

Development of a Problem-Based Learning E-Module for Pancasila Education to Improve Eighth-Grade Students' Learning Outcomes at SMP Bani Abdillah Bogor

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ABSTRACT

This study aimed to develop a Problem Based Learning (PBL)-based Pancasila Education e-module on the topic of Indonesia as a State of Law to improve the learning outcomes of eighth-grade students at SMP Bani Abdillah Bogor. The study was motivated by low student achievement, with 20 of 30 students (67%) scoring below the Learning Objective Achievement Criteria (KKTP), caused by the abstract presentation of legal content and the scarcity of interactive digital teaching materials. The research employed a Research and Development (R&D) approach that integrated the Rowntree and Lee & Owens instructional design models into six combined phases, together with a mixed-methods embedded experimental design. Data were collected through expert validation sheets, practicality questionnaires, and pre-test and post-test. The e-module was rated highly feasible, with an average expert validation score of 95.42%. Practicality reached 91.0%, 92.2%, and 93.1% in the one-to-one, small-group, and large-scale field trials, respectively. The average pre-test score of 18.73 increased to 19.73 at post-test, with an average Normalized Gain (N-Gain) of 0.8167 (high category) and a paired-sample t-test significance of 0.0304 (< 0.05). The PBL-based e-module is valid, feasible, practical, and effective for improving students' learning outcomes.

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1. INTRODUCTION

Educational development requires the education sector to continually adapt, particularly in responding to the characteristics of learners who have grown up as digital natives, that is, a generation born and raised alongside digital technology from an early age [1]. These characteristics demand a transformation from conventional teaching methods toward methods that are more interactive, contextual, and technology-based, including in Pancasila Education, which has long been associated with lecturing and rote memorization. Recent studies of the learning behavior of the digital generation confirm that today's students respond better to visual, concise, and interactive materials than to one-way expository formats [2]–[4]; hence, the gap between students' learning characteristics and the format of conventional teaching materials needs to be bridged promptly.

Islam regards education as a noble and strategic process in building human civilization. The Qur'an emphasizes the importance of knowledge, as stated in Surah Az-Zumar verse 9, which in

essence states that those who know are not equal to those who do not know, and that only people of sound reason (*ululalbab*) can take heed of the lesson. This verse affirms that education is not merely the transfer of knowledge but also a process of shaping wise ways of thinking and attitudes, so that education plays a central role in elevating human dignity.

Education is the main foundation for shaping the character and quality of a nation's human resources. Law No. 20 of 2003 on the National Education System [5] stipulates that the goal of national education is to develop learners' potential so that they become individuals who are faithful, knowledgeable, capable, creative, and independent, as well as democratic and responsible citizens. One subject that plays a strategic role in shaping such character is Pancasila Education, which serves as a vehicle for instilling national values, legal awareness, and a spirit of nationhood and statehood.

One important topic in eighth-grade junior high school Pancasila Education is Indonesia as a State of Law. This topic is highly relevant because it relates directly to students' understanding of the supremacy of law, citizens' rights and obligations, and the principles of the rule of law adopted by Indonesia. Learning this topic also serves as a means of cultivating legal awareness from an early age, which, according to recent civic education studies, is strongly correlated with contextual and meaningful Pancasila and Civic Education (*PPKn*) learning rather than mere normative memorization [6]–[8]. However, student score data for eighth-grade students at SMP Bani Abdillah Bogor in the 2025/2026 academic year show that, of 30 students, 20 (67%) were in the low category, i.e., below the Learning Objective Achievement Criteria (*Kriteria Ketercapaian Tujuan Pembelajaran*, KKTP), while only 10 students (33%) had reached the KKTP. This condition indicates that most students have difficulty explaining and implementing the concept of Indonesia as a state of law, including the norms of everyday life and the hierarchy of statutory regulations in Indonesia.

Initial observations and interviews with the Pancasila Education teacher showed that eighth-grade students tend to have difficulty understanding legal concepts that are abstract, hierarchical, and doctrinal. The limited availability of interactive digital learning resources means that this material, which is heavy with formal legal structure, is often delivered through monotonous conventional methods, so that learning becomes trapped in theoretical memorization. The essence of the State of Law topic at the junior high school level is not merely to require students to memorize constitutional articles but to train their juridical sensitivity in addressing legal violations in their surroundings. Therefore, this topic calls for a Problem Based Learning (PBL) model, which places real problems as the starting point of students' knowledge construction [9]–[11], integrated into an interactive e-module so that real cases, such as violations of school rules, can be used as the main learning stimulus.

Advances in information and communication technology open great opportunities for learning innovation, one of which is the development of the electronic module (e-module), a digital teaching material designed systematically and interactively that can contain text, images, video, animation, and interactive quizzes in a single integrated medium. To maximize the effectiveness of the e-module, the PBL approach is used, a learning model that places real problems as the starting point of learning and encourages students to actively seek solutions through investigation, collaboration, and reflection. The novelty of this study lies in developing an e-module that specifically formulates the PBL syntax to dissect the topic of Indonesia as a State of Law for eighth-grade junior high school students, a domain that has been studied far less than the application of PBL in science or mathematics.

Previous studies have developed PBL-based e-modules for science subjects [12], [13], mathematics, and Pancasila Education [14]–[16]; however, most of them still used a single development model (such as ADDIE or 4D) and focused on the elementary school level, supported by media such as videos, Wordwall, or Powtoon. Research that specifically integrates two instructional development models (Rowntree and Lee & Owens) to produce a Pancasila Education e-module on the topic of Indonesia as a State of Law for the junior high school level, using the Canva platform as a no-code production medium, has rarely been studied. This gap underlies the urgency of this study and constitutes the novelty that distinguishes it from similar previous studies.

