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Developing E-Modules Local Wisdom Based on PBL for Elementary School

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Abstract: This research aims to develop an e-module based on Problem-Based Learning (PBL). The study employs a Research and Development (R&D) approach, utilizing the Borg and Gall model, which was implemented in seven steps. The data sources include students, teachers, and subject matter experts, and data collection was conducted through interviews and documentation. A questionnaire was used as the research instrument. Both qualitative and quantitative data analysis techniques were applied. The outcome of this research is a PBL-based e-module tailored to the needs of fourth-grade students and teachers. Specifically, the e-module covers science and local wisdom topics and was developed using six steps of the Borg and Gall model, with the Flipbook application as the primary tool. The e-module was validated by experts and deemed highly suitable for use in educational settings, with validation results showing high average percentages: 92.65% from media experts, 96.4% from material experts, and 95.4% from language experts, all falling under the "very feasible" category. Student responses averaged 97.5%, and teacher responses from three elementary schools averaged 97.3%, both categorized as "very appropriate." These findings suggest that the PBL-based e-module is effective, engaging, and enhances students' knowledge.

Keywords: E-modules, problem-based learning, IPAS, local wisdom

1. Introduction

Technological advancements in the digital era have significantly impacted the education sector, leading to a paradigm shift in the learning process. Previously, education was centered around the teacher as the primary source of knowledge, with a focus on information delivery. However, this has evolved into equipping students with digital literacy skills, encouraging curiosity, problem-solving abilities, and creativity. As a result, the rapid development of technology presents both opportunities and challenges for the educational system today (Aspi & Syahrani, 2022). Furthermore, the independent curriculum emphasizes the integration of technology to enhance the effectiveness and efficiency of learning processes (Masfufah et al., 2022). This has motivated teachers to incorporate technology into their teaching strategies, aiding students in better understanding the learning material (Rahma et al., 2023; Sulistyarini & Fatonah, 2022).

Currently, elementary schools in Indonesia implement both the 2013 curriculum and the independent curriculum, with the latter being introduced in grades one and four. The independent curriculum, launched in 2022, aims to address learning losses caused by the pandemic (Kemendikbud, 2022). However, based on interviews conducted with fourth-grade teachers at several elementary schools in Ngasem on April 12-13, 2023, it was found that student motivation and learning outcomes remain low. Students exhibit a lack of concentration and enthusiasm in the learning process, and teachers face challenges in implementing the independent curriculum. The traditional lecture-based teaching methods do not engage students, resulting in passive learning and poor outcomes. Moreover, the absence of technology in the learning process, particularly in science subjects like IPAS, contributes to students' difficulties in grasping concepts, as they rely heavily on rote memorization. The teaching materials, primarily sourced from government-issued books, are often unengaging and difficult for students to understand.

To address these issues, teachers must be proficient in the subject matter, and adopt approaches, strategies, and learning models that align with students' needs, creating meaningful learning experiences that incorporate technology

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(Fakhriyah et al., 2023; Ilmi & Reskiani, 2022; Rahayuningsih & Muhtar, 2022; Rahayu et al., 2022). Integrating technology in the classroom, such as through e-modules, can make the learning process more engaging and conducive (Cahyanto & Afifulloh, 2020). In addition to technology, selecting an appropriate learning model that matches students' characteristics is crucial. Problem-Based Learning (PBL) is one such model that centers on students, presenting them with real-life problems to solve, thereby fostering critical thinking, motivation, and a deeper understanding of concepts (Tanjung et al., 2022; Sari et al., 2019; Barrows & Tamblyn, 1980).

The use of e-modules in PBL has been shown to enhance student engagement and learning outcomes (Kurniati et al., 2021; Fidan & Tuncel, 2019; Yovianda et al., 2019). Research indicates that digital teaching materials can capture students' attention and are well-suited for use in educational settings (Bahri et al., 2024; Yunansah et al., 2022). Furthermore, PBL-based media are particularly effective in teaching science, as they encourage problem-solving skills and practical application (Pulungan & Hasanah, 2022; Putri, 2022; Mella et al., 2022).

