E-Modules of Natural and Social Sciences (IPAS) "Changes in Energy Forms" with FlipHTML5 to Improving the Student Motivation of Elementaray School

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Abstract: In grade IV, students continue to show low learning in learning materials at school, especially in IPAS material. many things that cause one of them is learning media that is still conventional. This study aims to develop a FlipHTML5-assisted electronic module with the aim of improving learning outcomes and motivation. By combining R&D methodology with the ADDIE development concept. With an average result from material validators of 70% which included the "Feasible" category, an average result from media validators of 96%, which included the "Very Feasible" category, and an average result from language validators of 85%, which included the "Very Feasible" category, the findings showed that implementing electronic learning modules with the support of FlipHTML5 was very feasible. By evaluating the effectiveness of FlipHTML5-assisted E-Modules in IPAS subjects and calculating N-Gain and t-test values to determine differences from experimental and control groups, this research has helped in the development of teaching materials and is effectively used in the learning process. The results of the analysis show that the development of electronic modules is feasible, which aims to motivate students to learn.

Keywords: E-Modules; FlipHTML5; Learning media; Learning motivation

Introduction

Nowadays, in the globalized world technology and science are developing rapidly. So that humans are able to balance themselves in the modern era, this progress requires the development and improvement of their abilities (Mulyani Fitri & Haliza Nur, 2021). This has had an impact on many things, including education. With the entry of technology into the world of education, learning patterns have changed (Ulfa & Sari, 2021). If previously learning was teacher-centered, now learning is student-centered. This is a new challenge for education because it has entered the 21st century learning. Teaching and learning skills for this century are needed for this learning to be achieved (Legina & Sari, 2022).

A tool used in activities for instruction and learning is teaching resources. The media functions as a tool to further the objectives by promoting the topic matter (Fadillah et al., 2021). In the meanwhile, instructional resources are essential to the student learning system's achievement of learning goals and learning outcomes in the independent curriculum (Putriani & Kristiantari, 2022). Prioritizing elements such as instructional materials and learning media is necessary since they are crucial elements in the learning process (Rohmah, 2020). According to earlier studies, educators need to provide educational materials to help pupils meet the required learning objectives (Feri & Zulherman, 2021).

According to the research conducted at SDN Cilincing 09 and SDN Cilincing 02 Pagi, the delivery of material using the lecture method is more prevalent.

Only a small part was delivered interactively, mainly through student presentations and facilitated class discussions. Educators use digital media tools, mainly PowerPoint presentations and videos found on YouTube. Students still face problems in learning, especially in maintaining their interest in the subject matter and acquiring problem-solving skills, despite using these educational resources.

A learning module is an element that facilitates learning activities and is a comprehensive learning resource with all necessary instructions and learning materials, all intended to help the learning process reach predefined objectives (Ninawati et al., 2021). Modules allow students to learn independently which results in efficient transfer of information and materials (Hegade et al., 2022). With the advancement of technology, humans intentionally or unintentionally interact with it. One example is the transformation of teaching materials from printed modules to electronic-based modules known as "E-Modules" (Haleem; Javaid, 2022).

E-Modules are digital copies available collection of printed books via gadgets. They may include text, images, or both. This is in line with earlier studies (Almunawaroh, 2020). Additional study demonstrates that interactive E-Modules' adaptability as digital learning materials makes them an appropriate teaching tool for contemporary education (Imansari et al., 2022). It may be possible to increase involvement of students in the IPAS procedure of learning through the use of E-Modules as a learning resource (Zulherman et al., 2021).

Of course, it is important to improve the learning media that contains all learning outcomes as a reference and the application of the IPAS E-Module with the help of FlipHTML5 (Nurhayati et al., 2022).Critical thinking skills are essential for IPAS learning, but are currently not supported. Interviews with teachers revealed that students' critical thinking skills are still inadequate, seen from the way they solve the problems given and the lack of courage to give opinions or ask questions. One of the factors that cause students' ability to think critically is still lacking is due to the teacher-centered IPAS learning approach (Ratnawati et al., 2020).

Researchers are interested in creating learning materials using FlipHTML5 in light of studies on creating educational media. Thus, the goal objective of this study is to create media in the electronic modules format using FlipHTML5 assistance. Researchers said that they were interested in researching the development of FlipHTML5 assisted electronic modules to facilitate the learning of IPAS, especially the material about changing the form of energy.

