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Article

Validation of GreenBytes: an Educational App to Enhance Environmental Awareness in Junior High Students

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ABSTRACT

GreenBytes is an educational application that utilizes SAC technology to provide an interactive learning experience around the environment to junior high school students. This app is designed to arouse students' interest and awareness of the importance of protecting the environment. This research aims to develop an educational application based on Smart Apps Creator that can increase environmental awareness of junior high school students. The research method consists of several stages, namely Research and Information Collecting, Planning, Develop Preliminary Form a Product, Preliminary Field Testing, and Final Product Revision. The validation results showed an average percentage of 82% with a good category. The validity percentages are as follows: 90% material with excellent category, 70% technology with pretty good category, 60% design with pretty good category, 90% concept with excellent category and 100% language with excellent category. The validity results show the highest percentage, namely language, material and concept while the lowest percentage is technology and design. In general, this learning media is suitable for use with revisions as suggested. Thus, the Smart Apps Creator application is a potential tool to develop applications that can contribute to increasing environmental awareness.

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INTRODUCTION

In the current era of globalization, the development of Science and Technology (IPTEK) continues to experience rapid progress and has a significant impact on various aspects of life, including education. The use of technology is one of the innovations that can be used in the learning process as emphasized in 21st century learning (Nurhamidah, et al., 2022). In the world of education, especially at the school level, technology plays an important role in improving the effectiveness of the learning process in the classroom (lwoga & Sanga, 2007). With the ongoing development of technology, the learning resources and media used by educators must also develop to remain relevant and effective. Teachers no longer only rely on conventional media such as textbooks or modules, but are also required to develop innovations

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in the delivery of subject matter. Teachers can compile materials that will be taught to students using the help of software in a combination of various media into interactive multimedia learning devices (Pebriani, et al., 2022). This aims to make the learning process more interesting, easy to understand, and able to increase student participation and enthusiasm in learning (Nasir, et al., 2022).

One of the innovations in learning media is the development of Android-based learning applications. Android application-based learning media is an interesting alternative because it allows students to learn to use smartphones flexibly, without being bound by space and time. The app can be designed to not require an internet connection so its use is not limited by the availability of a data network. The use of Android-based applications in learning is also supported by various previous studies. Nuroifah & Bachri (2015) showed that Android application-based learning media for excretory system materials is effective and feasible to be used in teaching and learning activities.

Environmental awareness among junior high school students is an increasingly important aspect in this era of globalization. In the midst of the increasingly real challenges of climate change and rising pollution levels, it is important for the younger generation to have a strong understanding of environmental issues and the impact of human behavior on the environment. In the context of education, especially at the junior high school level, the development of environmental awareness needs to receive serious attention so that students not only understand the theory, but also can apply that knowledge in their daily lives. According to Gul & Ozdemir (2022), environmental awareness among students is very important to be increased so that they are able to play an active role in preserving the environment from an early age. Effective environmental education can form a mindset and attitude that cares for the environment, as well as encourage students to adopt more environmentally friendly behaviors in their daily lives.

However, the facts show that environmental awareness among students is still relatively low. Many students do not yet understand the importance of caring for the environment and how their behavior can affect the quality of the environment. This is where the role of technology in environmental education becomes important. The development of technology-based educational applications can be an effective means to increase environmental awareness in students. The application can be designed with an attractive interactive display, as well as educational materials that are easy to understand and relevant to students' daily lives.

GreenBytes is an educational application designed using Smart Apps Creator (SAC). *Smart Apps Creator software* is a type of technology that can be used in developing Android and iOS learning applications without requiring programming skills (Wa'fa, et al, 2023). The GreenBytes application has an interactive display and resembles a PowerPoint presentation or e-book, so this application can make it easier for students to understand the learning material. SAC allows educators to design interactive learning media with formats such as HTML, EXE, and APK (Puspitasari, et al., 2022). The app has an interface similar to PowerPoint or e-books, GreenBytes is designed to provide an engaging learning experience around environmental issues, such as water, air, and soil pollution, as well as the impact of climate change. Through various educational features, such as interactive simulations, quizzes, and learning videos, this application aims to help students understand abstract concepts to be more concrete and relevant to daily life. Research conducted by Fahlevi & Aminatun (2023) revealed that the application of Smart Apps Creator-based learning media improves students' critical thinking skills and problem-solving skills. Although there have been many studies that have proven the effectiveness of android-based learning media in improving student learning outcomes, further evaluation is still needed regarding the feasibility and effectiveness of GreenBytes in the context of environmental education in junior high schools.

