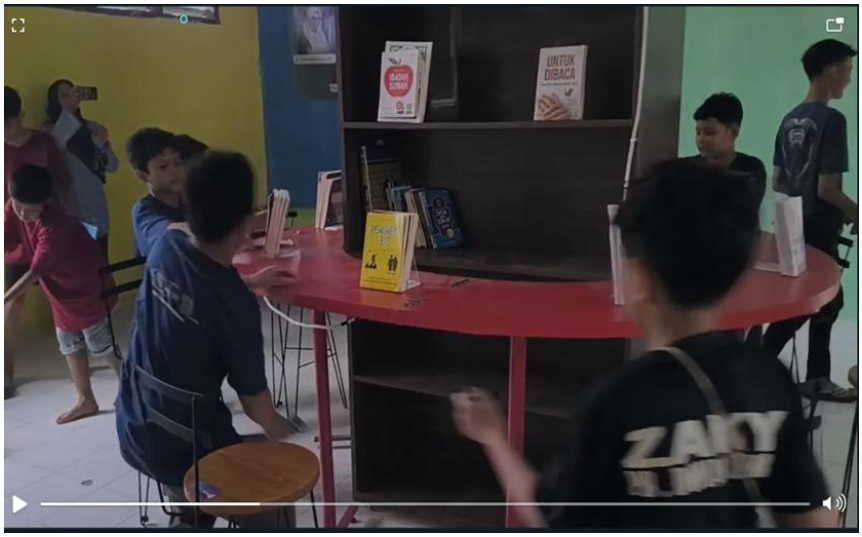

Figure 4. Install ReadCharge Booth

3. Assistance in the use of ReadCharge and training to the school community, especially teachers and technical staff, regarding the working, operation, and maintenance of solar ReadCharge devices, as well as forming a management team consisting of teachers, students, and community representatives to manage the use and maintenance of ReadCharge devices, was carried out on Friday, August 30, 2024, with 20 participants.

Figure 5. Solar Panel

4. Assistance in the use of ReadCharge and ReadCharge Stan maintenance practices was implemented, and intensive monitoring of the use of technology, evaluating additional needs, and documenting initial responses and results was done on Monday, September 9, 2024, with 20 participants.
5. The cooking practice of Aceh Noodles and ReadCharge empowerment to improve the green economy and green products (Kamalanon et al., 2022;

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Moslehpour et al., 2023; Nuryakin & Maryati, 2020; Nusraningrum et al., 2023; Tezer & Bodur, 2021) was held on Sunday, September 22, 2024, with 40 participants.

Figure 6. Aceh noodle cooking progress

The solar ReadCharge grant from the Ministry of Education and Culture is expected to be beneficial not only for Arrihlah Islamic Junior High School but also to improve the green economy (Hamidi et al., 2022; UNEP, 2010) for the surrounding community by using solar ReadCharge to increase reading interest while charging for free and increasing their knowledge of various things from available free reading sources.

Figure 7. ReadCharge sign board

The evaluation of the program has been carried out through; a) data collected from various sources, including partner surveys, field observations, and program

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documentation. b) The collected data is analyzed to evaluate program achievements, identify emerging problems, and assess the program's impact on society. c) The program's objectives are evaluated to see how far it has been achieved. This type of evaluation includes increasing people's interest in reading, increasing access to technology, and the impact on the local economy. d) The sustainability of the program is evaluated to ensure that its benefits can continue in the long term. This assessment involves analyzing factors that can affect the sustainability of the program, such as community support and financial sustainability. e) The efficiency of the program is evaluated to see the extent to which resources have been optimally utilized. This phase includes an evaluation of the use of budget, time, and labor. f) Input is collected from various stakeholders, including the community, local stakeholders, and project team members. This input will be used to improve the program in the future. g) The results of the evaluation are compiled in the form of a comprehensive report. The report includes evaluation findings, improvement recommendations, and measures to improve the program in the future. h) Monitoring of the "Read-Charge" program is carried out regularly to ensure the smooth implementation and achievement of the goals that have been set.