Method

In this study, R&D is the methodology. R&D is a development research approach that designs specific learning media and evaluates how effective they can be (Sofya & Adzkia, 2023).This R&D method employed in this work is based on the ADDIE model (Ridho et al., 2021; Zulherman et al., 2021).

Such study of research and development can provide particular educational resources that are appropriate for usage in the teaching and learning process by assessing the validity and effectiveness of the media. Subsequently, the media can be utilized to support learning (Roza et al., 2021; Silaban et al., 2022).

This research was carried out in April 2024, the research includes one hundred twenty-two students from grade four of SDN Cilincing 09 and SDN Cilincing 02 Pagi. Through the use of learning media questionnaires and pre and post-test questions FlipHTML5-assisted E-Module was tested to find out how effective the learning media is in increasing students' learning motivation. Quantitative analysis method was used to analyse the data. Data collection strategies include validation of the pilot test and instrument questionnaire to show the importance of the score, N-Gain score results for experimental and control classes and T-Test with the use of a pre and post-test design in one group. The trial assessments given by students and validators were collected at the validation stage to conduct evaluation according to a five-point Likert scale (Mardin et al., 2022; Sunaryo & Soenarto, 2020). The test evaluation results will be shown in the form of a percentage figure that will be used to establish the material to be developed's qualifying category. Table 1 shows the feasibility level of E-Module development with FlipHTML5 as an assessment requirement.

Table 1. Scale of ability to create E-Modules with FlipHTML5

No.	Interpretation	Percentage of Value
1.	Very Worthy	81% - 100%
2.	Worthy	61% - 80%
3.	Decent Enough	41% - 60%
4.	Not Worth It	21% - 40%
5.	Very Not Worth It	0% - 20%

As shown in Table 1. The ability scale for developing FlipHTML5-assisted E-Module media to determine the media qualification category. Experts assess the efficacy of evaluating learning motivation using FlipHTML5-assisted E-Modules on the subject of shifting energy forms by using a Likert scale to verify data. The Likert scale requirements listed in Table 2. are as follows.

To demonstrate the efficacy of the E-Modul improves student's motivation and comprehension of the information on shifting energy form, a T-Test with a pre and post-test design was carried out in one group using the phases of pre and post-test action. The importance of the test for N-Gain for the experimental and control groups was demonstrated using the N-Gain value (Siagian et al., 2019). To conduct data analysis, the pre and post-test results of the students were assessed by adjusting the criteria given in Table 3.

Table 2. Scale of expert assessment and student respons

Category	Score
Very Good	5
Good	4
Enough	3
Less	2
Very Less	1

Table 3. Criteria for N-Gain Score

Gain Index	Gain Criteria
< 40	Not Effective
40 – 55	Less Effective
56 – 75	Moderately Effective
> 76	Effective

The data in this study were processed using SPSS because of its capacity to provide trustworthy statistical data in a variety of forms, including tables, graphs, and percentages, which make information analysis in research easier.

Result and Discussion

Students demonstrate a rapid ability to obtain information and access various resources through digital media in the current digitalization era. The rapid development of technology requires teachers and students to understand and use technological tools in accessing information via electronic platforms (Rostyawati et al., 2021; Saputra et al., 2022). This means that teachers must have the ability to produce educational materials consistently to ensure that students get the best results. Students can understand and implement the basic concepts of learning materials if students have learning media available (Zulfadewina et al., 2020; Zulherman et al., 2021).

According to research Ry-Kottoh (2022), Hegade et al. (2022), students perceive teacher explanation as an important component that contributes to student's lack of knowledge of the subject matter covered in class. Learning more often uses the lecture method and the media used are only whiteboards and PowerPoint. Educators have not integrated electronic modules into teacher learning in the classroom. Students demonstrate

a rapid ability to obtain information and access various sources through digital media in today's digital era (Ninawati et al., 2021; Feri & Zulherman, 2021). Because of this, researchers need to consider what kinds of media may be used to aid students in understanding the material that is delivered in FlipHTML5 aided E-Modules.