This research aims to develop and test the feasibility of the GreenBytes application as an innovation in the form of an educational application that aims to increase environmental awareness among Junior High School students. It is hoped that this research can make a significant contribution to the development of technology-based learning media that is not only in line with current educational needs, but also plays a role in creating a generation that is more sensitive and concerned about environmental sustainability issues. Through the GreenBytes application, it is hoped that students will better understand the importance of protecting and preserving the environment, so that they can actively contribute to efforts to preserve the nature around them.

METHODS

The research is a qualitative descriptive study that will be carried out starting on October 6, 2024, covering several stages in the development of the GreenBytes environmental education application. The first stage is Research and Information Collecting, where a needs analysis is carried out to understand the problems of junior high school students related to environmental awareness. The second stage of the Planning stage, where the GreenBytes application is designed in detail, includes educational features and appropriate usage flows. The third stage, Develop Preliminary Form a Product, involves creating a GreenBytes application using Smart Apps Creator (SAC) software. The fourth stage is Preliminary Field Testing, which is carried out by validation by several experts related to the GreenBytes application on October 15, 2024. The final stage is the Final Product Revision, where the application is refined based on suggestions from experts to improve its effectiveness in increasing students' environmental awareness. To analyze the data from the validation of the GreenBytes application, the evaluation results from experts were calculated using the following percentage formula (Wa'fa, et al., 2023).

$$\text{Presented} = \left(\frac{\sum \text{Subject answer}}{\sum \text{Highest score}}\right) \times 100\%$$

The scores from the GreenBytes application validation results will be classified into five categories based on the average score obtained. The following is the classification of criteria used (Purwanto, 2013).

Table 1. The classification of criteria used

Average grade	Criterion
86-100	Excellent
76-85	Good
60-75	Pretty good
55-59	Less
<55	Very less

The classification helps in assessing the overall quality of the app, so the development team can know which parts need to be improved based on feedback from experts.

RESULTS AND DISCUSSION

GreenBytes development validation results shown in table 2.

Table 2. Results of the 5 Expert Assessment

No.	Assessment Aspects	Information	Percentage
1	Material Expert	Excellent	90%
2	Technologist	Pretty good	70%
3	Design Expert	Pretty good	60%
4	Concept Expert	Excellent	90%
5	Linguist	Excellent	100%

Based on table 1, the results of each expert, including material experts with a percentage of 90%, were declared excellent. Technologists with a percentage of 70% were declared pretty good. Then the design expert has a percentage of 60% declared pretty good. The researcher received advice from a design expert validator to further adjust the color of the media display, the selection of fonts and other things related to media design. The concept expert has a percentage of 90% and is declared excellent. Finally, linguists have a percentage of 100% and are declared excellent. The researcher received advice from linguist validators to update the media in terms of language selection and use. This is intended so that the application made by the researcher can be used effectively. Thus, it can be seen that the highest percentage of assessment was obtained from linguists with a score of 100%, followed by material experts and concept experts with a score of 90%. Meanwhile, technologists and design experts scored lower, 70% and 60% respectively. This shows that the product developed has been assessed very well in terms of language and concept, but still needs improvement in technology and design aspects.

The language aspect plays an important role in the development of applications to foster environmental awareness because with clear and effective language can increase user understanding of environmental issues. Simple and easy-to-understand language allows users, especially students, to more quickly grasp the information being conveyed, thereby increasing their involvement in environmental issues (Hadzigeorgiou & Skoumios, 2013). The language aspect in this study received the highest validation score because of the use of clear and easy-to-understand language, which is important to improve students' understanding of the learning material (Barlian et al., 2024). Effective language can foster environmental awareness among junior high school students by presenting relevant and interesting information, thereby encouraging active participation in environmental issues (Harmita, 2004). Good language quality also contributes to a positive learning experience, strengthening student engagement in environment-based learning (Permata Sari & Erita, 2024). This indicates that the selection and use of language in the product has been very effective. Thus, the development of applications that pay attention to the language aspect not only improves comprehension but also contributes to better behavior changes regarding environmental awareness.

The material aspect plays an important role in the development of the Smart Apps Creator (SAC) application to foster environmental awareness in junior high school students because the material presented must be relevant and interesting to increase student understanding and engagement. Good material can help students understand environmental issues in depth (Azizah, 2020). The material aspect in this study received a high validation value because the presentation of material in accordance with the basic competencies and level of understanding of students, as well as the depth of the material presented was clear and easy to understand (Barlian et al., 2024). Relevant and interesting materials contribute to increasing environmental awareness of junior high school students, by providing educational information about environmental issues interactively (Habiburrahman et al., 2023). This allows students to be more involved in learning and increase their attitude of caring for the environment (Permata Sari & Erita, 2024).