This study aims to develop a PBL-based e-module focused on science content and local wisdom in Jepara, such as torch wars, Ramban parties, and torso weaving. The e-module will be created using the Flipbook application and is designed to address the specific needs identified through field research. The development process follows the Borg and Gall (2007) model, which includes the following steps: 1) identifying potential and problems; 2) data collection; 3) product design; 4) design validation; 5) design revision; 6) initial trials; and 7) product revision. This research seeks to design an e-module, evaluate its feasibility, and assess its effectiveness in improving learning outcomes for elementary school students.

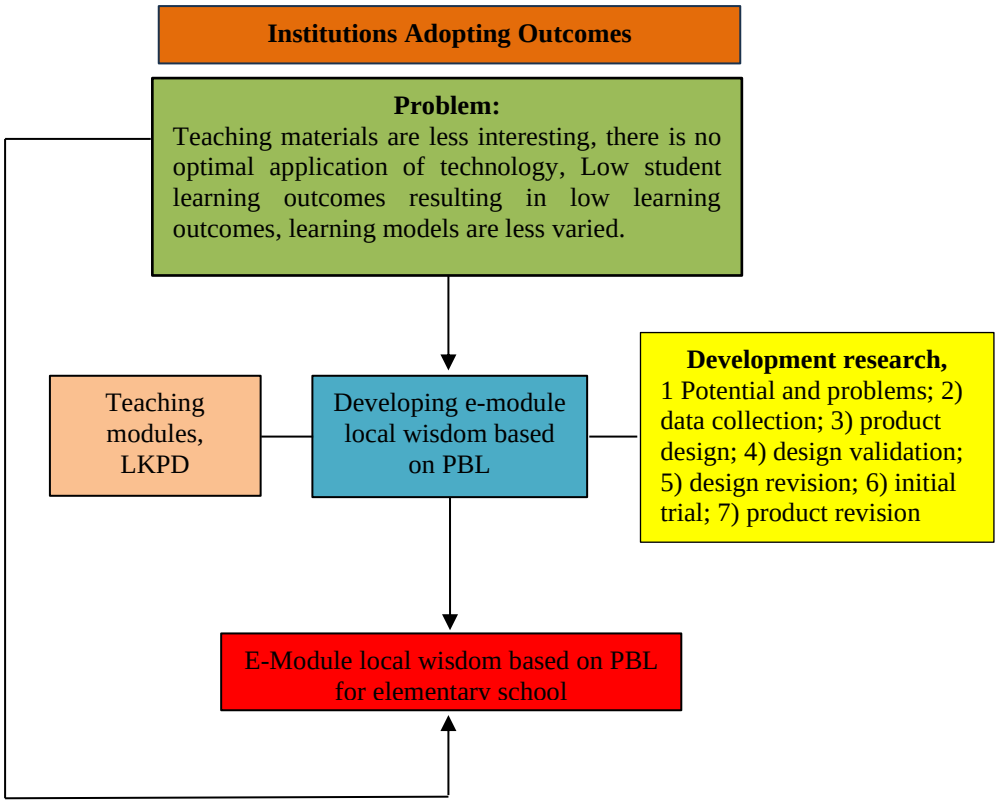

Fig. 1 Conceptual framework

2. Methodology

This research employs a Research and Development (R&D) design aimed at developing a product and evaluating its effectiveness through systematic procedures and steps (Fransisca et al., 2019). The product developed in this study is a Problem-Based Learning (PBL)-based e-module that integrates local wisdom and science content. The development model adopted for this research is the Borg and Gall model, which traditionally comprises 10 stages (Sugiyono, 2016). However, this study utilizes only 7 stages of the model, which are as follows: 1) identifying potential and problems; 2) data collection; 3) product design; 4) design validation; 5) design revision; 6) initial testing; and 7) product revision (Borg & Gall, 2007).