Students gain improved reading comprehension, learning performance and positive learning attitudes through electronic modules that motivate and assist students. Therefore, the creation of E-Modules requires the use of software media that can convert material into digital form. FlipHTML5 is software for creating electronic modules (Sari et al., 2022; Sima et al., 2020). This study's findings are consistent with other research demonstrating the value of e-modules in improving students comprehension of course topics (Doyan et al., 2020; Sunaryo & Soenarto, 2020).

This research is a FlipHTML5-assisted teaching module development research on IPAS subjects in the independent curriculum for grade IV elementary school (Mahmudi et al., 2023). Before using the IPAS e-module in the learning process, it is very important to test its quality because an invalid module can affect student understanding and student motivation to be learning (Syafri Yanti & Hufri, 2020). Through feedback and recommendations from experts involved in the assessment process, the validation test can also help improve the quality of this learning media (Amalatus et al., 2021). The validation test is conducted to evaluate the effectiveness of the media. This can help the learning process in various ways, such as language aspects, clarity of material, use of media, and others (Rofidah et al., 2020). As such, the validation test of the IPAS e-module is very important to ensure that the e-module helps students better understand the IPAS material when used in learning.

The validation results show that the IPAS E-Module learning media using FlipHTML5 on the Material of Changing Forms of Energy for Class IV significantly increases the motivation to learn. The assessment conducted by these experts can provide an overview of the learning quality of the e-module created (Offenberger et al., 2019).

The results of the assessment conducted by material experts, media experts, and linguists at the stage of developing E-Module IPAS learning media on the material of changing the form of energy, which is shown in Table 4. The assessment results show that the developed E-Module IPAS meets all the criteria for material, media, and language feasibility, as shown in Figure 1.
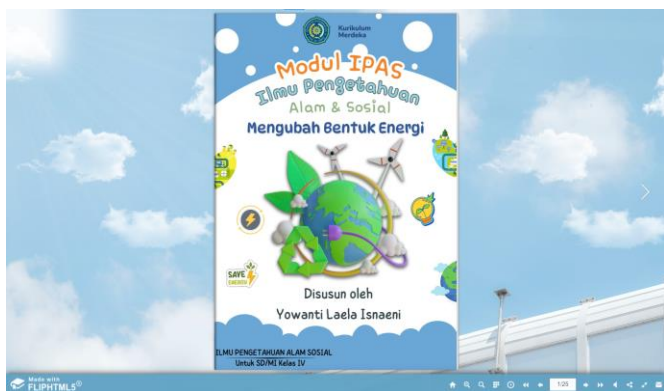
Figure 1. E-Module Design

The developed IPAS E-Module is shown in Figure 1. This media is used to convey material about changing the form of energy in class IV. It is expected that with an attractive design and easy to use, students will be more interested and understand the IPAS material, especially about changing the form of energy.

Tabel 4. Results of Feasibility Analysis by Experts

Validator	Average Percentage	Category
Media	96%	Very Feasible
Material	70%	Feasible
Language	85%	Very Feasible

Table 4. shows the results of the media feasibility test from experts who are very feasible with a percentage of 84%, indicating that the media can be used in learning. This shows that the learning media has fulfilled the CP, TP, and ATP during the design of the E-Module learning media and is suitable for use in IPAS learning about the material of changing forms of energy. The material, media, and linguistic aspects of the IPAS E-Module are highly considered. The language used in the module has been adjusted so that it is easy for students to understand. In addition, visual images help students understand the concept of changing the form of energy.

The effectiveness of E-Modules in grade IV increases students' motivation to learn. Prior studies have demonstrated that integrating digital learning into the can greatly raise student's academic performance (Algani et al., 2021; Zulherman et al., 2021). In other research, electronic modules have been shown to be effective and motivate students to learn (Saputri et al., 2021). The table 5 displays the test's calculation.

Table 5. Average N-Gain scores for experimental and control classes

No.	Experiment Class N-Gain Score	Control Class N-Gain Score
Average	77.95	40.47
Minimum	39.39	00.00
Maximum	100.00	72.60

In light of Table 5. the experimental group's average N-Gain test score after utilizing the E-Module learning media is calculated to be 77.95% placing it in the "Effective" classification. 39.4% was the lowest possible N-Gain score and 100% was the highest possible. The control group, which didn't get the E-Module had an average N-Gain score of 40.47% throughout the same time frame. As was previously noted, the percentage falls into the "Not Effective" category with a minimum N-Gain score of 00.00% and a maximum score of 72.60%. Furthermore, to evaluate the N-Gain score statistical analysis was done the means of a separate T-Test. The research analysis as demonstrated in Table 6.