Monitoring has also been carried out through a) conducting daily monitoring of the ReadCharge Stan's operations, including the availability of electricity from solar panels, the condition of charging equipment, and the safety of the stand. b) Technical monitoring, such as solar panel performance, charging efficiency, and the condition of reading materials, will be monitored periodically to ensure smooth operations and facility availability. c) Program performance is monitored by comparing the achievements that have been reached with the targets that have been set. An evaluation of success indicators will help identify areas that need improvement. d) All monitoring activities are documented, including meeting notes, survey results, and monitoring reports. This documentation will serve as the basis for a thorough evaluation of the program. e) The roles and duties of each team member align with their competencies and the assignments given to students.

Some of the obstacles in achieving the improvement of the green economy through Read-Charge technology at SMP Islam Arrihlah include: 1) The installation and maintenance of solar technology may require considerable initial costs, especially in areas that do not yet have adequate infrastructure. 2) Teachers and students may need special training to understand how this solar literacy technology works and is utilized effectively. 3) Low reading interest in some communities can be challenging, even

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though technology is readily available. Changing habits takes time and continuous effort. 4) The limited budget of the school or community to maintain and develop this green project can be a long-term obstacle. 5) Not all students, teachers, or the public understand the importance of renewable energy and the concept of a green economy, which can affect the success of the program.

After the entire series of activities was carried out, the ReadCharge user satisfaction survey was also carried out at the end of the activity.

Table 1. Community Partnership Empowerment Respondent

No	Name	Age	Sex	Daily Activity	Hobby	Profession
1	Setyo	20	M	Studying	Drawing	Student
2	Hasanudin	51	M	Teaching	Reading	Teacher
3	Mulyanah	46	F	Housewives	Cooking	Housewives
4	Dian Hazanal	54	F	Teaching	Reading	Teacher
5	Joko	63	M		-	Honorary teacher
	Sarti	46	F	Cooking and household	Cooking	Housewives
6	Siti Nurjanah	40	F	Housewife	-	Housewives
7	Ade Yanti	36	F	Taking care of the house	Cooking	Housewives
8	Naira Ahlika	20	F	Learning	Reading	Student
9	Suryati	35	F	Taking care of the house	Singing	Housewives
10	Dahlina	50	F	Cooking	Cooking	Housewives
11	Susan	44	F	Doing household chores	Cooking	Housewives
12	Yuyun zairahmi	56	F	Household	Cooking	Housewives
13	Herman	50	M	Bird play	Bird Keeping	Laborer
14	Saripah Soleha	38	F	Housewives	Cooking	Housewives
15	Umar	38	M	Worker	Agate Collection	Worker
16	Raisa Alyaa	15	F	School, Tutoring, Learning	Read the book	School
17	afifa nur faradila	16	F	School	play tiktok	Students
18	Dedy Supriadi	49	M	Worker	Bird Keeping	pension
19	Muhammad Bilal umair	15	M	School	game online	Junior High School Students
20	Siti Harisah	26	F	Teaching	Teaching	Elementary School Teacher
21	Jahyadi Suherman	41	M	Teaching	Teaching	Elementary School Teacher
22	Fatonah	38	F	Taking care of the house	Singing	Housewives
23	Dwi	50	F	Cooking	Cooking	Housewives

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24	Reza	14	M	School, playing	Futsal	Junior High School Students
25	Moh Salim	41	M	Principal	Fishing	Educators

The results showed that the respondents were satisfied with the community partnership empowerment activities that had been carried out, as seen in Table 2.