The respondents in this study include three elementary school teachers from SD Ngasem 5, SD Ngasem 4, and SD Ngasem 1, as well as fourth-grade students from these schools. Additionally, media, language, and content experts from

Muria Kudus University and PGRI University Yogyakarta were involved. The sampling technique employed is simple random sampling, which allows for the random selection of participants without considering strata, ensuring that every member of the population has an equal chance of being included (Sugiyono, 2016).

The research instruments used in this study include interview guides, tests, and a needs analysis questionnaire comprising 25 questions to assess the requirements of both students and teachers for teaching materials. Additionally, validation instruments were utilized to gather feedback from teaching material experts and content experts. Response instruments, in the form of questionnaires, were distributed directly to teachers, students, and experts to gather their input on the developed e-module.

Table 1: Description of the average e-module assessment

Achievement level	Category	Information
81% - 100%	Very good	Very valid/very worthy/not revised
61% - 80%	Good	Valid/eligible/not revised
41% - 60%	Enough	Valid enough/quite worthy/revised
21% - 40%	Not enough	Invalid/inadequate/requires revision
0%-20 %	Very less	Very invalid/very inappropriate/requires revision

(Source: Purwanto, 2018)

3. Results

In developing the design of e-modules, the first step is planning the product to be developed. The planning stage is very important so that the product developed meets the needs of fourth-grade elementary school teachers and students. The planning stage includes material planning and e-module design. Material planning was carried out by dissecting CP, making TP, and ATP, and collecting class IV material regarding local wisdom, apart from looking for material through article sources and books related to local wisdom in Jepara. The next step is to make LKPD, questions and videos about local wisdom. The final step is planning the e-module design by creating the e-module flow, e-module design, placing images and text, and selecting letters and colors, apart from planning so that the e-module looks attractive. The following is a PBL-based e-module design containing IPAS material on Jepara local wisdom.

(a) Cover e-modules (b) Instructions using e-modules (c) Modules material (d) E-modules evaluation

Fig. 2: Module design

The results obtained from the validation test showed that e-module-based problem learning is very good and feasible to use. Table 2 shows the PBL-based e-module was validated by two media experts from UMK lecturers at the Faculty of Education. There were three aspects assessed, namely the skin design aspect (cover), the e-module content design aspect, and the visual communication aspect (display) which had an attractive appearance which was described in 15 questions. Based on the table above, validation was carried out once because it was deemed feasible without revision from the media validator with an average value of 92.65.

Table 2: The validation result of media experts

Expert	Validation results	Validation criteria
Media Experts 1	92.0	Very valid/very worthy/not revised
Media Experts 2	93.3	Very valid/very worthy/not revised
The average validation value		92.65

Table 3 shows the Material validation was carried out by two UPY lecturers at the Faculty of Education. The e-module assessment consisted of five aspects, namely self-instruction, self-contained, stand-alone, adaptive, and user

friendly which were explained in 25 questions. The average score of material expert validators was 96.4 It can be concluded that the E-module is suitable for use in the learning process.

Table 3. The validation result of learning experts

Expert	Validation results	Validation criteria
Learning Experts 1	97.6	Very valid/very worthy/not revised
Learning Experts 2	95.2	Very valid/very worthy/not revised
The average validation value		96.4

Table 4 shows the average score of linguist expert validators is 95.4. It can be concluded that the E-module is suitable for use in the learning process. The results of trials on fourth-grade teachers at 5.4.1 Ngasem Elementary School, an average percentage of 97.3% of the e-module was found to be in the very feasible category.

Table 4: The validation result of linguist experts

Expert	Validation results	Validation criteria
Linguist Experts 1	94	Very valid/very worthy/not revised
Linguist Experts 2	96	Very valid/very worthy/not revised
The average validation value		95.4

Product trials were carried out on class IV students and class teachers. Researchers took a sample of several grade 4 students at 5,4,1 Ngasem elementary school, with a total of 17 students consisting of 7 female students and 10 male students, the results of product trials on students obtained an average percentage of 97.5% e-module is included in the very feasible category.