The conceptual aspect is crucial in designing an application that is not only informative but also interesting and relevant to users, so that it can effectively increase environmental awareness among junior high school students. The conceptual aspects in this study also received a high validation value because the concepts used were systematically and well integrated, creating an interactive and interesting learning experience for junior high school students. For example, in the Smart Apps Creator application which combines multimedia elements such as animations, videos, and practice questions, which significantly increases students' interest in learning and facilitates a deeper understanding of the material (Habiburrahman et al., 2023). This interactive concept not only increases the effectiveness of learning, but also contributes significantly to increasing environmental awareness of junior high school students, making them more concerned and active in environmental issues (Permata Sari & Erita, 2024).

The design aspect in this study received the lowest validation value because some visual elements and layout were not fully in accordance with the expected aesthetic and functional standards. This can have a negative impact when used to foster environmental awareness among junior high school students, because less attractive designs can reduce students' interest in interacting with the educational content provided (Barlian et al., 2024). If the design is not improved, the potential of the application to increase students' understanding and concern for environmental issues may not be optimal, thus hindering the desired educational goals (Habiburrahman et al., 2023). How to overcome the shortcomings in the design aspect of the Smart Apps Creator application involves several strategies that can improve the performance and comfort of using the application. First, improvements to the appearance must be made by considering the availability of space and the right font size, so that information can be conveyed clearly and easily read (Dyah and Isa 2024). Second, the use of harmonious colors and appropriate contrast can improve its visibility and aesthetics. Third, an intuitive and user-friendly navigation structure must be optimized to make it easier for students to find the information they need (Habiburrahman et al., 2023). Through these improvements, the Smart Apps Creator application can increase the environmental awareness of junior high school students by presenting interesting and informative content. Therefore, systematic and continuous design improvement can have a positive impact on students' learning motivation and their ability to understand environmental materials.

The technological aspect in this study received the lowest validation score due to several shortcomings in the technological infrastructure used. Although these applications have been well developed in terms of material and concepts, the adoption of the technology is still limited and not fully flexible for all types of devices or different internet conditions (Khasanah & Rusman 2021). This can have a negative impact when used to foster environmental awareness among middle school students, as some students may not have the same access to the modern technology needed to use these apps optimally. Overcoming the shortcomings in the technology aspect of the Smart Apps Creator application can be done with several strategic steps. First, improving the compatibility of the application with various devices and operating systems, so that students can access it more easily, regardless of the type of device they are using (Fitrah Dinanti et al., 2023). Second, perform regular software updates to fix bugs and improve application performance, which is important for maintaining a good user experience (Dyah & Isa, 2024). Third, it provides training or tutorials for teachers and students on how to use the app optimally, so that they can take advantage of all the available features. With this improvement, the application is expected to be more effective in fostering environmental awareness among junior high school students, as the content presented becomes more interesting and accessible, encouraging students to actively learn and participate in environmental issues.

CONCLUSION

Based on the data obtained, it can be concluded that the highest validation value is in the language aspect of 100%, followed by concept and material experts at 90% each. Then the lowest validation results by design experts at 60% and also technology experts at 70%. With the average value of the entire validation being 82%, it is declared feasible to use with revisions according to the advice of expert validators. Overall, Smart Apps Creator is a potential tool for developing apps that can contribute to increasing environmental awareness. However, to achieve this goal, it is necessary to make improvements in aspects that still need to be improved, especially in terms of design and technology. Thus, the resulting application can be an effective medium to educate junior high school students in particular and the general public about the importance of protecting the environment.

REFERENCES

Azizah, A. R. (2020). *Using Smart Apps Creator (SAC) to teach global warming*.

Barlian, I., Artati, S., & Achmad, R. (2024). The level of validity of the preparation of interactive assessments based on Smart Apps Creator for students of the Teacher Professional Program. *PROFIT JOURNAL: A Study of Economics and Economics Education*, *11*(1), 19–25.