Table 2. Satisfaction Survey Result

No.	Statement	SA	A	N	DA	SDA
1	The PKM activities carried out provide solutions to problems What partners are facing?	8	6	7	5	1
2	Team members involved in PKM activities are active in Assisting.	8	8	8	2	1
3	The frequency of assistance carried out by the PKM team is felt to be appropriate.	6	11	6	3	1
4	There is an increase in independence or an increase in knowledge and skills in partners.	5	13	6	2	1
5	Overall, partners feel satisfied with the activities PKM that has been implemented.	6	10	8	2	1
6	The usefulness of appropriate technology resulting from the program to the community readCharge against the goals expected by the community?	6	10	6	4	1
7	PKM activities are carried out are to the needs identified by partners.	8	11	3	3	2
8	Tim PKM providing training or socialization that is easy for partners to understand.	6	11	6	4	0
9	Partners feel that communication with the PKM team is going well and effectively.	6	9	7	4	1
10	The PKM team provides adequate support after the activity is completed.	8	11	6	1	1
11	There is a positive change in the quality of life of partners after participating in PKM activities.	8	12	4	2	1
12	Partners feel that PKM activities improve their ability to manage local resources.	6	18	1	1	1
13	The methods used in PKM activities are relevant to the local context and conditions of the partners.	8	11	6	1	1
14	The PKM team can overcome challenges or obstacles that arise during the activity.	6	15	3	1	2
15	Partners feel that the results of PKM activities can be applied sustainably in the long term.	7	11	6	2	1
16	The given solar-based tables and cabinets function as expected.	5	16	4	1	1
17	The use of solar-based desks and cabinets increases efficiency in teaching and learning activities at Arrihlah Islamic Junior High School.	6	12	8	0	1
18	Solar-powered desks and cabinets make it easy to access energy sources for school needs.	6	11	6	2	1
19	The integrated solar power system in desks and cabinets makes it easier to use electronic devices in schools.	7	10	7	2	1
20	Students and staff of Arrihlah Islamic Junior High School feel more comfortable and productive with solar-powered desks and cabinets.	4	18	4	0	1

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21	Solar-based desks and cabinets help reduce dependence on conventional energy sources at Arrihlah Islamic Junior High School.	6	12	6	2	1
22	The service team provides adequate training on the use and maintenance of solar-based countertops and cabinets.	6	15	4	0	2
23	The existence of solar-powered desks and cabinets provides significant benefits for daily activities at Arrihlah Islamic Junior High School.	8	11	6	1	1
24	The use of solar-based desks and cabinets has affected the way students and staff plan and use energy.	8	12	4	2	1
25	Overall, SMP Islam Arrihlah is satisfied with the implementation of solar-based tables and cabinets provided.	6	18	1	1	1

Note: SA=strongly Agree, A=Agree, N=Neutral, DA=Disagree, SDA=Strongly Disagree

ReadCharge solar power has been installed and integrated with the library room that has been used for a long time by Arrihlah junior and elementary school students and the surrounding community during school hours from 07.00 to 13.00 from Monday to Friday. The impact of the use of Solar ReadCharge is the increasing desire of students and the community to increase knowledge through reading while charging using available solar power. The results of monitoring for 6 months showed that 40 books were read every month. When compared to before the installation of the solar recharge, when no students were interested in visiting the library, it can be said that the increase in literacy in the Arrihlah Junior High School environment is 100%.

CONCLUSION

The Solar Literacy Read-Charge aims to increase public interest in reading and literacy. The program has many benefits and uses that can help people and society as a whole. The program offers free and convenient access to a diverse range of books and reading materials. The existence of solar literacy will increase people's interest in reading and learning various types of books, ranging from fiction to non-fiction, so that it increases reading interest in general; not only school textbooks are available. Solar literacy can be a fun place to learn for all ages by providing easy access to books and reading resources. Everyone can continue to learn and increase their knowledge throughout life by reading the available books. Anyone can improve their literacy skills, which include the ability to read, write, and comprehend information, by visiting literacy centers, where they can practice and hone their literacy skills through different types of reading materials. Solar literacy helps readers broaden their horizons and knowledge because of the different types of books and reading materials available . People can learn many things, such as history, science, art, culture, society, entrepreneurship, and technology, which can make them more open and intelligent. This aids in lessening the

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disparity in literacy between individuals with easier access to reading materials and those with restricted access. And for the surrounding community, it can be a driver to be more creative, innovative, and productive.

SUGGESTION

The Solar ReadCharge program is recommended to be applied to schools in Indonesia, considering that Indonesia has an abundance of sunlight that can be used as much as possible to educate students and the community around the school, as well as to cultivate a love of reading in a fun way. As a further development, ReadCharge technology can be equipped with an IoT-based digital monitoring system to monitor energy performance and usage levels in real time.

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