Table 5: The Results of e-module validation by the teacher

Respondent	School	Acquisition value	Maximum Value	%	Validation Criteria
RTY	Elementary School 5 Ngasem	98.4	100	98	Very valid
DN	Elementary School 4 Ngasem	96.8	100	97	Very valid
IMM	Elementary School 1 Ngasem	96.8	100	97	Very valid
The average validation value is		97.3			

4. Discussion

The product design of the e-module was carried out using the Flipbook application. The initial stage of the design process involved analyzing the Core Competencies (CP), formulating Learning Objectives (TP), and gathering relevant fourth-grade material on local wisdom from various sources, including articles and books related to Jepara's cultural heritage. This approach aligns with the findings of Friska et al. (2022), who emphasized the importance of thoroughly analyzing the material, CP, and learning objectives during the design phase. Similarly, Apreasta et al. (2023), Fitri & Iryani (2023), and Susilawati et al. (2023) support the practice of conducting a thorough material analysis and preparing CP and TP to ensure that the content is relevant to the topic under discussion.

Subsequent steps in the design phase included creating the cover, summarizing the material, developing the Learning Activity Sheets (LKPD), crafting evaluation questions, and selecting appropriate images and videos from YouTube. Once these elements were finalized, they were integrated into the e-module. This process is consistent with the research of Wahyuni & Eliza (2022) and Karima & Fitriah (2021), who outlined similar steps in the design stage, including the creation of a cover, table of contents, material content, and author bio.

The feasibility of the PBL-based e-module was assessed through validation by experts in media, material, language, as well as by teachers and students. The e-module was evaluated based on predetermined eligibility criteria and was found suitable for use after a single round of validation. The validation results showed high approval ratings, with media experts rating it at 92.65%, material experts at 96.4%, and language experts at 92.65%, all falling into the "very appropriate" category. Teacher and student assessments further supported this, with scores of 97.3% and 97.5%, respectively.

Cahyani and Gusman (2023) emphasize that the feasibility of an e-module is determined by validation from experts. In their study, validation by three media and material experts yielded an average score of 86.7% for media experts (categorized as "very feasible") and 80% for material experts ("feasible"). This supports the conclusion that the e-module developed in this study is indeed suitable for educational use. Similarly, Haq et al. (2023), Ajri and Diyana (2023), and Putri & Santosa (2023) found that PBL-based e-modules were deemed "very feasible," with material experts giving a 76% approval rating and media experts an average of 82%. Additionally, Marselina (2023) and Milanti et al. (2023)

reported that PBL-based e-modules are highly suitable for use according to evaluations by experts in media, material, and pedagogy, as well as by teachers and students.

5. Conclusion

Based on the results of this study, the following conclusions were drawn. The product design process involved careful material planning and e-module design. Material planning included analyzing the Core Competencies (CP), developing Learning Objectives (TP) and Achievement Targets (ATP), and gathering relevant fourth-grade content on local wisdom from various sources, including articles and books related to Jepara. Subsequently, Learning Activity Sheets (LKPD), questions, and videos about local wisdom were developed. The final phase involved planning the e-module design, which included organizing the content flow, designing the visual layout, placing images and text, and selecting appropriate fonts and colors to ensure the e-module is both educational and visually appealing. The e-module was created using the Flipbook application. The PBL-based e-module, which integrates science content with local wisdom, was validated and found to be highly suitable for use in educational settings. The validation results showed high ratings across various criteria: 92.65% from media experts, 96.4% from material experts, and 95.4% from language experts, all categorized as "very feasible." Additionally, student responses averaged 97.5%, and teacher responses across three elementary schools averaged 97.3%, both also categorized as "very feasible." These findings indicate that the e-module is well-suited for implementation in learning activities. It is recommended that students utilize the PBL-based e-module effectively, following the instructions provided by their teachers. Teachers are encouraged to maximize the use of this e-module in their teaching and to consider developing additional technology-based learning media, leveraging the facilities available in their schools, such as Wi-Fi and other technological resources. This approach can further enhance the effectiveness of learning activities and support the integration of technology in education.