The examination of statistics of the T-test reveals that the two-tailed significance value (Sig.) is smaller than the predetermined alpha threshold, with a value of 0.00 <0.05. The data clearly shows that the two courses that make use of FlipHTML5-assisted E-Modul learning materials and the ones that don't vary significantly from one another. FlipHTML5-assisted e-modules might increase elementary school students' motivation to learn. This will positively influence the creation of more engaging and dynamic teaching strategies. The findings of this study may stimulate more investigation into how technological advancements might enhance student motivation and academic performance. A number of elements, including the school's setting and degree of technological availability, affect how successful FlipHTML5 aided E-Modules are. It's possible that not all scenarios can be immediately applied to the outcomes. Although this research may indicate a short-term boost in motivation, it should also take into account the long-term implications of employing particular using technology in the lesson.

Table 6. Independent T-Test for N-Gain score

	Statistics	Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
N-Gain Percentage	Equal variances assumed	.599	.441	12.269	120	.000

Table 6. presents the findings of the independent sample test, indicating that the Levene's Test for Equality of Variances has a Sig. value of 0.441, above the significance threshold of 0.05. This implies that both the experimental and control groups variance of the N-Gain (%) data is homogeneous. Sig. (2-tailed) has a value of 0.00<0.05 according to Table 5. "Independent samples test" section. It may be seen that there are considerable

differences in the effectiveness of increasing student motivation and enhancing learning outcomes in IPAS topics pertaining to changing the type of energy for grade IV students.

Conclusion

The application of learning media in the content about altering the form of energy boosts student motivation, particularly for fourth-grade primary school pupils, according to research on the construction of E-Modules with assistance from FlipHTML5. Student motivation for learning is greatly increased when FlipHTML5-assisted E-Module learning materials are used. E-modules with FlipHTML5 support have also been shown to improve learning results. Future studies on the FlipHTML5-based E-Module application are anticipated, with an emphasis on additional features and components that may improve the learning environment.

References

Algani, Y. M. A., Alhaija, Y. F. A., & Awad, N. (2021). The impact of using digital books on the level of motivation of teachers and students to teach and learn mathematics in elementary schools in Palestinian Arab society in Israel. *Turkish Journal of Computer and Mathematics Education (TURCOMAT),* *12*(14), 3025–3043. Retrieved from https://www.turcomat.org/index.php/turkbilma t/article/download/10854/8100

Almunawaroh, N. F. (2020). The Effectiveness of Using an E-book in ELT: worldwide cases. *Journal of Teaching and Learning English in Multicultural Contexts*, *4*(2), 68–74. Retrieved from https://jurnal.unsil.ac.id/index.php/tlemc/article /view/2068

Amalatus, R. B., Alifha, R. N., Ningsih, I. S., Hartono, A.,

& Ikbal, M. (2021). Analisis Studi Kelayakan Laboratorium Ilmu Pengetahuan Alam di SMPN 2 Tempurejo. *VEKTOR: Jurnal Pendidikan IPA*, *2*(1), 49–55. https://doi.org/10.35719/vektor.v2i1.25

Doyan, A., Susilawati, S., & Hardiyansyah, H. (2020). Development of Natural Science Learning Tools with Guided Inquiry Model Assisted by Real Media to Improve Students' Scientific Creativity and Science Process Skills. *Jurnal Penelitian Pendidikan IPA*, *7*(1), 15. https://doi.org/10.29303/jppipa.v7i1.485

Fadillah, A., Nopitasari, D., & Bilda, W. (2021). Development E-Book Learning Media Based on Kvisoft Flipbook Maker. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *12*(2), 312–322. https://doi.org/10.15294/kreano.v12i2.31684

Feri, A., & Zulherman. (2021). Development of nearpod-based e module on science material" energy and its changes" to improve elementary school student learning achievement. *International Journal of Education and Learning*, *3*(2), 165–174. https://doi.org/10.31763/ijelev.v3i2.400

Haleem; Javaid, Q. & S. (2022). Understanding the role of digital technologies in education. *Journal of Educational Science and Technology (EST)*, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