Dyah Ratnasari & Isa Ansori. (2024). Media Smart Apps Creator Based on Problem Based Learning Improves Effective Sentence Writing Skills. *Journal of Educational Research and Development*, *8*(1), 10–21. https://doi.org/10.23887/jppp.v8i1.68614

Fahlevi, R., & Aminatun, T. (2023). Development of Smart Apps Creator Learning Media Using Problem-Solving Learning Models on Global Warming Materials to Improve Critical Thinking and Problem-Solving Ability. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 7221–7230. https://doi.org/10.29303/jppipa.v9i9.4311

Gül, A. C., & Özdemir, N. (2022). Investigation of Turkish Elementary School Students' Environmental Awareness. *Education Quarterly Reviews*, *5*(4). https://doi.org/10.31014/aior.1993.05.04.601

Hadzigeorgiou, Y., & Skoumios, M. (2013). The development of environmental awareness through school science: Problems and possibilities. *International Journal of Environmental & Science Education*, *8*, 405–426.

Harmita, H. (2004). Instructions For The Implementation Of Method Validation And How To Calculate It. *Pharmaceutical Science Magazine*, *1*(3), 117–135. https://doi.org/10.7454/psr.v1i3.3375

Khasanah, K., & Rusman, R. (2021). Development of Learning Media Based on Smart Apps Creator. *AL-ISHLAH: Jurnal Pendidikan*, *13*(2), 1006–1016. https://doi.org/10.35445/alishlah.v13i2.549

Massofia, F. D., Khoirunnisa, D. A., Dinanti, S. D., Huda, M., & Rahmawati, R. (2023). Arabic Language Learning Using Smart Apps Creator for Class VII Madrasah Tsanawiyah. *LUGAWIYYAT*, *5*(2), 123–133. https://doi.org/10.18860/lg.v5i2.23501

Nasir, N., Nurindah, N., Rauf, A., Ayu, S., & Hambali, U. (2022). Craft Learning Media Design Based on Smart Apps Creator. *Journal of Teacher Studies and Learning*, *5*(3), 226–232. https://doi.org/10.30605/jsgp.5.3.2022.1884

Nuroifah, N., & Bachri, B. S. (t.t.). Development Of Learning Media Based On Android Application Excretion System Material For Students Of Class Xi Sma Negeri 1 Dawarblandong Mojokerto. *Student Journal of Surabaya State University*.

Pebriani, F., Heliawati, L., & Ardianto, D. (2022). The Effect Of Stream-Based Teaching Materials Using Smart Apps Creator 3 On Students' Scientific Literacy. *International Journal of STEM Education for Sustainability*, *2*(1), 78–93. https://doi.org/10.53889/ijses.v2i1.29

Purwanto, N. (2013). Teaching Principles and Evaluations. Bandung: Remaja Rosda Karya.

Puspitasari, J., Juhadi, J., Suyahmo, S., Wijayanto, P. A., & Saadah, N. (2022). Smartphone Learning Media Prototype Model Based on SAC (Smart Apps Creator) For 4.0 Learning. *International Journal of Social Learning (IJSL)*, *3*(1), 31–47. https://doi.org/10.47134/ijsl.v3i1.75

Reza Habiburrahman, Basrowi Basrowi, & Kurniati Rahmadani. (2023). Development of Learning Media Using Android-Based Smart App Creator in ICT Subjects at SMPN 12 Cilegon. *Journal Of Education And Social Sciences (Jupendis*), *1*(4), 95–105. https://doi.org/10.54066/jupendis.v1i4.873

Sari, L. P., & Erita, Y. (2024). Development of Smart Apps Creator Learning Media in IPAS Learning in Grade V Elementary School. *INNOVATIVE: Journal Of Social Science Research*, *4*(3).

Sarin, A., Mamoh, O., & Suddin, S. (2021). The Use of Audio Visual-Based Teaching Materials in Overcoming Online Learning Difficulties for High School Students. *MATH-EDU: Journal of Mathematics Education*, *6*(2), 50–57. https://doi.org/10.32938/jipm.6.2.2021.50-57

Sife, A. S., Lwoga, E. T., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, *3*(2), 57–67.

Siti Deti Nurhamidah, Atep Sujana, & Dety Amelia Karlina. (2022). Development Of Android-Based Media On Solar System Materials To Improve Students' Mastery Of Concepts. *Journal of Pendas Horizons, 8*(4), 1318–1329. https://doi.org/10.31949/jcp.v8i4.3190

Wafa, A. R. E., Pamungkas, M. D., & Rahmawati, F. (2023). Development of Multimedia Learning Based on the Smart Apps Creator Application Integrated with Pancasila Student Profiles to Improve the Mathematical Literacy Ability of Grade VII Students. *MATH-EDU: Journal of Mathematics Education*, *5*(1), 63–76.