References

Ajri, A. S., & Diyana, T. N. (2023). Pengembangan E-Modul berbasis problem based learning berbantuan liveworksheets untuk mengoptimalkan keterampilan pemecahan masalah. *Jurnal Kajian Pendidikan IPA*, *3*(2), 223-234. https://doi.org/10.52434/jkpi.v3i2.2377

Alimuddin, A., Juntak, J. N. S., Jusnita, R. A. E., Murniawaty, I., & Wono, H. Y. (2023). Teknologi dalam pendidikan: Membantu siswa beradaptasi dengan revolusi industri 4.0. *Journal on Education*, *5*(4), 11777-11790.

Apreasta, L., Susilawati, W. O., & Nopiyanti, R. (2023). Pengembangan Media Monosa (Monopoli Bahasa) Pembelajaran Bahasa Indonesia Materi Lihat Sekitar Kelas IV Sekolah Dasar. *Jurnal IKA PGSD (Ikatan Alumni PGSD) UNARS*, *13*(1), 59-69. https://doi.org/10.36841/pgsdunars.v13i1.3059

Aspi, M., & Syahrani, S. (2022). Profesional guru dalam menghadapi tantangan perkembangan teknologi pendidikan. *Adiba: Journal of Education*, *2*(1), 64-73.

Bahri, S., Utaminingsih, S., & Setiadi, G. (2024). The Evaluation of Curriculum 2013 Implementation. *ICCCM Journal of Social Sciences and Humanities*, *3*(1), 60-67. https://doi.org/10.53797/icccmjssh.v3i1.8.2024

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education* (Vol. 1). Springer Publishing Company.

Borg, R. W., & Gall, M. D. (2007). Educational Research: An Introduction. The Eight Edition. *New. York & London: Longman*.

Cahyani, M. D., & Gusman, T. A. (2023). Desain dan Uji Validitas e-Modul Perkuliahan Kimia Fisika Berbasis Problem Based Learning. *Orbital: Jurnal Pendidikan Kimia*, *7*(1), 117-125. https://doi.org/10.19109/ojpk.v7i1.17499

Cahyanto, B., & Afifulloh, M. (2020). Electronic Module (E-Module) Berbasis Component Display Theory (CDT) Untuk Matakuliah Pembelajaran Terpadu. *JINOTEP (Jurnal Inovasi Dan Teknologi Pembelajaran): Kajian Dan Riset Dalam Teknologi Pembelajaran*, *7*(1), 49-56. https://doi.org/10.17977/um031v7i12020p049

Fakhriyah, F., Masfuah, S., & Hilyana, F. S. (2023). Analysis of Student Generic Skills in terms of Scientific Literacy Aspects through Research-Based Learning Methods. *Pegem Journal of Education and Instruction*, *13*(3), 395-400. https://doi.org/10.47750/pegegog.13.03.40

Fitri, I. A., & Iryani, I. (2023). Validitas E-Modul Kimia Sma Kelas XI Berbasis Problem Based Learning Pada Materi Laju Reaksi Fase F. *Prima Magistra: Jurnal Ilmiah Kependidikan*, *4*(4), 579-589. https://doi.org/10.37478/jpm.v4i4.3221

Fransisca, S., & Putri, R. N. (2019). Pemanfaatan Teknologi RFID Untuk Pengelolaan Inventaris Sekolah Dengan Metode (R&D). *Jurnal Mahasiswa Aplikasi Teknologi Komputer dan Informasi (JMApTeKsi)*, *1*(1), 72-75.