Hegade, P., Abirami, A. M., Kaur, R., & Shettar, A. (2022). Understanding Technological Evolution in Teaching: A Qualitative Data Analysis. *Journal of Engineering Education Transformations*, *3*(1), 187–188. https://dx.doi.org/10.16920/jeet/2024/v37is2/24 110

Imansari, N., Ardi, P., & Endramawan, P. (2022). Development Of Interactive E-books On Digital Circuits To Improve TECHNOLOGY And Engineering Literacy Skills For Electrical Engineering Education Students. *Jurnal Education and Development*, *10*(3), 84-87. Retrieved from https://journal.ipts.ac.id/index.php/ED/article/ view/3829

Legina, N., & Sari, P. M. (2022). Pengembangan Media Pembelajaran Interaktif Articulate Storyline Berbasis Keterampilan Berpikir Kritis pada Pembelajaran IPA bagi Siswa Sekolah Dasar. *Jurnal Paedagogy*, *9*(3), 375. https://doi.org/10.33394/jp.v9i3.5285

Mahmudi, M. R., Yulia Darniyanti, & Anisa Oktaviani. (2023). Pengembangan Modul Ajar Berbantukan Canva Pada Mata Pelajaran Ipas Dalam Kurikulum Merdeka Kelas Iv Sekolah Dasar. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(2), 4910–4921. https://doi.org/10.36989/didaktik.v9i2.1289

Mardin, S., Ramadhan, A., & Ismail, M. (2022). The Development of an Ebook Integrated with Learning

Management System to Improve Student's Metacognition Ability. *Journal of Educational Science and Technology (EST)*, *8*(1), 36. https://doi.org/10.26858/est.v8i1.30947

Mulyani Fitri, & Haliza Nur. (2021). AnalisisPerkembangan Ilmu Pengetahuan dan Teknologi (IPTEK) Dalam Pendidikan. *Jurnal Pendidikan Dan Konseling (JPDK)*, *3*(1), 101–109. Retrieved from https://journal.universitaspahlawan.ac.id/index.php/jpdk/article/view/1432

Ninawati, M., Burhendi, F. C. A., & Wulandari, W. (2021). Pengembangan E-Modul Berbasis Software ispring Suite 9. *Jurnal Educatio FKIP UNMA*, *7*(1), 47–54. https://doi.org/10.31949/educatio.v7i1.830

Nurhayati, P., Emilzoli, M., & Fu'adiah, D. (2022). Peningkatan Keterampilan Penyusunan Modul Ajar Dan Modul Proyek Penguatan Profil Pelajar Pancasila Kurikulum Merdeka Pada Guru Madrasah Ibtidaiyah. *JMM (Jurnal Masyarakat Mandiri)*, *6*(5), 1–9. https://doi.org/10.31764/jmm.v6i5.10047

Offenberger, S., Herman, G. L., Peterson, P., Sherman, A. T., Golaszewski, E., Scheponik, T., & Oliva, L. (2019). Initial Validation of the Cybersecurity Concept Inventory: Pilot Testing and Expert Review. *Proceedings-Frontiers in Education Conference, FIE*, 1–9. https://doi.org/10.1109/FIE43999.2019.9028652

Putriani, N. K., & Kristiantari, M. G. R. (2022). Flipbook Maker-Based Teaching Materials of thematic Learning for grade II Elementary School Students. *Jurnal Ilmiah Sekolah Dasar*, *6*(3), 476–484. https://doi.org/10.23887/jisd.v6i3.47133

Ratnawati, D., Handayani, I., & Hadi, W. (2020). Pengaruh Model Pembelajaran Pbl Berbantu Question Card Terhadap Kemampuan Berpikir Kritis Matematis Siswa SMP. *Edumatica : Jurnal Pendidikan Matematika*, *10*(01), 44–51. https://doi.org/10.22437/edumatica.v10i01.7683

Ridho, S., Wardani, S., & Saptono, S. (2021). Development of Local Wisdom Digital Books to Improve Critical Thinking Skills through Problem Based Learning. *Journal of Innovative Science Education*, *9*(3), 1–7. https://doi.org/10.15294/jise.v9i1.37041