Friska, S. Y., Nurhalida, N., & Susilawati, W. O. (2022). Pengembangan E-Modul IPA tema 6 subtema 2 materi siklus

hidup hewan berbasis Problem Based Learning berbantu flipbook maker di Kelas IV Sekolah Dasar. *JEMS: Jurnal Edukasi Matematika dan Sains*, *10*(2), 377-382. http://doi.org/10.25273/jems.v10i2.13298

Haq, A. Z., Wijoyo, S. H., & Rahman, K. (2023). Pengembangan e-Modul Pembelajaran "Informatika" menggunakan Metode Research and Development (R&D). *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, *7*(4), 1883-1891.

Husna, K., Kusasi, M., & Zuwida, H. (2021, November). Development of flipbook e-module problem-based learning (PBL) learning model to increase students' learning outcomes in oxidation-reduction reaction material. In *Journal of Physics: Conference Series* (Vol. 2104, No. 1, p. 012024). IOP Publishing. https://doi.org/10.1088/1742-6596/2104/1/012024

Ilmi, N., & Reskiani, W. (2022). Penerapan Model Pembelajaran Drta (Directed Reading Thinking Activity) Untuk Meningkatkan Hasil Belajar Membaca Pemahaman Siswa SD Negeri 209 Salobulo Kabupaten Wajo. *JIPD (Jurnal Inovasi Pendidikan Dasar)*, *6*(2), 73-78. https://doi.org/10.36928/jipd.v6i2.1222

Kemendikbud. (2022). *Keputusan menteri pendidikan, kebudayaan, riset, dan teknologi republik indonesia nomor 56/M/2022/ tentang pedoman penerapan kurikulum dalam rangka pemulihan pembelajaran*.

Kurniati, R. D., Andra, D., & Distrik, I. W. (2021, February). E-module development based on PBL integrated STEM assisted by social media to improve critical thinking skill: A preliminary study. In *Journal of Physics: Conference Series* (Vol. 1796, No. 1, p. 012077). IOP Publishing. https://doi.org/10.1088/1742-6596/1796/1/012077

Malmia, W., Makatita, S. H., Lisaholit, S., Azwan, A., Magfirah, I., Tinggapi, H., & Umanailo, M. C. B. (2019). Problem-based learning as an effort to improve student learning outcomes. *Int. J. Sci. Technol. Res*, *8*(9), 1140-1143.

Mella, B., Wulandari, I. G. A. A., & Wiarta, I. W. (2022). Bahan ajar digital interaktif berbasis problem based learning materi keragaman budaya. *Jurnal Penelitian Dan Pengembangan Pendidikan*, *6*(1), 127-136. https://doi.org/10.23887/jppp.v6i1.46368

Marselina, D. Y., & Hindun, N. (2023). Pengembangan E-modul Materi Keragaman Hayati Berbasis Problem Based Learning pada Siswa SMP Kelas VIII. *Paradigma: Jurnal Filsafat, Sains, Teknologi, dan Sosial Budaya*, *29*(2), 65-78. https://doi.org/10.33503/paradigma.v29i2.3303

Masfufah, R. A., Muyasyaroh, L. K., Maharani, D., Saputra, T. D., Astrianto, F., & Dayu, D. P. K. (2022). Media Pembelajaran Canva untuk Meningkatkan Motivasi Belajar pada Pembelajaran Kurikulum Merdeka. In *Prosiding Seminar Nasional Bahasa, Sastra, Seni, dan Pendidikan Dasar (SENSASEDA)* (Vol. 2, pp. 347-352).