Rofidah, R., Junus, M., & Hakim, A. (2020). Analisis Perbandingan Buku Teks Fisika Siswa SMA Kelas XI Antara Buku Sekolah Elektronik (BSE) dan Buku Non BSE Ditinjau Pada Komponen Kelayakan Isi, Penyajian Materi Ajar, Penyajian Pembelajaran, dan Kebahasaan. *Jurnal Literasi Pendidikan Fisika*, *1*(02), 97–104. https://doi.org/10.30872/jlpf.v1i2.351

Rohmah, F. N. (2020). Pengembangan Media Pembelajaran Interaktif Mata Pelajaran Korespodensi Berbasis Android Menggunakan Articulate Storyline 3. *Jurnal Ecoducation*, *2*(2), 171. Retrieved from http://ejurnal.budiutomomalang.ac.id/index.php/ecoducation/article/download/892/523/

Rostyawati, R., Zulherman, & Bandarsyah, D. (2021). Analytical Effectiveness using Adobe Flash in Learning Energy Source at Primary School. *Journal of Physics: Conference Series*, *1783*(1). https://doi.org/10.1088/1742-6596/1783/1/012125

Roza, L., Aulia, N., & Zulherman, Z. (2021). Analisa Pemanfaatan E-Learning Menggunakan Data Statistik Pengguna Aplikasi Startup Pendidikan Selama Wabah Pandemi Covid-19 Pendahuluan. *Jurnal Pendidikan Sains Indonesia*, *9*(3), 407–420. https://doi.org/10.24815/jpsi.v9i3.20396

Ry-Kottoh, L. A. (2022). Audiobooks: Improving Access to and Use of Learning and Teaching Materials for the Print-Disabled. *The Journal of Electronic Publishing*, *24*(2). https://doi.org/https://doi.org/10.3998/jep.983

Saputri, K. Y., Santoso, S., & Hindrayani, A. (2021). Effectiveness of ARCS Based Economic E-Book to Improve Learning Motivation and Learning Outcomes. *IOP Conference Series: Earth and Environmental Science*, *1808*(1). https://doi.org/10.1088/1742-6596/1808/1/012031

Sari, S. Y., Rahim, F. R., Sundari, P. D., & Aulia, F. (2022). The importance of e-books in improving students' skills in physics learning in the 21st century: A literature review. *Journal of Physics: Conference Series*, *2309*(1). https://doi.org/10.1088/1742-6596/2309/1/012061

Siagian, M. V., Saragih, S., & Sinaga, B. (2019). Development of Learning Materials Oriented on Problem-Based Learning Model to Improve Students' Mathematical Problem Solving Ability and Metacognition Ability. *International Electronic Journal of Mathematics Education*, *14*(2), 331–340. https://doi.org/10.29333/iejme/5717

Sofya, R., & Adzkia, S. F. (2023). Pengembangan E-Modul dengan Aplikasi Canva dan Flipbook Pada Pembelajaran Ekonomi. *Jurnal Ecogen*, *6*(1), 74. https://doi.org/10.24036/jmpe.v6i1.14430

Syafri Yanti, Y., & Hufri, H. (2020). Analisis Kelayakan Modul Fisika Berbasis Konstruktivis Dalam Pembelajaran Inkuiri PAda Materi Pembelajaran Fluida Untuik Meningkatkan HAsil Belajar Siswa Kelas XI SMA. *Physics Education*, *13*(3), 395–402. Retrieved from

https://ejournal.unp.ac.id/students/index.php/pfis/article/view/8379

Ulfa, Y., & Sari, P. M. (2021). Pengembangan Macromedia Flash Berbasis Keterampilan Berpikir Kritis di Sekolah Dasar. *Edukatif : Jurnal Ilmu Pendidikan*, *3*(5), 3131–3144. Retrieved from https://edukatif.org/index.php/edukatif/article/view/1235

Zulfadewina, Z., Sucipto, A., Iba, K., & Zulherman, Z. (2020). Development of Adobe Flash CS6 Multimedia-Based Learning Media on Science Subjects Animal Breeding Materials. *Jurnal Basicedu*, *4*(4), 1308–1314. https://doi.org/10.31004/basicedu.v4i4.551

Zulherman, Z., Amirulloh, G., Purnomo, A., Aji, G. B., & Supriansyah, S. (2021). Development of Android-Based Millealab Virtual Reality Media in Natural Science Learning. *Jurnal Pendidikan Sains Indonesia*, *9*(1), 1–10. https://doi.org/10.24815/jpsi.v9i1.18218