Milanti, A. A., Lasambouw, C. M., & Maulana, M. Y. (2023). Validasi E-Modul Berbasis Mobile Learning dalam Pembelajaran Inovatif Pendidikan Kewarganegaraan. *Journal of Education Research*, *4*(4), 1543-1552. https://doi.org/10.37985/jer.v4i4.482

Panggabean, D., & Hidayat, D. (2022). Integrasi Teknologi Pembelajaran dalam Aktivitas Belajar dan Mengajar. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *5*(11), 5020-5024. https://doi.org/10.54371/jiip.v5i11.1061

Pulungan, H., & Hasanah, H. (2022). Pengembangan Media Pembelajaran Ipa Menggunakan Animaker Berbasis Problem Based Learning (Pbl) Pada Materi Perubahan Wujud Benda Di Kelas IV SD. *Jurnal Penelitian Pendidikan MIPA*, *6*(2), 22-27. https://doi.org/https://doi.org/10.32696/jp2mipa.v6i2.1130

Purwanto, P. (2018). Teknik Penyusunan Instrumen Uji Validitas Dan Reliabilitas Penelitian Ekonomi Syariah. *Magelang: Staiapress*.

Rahayu, R., Iskandar, S., & Abidin, Y. (2022). Inovasi Pembelajaran Abad 21 Dan Penerapannya Di Indonesia. *Jurnal Basicedu*, *6*(2), 2099–2104. https://doi.org/10.31004/basicedu.v6i2.2082

Rahayuningsih, Y. S., & Muhtar, T. (2022). Pedagogik Digital Sebagai Upaya untuk Meningkatkan Kompetensi Guru Abad 21. *Jurnal Basicedu*, *6*(4), 6960–6966. https://doi.org/10.31004/basicedu.v6i4.3433

Rahma, F. A., Harjono, H. S., & Sulistyo, U. (2023). Problematika Pemanfaatan Media Pembelajaran Berbasis Digital. *Jurnal Basicedu*, *7*(1), 603–611. https://doi.org/10.31004/basicedu.v7i1.4653

Sari, Y. P., Serevina, V., & Astra, I. M. (2019, April). Developing E-Module for fluids based on problem-based learning (PBL) for senior high school students. In *Journal of Physics: Conference Series* (Vol. 1185, No. 1, p. 012052). IOP Publishing. https://doi.org/10.1088/1742-6596/1185/1/012052

Sugiyono, S. (2016). Metode penelitian kuantitatif, kualitatif, R&D. *Bandung: Alfabeta*, 1-11.

Sulistyarini, W., & Fatonah, S. (2022). Pengaruh Pemahaman Literasi Digital dan Pemanfaatan Media Pembelajaran Terhadap Kompetensi Pedagogik Guru Era Digital Learning. *Journal of Educational Learning and Innovation*

(ELIa), *2*(1), 42-72. https://doi.org/10.46229/elia.v2i1.383

Susilawati, W. O., Friska, S. Y., & Yustika, S. I. (2023). Pengembangan E-Modul Pendidikan Pancasila Kelas IV dalam Kurikulum Merdeka di Sekolah Dasar. *Innovative: Journal Of Social Science Research*, *3*(2), 7976-7987. https://doi.org/10.31004/innovative.v3i2.1336

Yovianda, F., Juliani, R., & Hasibuan, K. A. (2019, October). Application of problem based learning (PBL) to increasing student activity in the subject matter of temperature and heat. In *Journal of Physics: Conference Series* (Vol. 1317, No. 1, p. 012157). IOP Publishing. https://doi.org/10.1088/1742-6596/1317/1/012157

Yunansah, H., Yuniarti, Y., Herlambang, Y. T., Hendriyani, A., & Wahid, R. (2022). Rancang Bangun Media Bahan Ajar Digital Berbasis Multimodalality dalam Pendekatan Pedagogik Futuristik. *Jurnal Kajian Penelitian Dan Pendidikan Dan Pembelajaran*, *6*(2), 1136–1149. https://doi.org/10.35568/naturalistic.v6i2.1881

Zulfitria, Z., Ansharullah, A., & Fadhillah, R. (2020, October). Penggunaan teknologi dan internet sebagai media pembelajaran di masa pandemi covid-19. In *Prosiding Seminar Nasional Penelitian LPPM UMJ* (Vol. 2020), 1-10.