Based on the above description, the research questions of this study are: (1) what is the procedure for developing a PBL-based e-module on the topic of Indonesia as a State of Law; (2) does

the e-module meet the feasibility criteria for use in learning; and (3) how effective is the e-module in improving student learning outcomes. In line with these questions, this study aims to analyze the development procedure, feasibility, and effectiveness of the PBL-based Pancasila Education e-module on the topic of Indonesia as a State of Law for eighth-grade students of SMP Bani Abdillah Bogor. Theoretically, this study is expected to enrich the body of knowledge in educational technology, particularly regarding the integration of instructional development models and the application of PBL in doctrinal subjects. Practically, this study is expected to benefit students in building meaningful understanding, teachers as an alternative innovative learning medium, schools in supporting the implementation of the *Kurikulum Merdeka* (Independent Curriculum), and future researchers as a reference for developing similar media for other Pancasila Education topics.

2. THEORETICAL FRAMEWORK

Educational technology, at the macro level, is understood as the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources [17]. One of its main domains is development, i.e., the process of translating design specifications into concrete products, whether in print technology, audiovisual technology, or integrated digital forms. In academic practice, educational technology is realized through development research, or Research and Development (R&D), a systematic study of design, development, and evaluation processes intended to build an empirical basis for new products and instructional models [18].

Instructional development models serve as the procedural framework for R&D, guiding the systematic process from initial analysis to final evaluation, and have evolved historically since the mid-twentieth century in response to increasingly complex learning needs [19]. Various models have been developed by experts, including Dick and Carey, which excels in the thoroughness of formative evaluation but is relatively rigid at the revision stage [20]; ADDIE (Analyze, Design, Develop, Implement, Evaluate), which is flexible and outcome-oriented but less detailed in its evaluation mechanisms [21], [22]; Borg and Gall, which is comprehensive but requires a very long implementation time and is therefore less suitable for a master's thesis; Jerold E. Kemp, which is non-linear and flexible in its development starting point [23]; and ASSURE, which was designed specifically for classroom learning needs. A comparison of these models shows that no single model can accommodate both the depth of pedagogical content and the technical engineering of digital multimedia at the same time.

To produce a valid and feasible product, this study synergistically integrates two instructional development models: the Rowntree Model and the Lee & Owens Model. The Rowntree Model is positioned as the fundamental framework that guides the macro structure of the curriculum and the writing of the material script because of its strength in designing self-instructional materials (self-regulated learning) through three sub-stages, namely writing preparation, writing and editing, and production specification [24]. Meanwhile, because Rowntree is limited in the technical execution of modern multimedia, the Lee & Owens Model [25] is used as an advanced technical engineering framework, covering front-end analysis, interface design, digital prototyping, programming of interactive features, and multilayer formative evaluation (one-to-one, small-group, and field trials).

The integration of the two models is elaborated into six combined phases. Phase 1 (Assessment & Analysis) maps the gap between ideal and actual conditions in the field, including analysis of student characteristics, device availability, and cost and time constraints. Phase 2 (Planning & Design) prepares a tiered concept map of the material along with the technical product specifications, navigation architecture, and functional icon visualization. Phase 3 (Writing & Editing) focuses on drafting the teaching material, including a contextual case study as a trigger for problem-based discussion. Phase 4 (Development) transforms the script into a digital product that is validated by experts. Phase 5 (Implementation) tests the product gradually with real users, accompanied by a remediation loop mechanism. Phase 6 (Evaluation) conducts a large-scale field trial to measure the product's effectiveness, followed by final refinement (final freezing) before the product is disseminated. Through this integration, Rowntree provides a structured content-development framework, while Lee & Owens ensures that the production and evaluation of the digital media are carried out technically and scientifically.

The e-module design is built on an epistemological foundation that integrates three learning-theory paradigms. Behaviorism is applied through instant feedback on interactive quizzes in line with the principle of operant conditioning [26]; cognitivism regulates the flow of information processing so as to avoid cognitive overload by presenting material that is graded from concrete to abstract concepts [27]; and constructivism is the culmination of the instructional objectives, in which students are given autonomy (learner control) to construct their own legal understanding through dilemmatic cases presented in the PBL syntax [28], complemented by hard scaffolding in the form of a digital glossary and trigger videos. The selection of Canva as the production platform is also in line with the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes teachers' integrated mastery of technology, pedagogy, and content in designing learning media [29].

Problem Based Learning (PBL) is a student-centered learning model that uses open-ended, ill-structured real-world problems as the initial context for students to construct knowledge while developing critical thinking and problem-solving skills [9]–[11]. In this study, PBL is operationalized through five syntax steps: orienting students to the problem through the case study of “Budi,” who violates school rules; organizing students for learning; guiding individual and group investigation; developing and presenting work products; and analyzing and evaluating the problem-solving process. The effectiveness of PBL in improving critical thinking skills and learning outcomes has been consistently confirmed across educational levels and subjects, from mathematics [30]–[34] to social studies and elementary school learning [35], [36], which strengthens the rationale for choosing PBL as the pedagogical framework for developing this e-module. This approach was chosen because it suits the characteristics of the State of Law topic, which demands logical, contextual, and solution-oriented reasoning, thereby changing students' passive, memorization-based learning pattern into an active and critical process of inquiry.

A digital module, or e-module, is a form of self-instructional teaching material presented systematically and interactively in digital learning units that can be accessed flexibly through various electronic devices without limitations of space and time. Unlike conventional printed modules, which are static and one-way, e-modules offer high interactivity that combines text, graphics, audio, animated video, and adaptive evaluation quizzes. In this study, the product was developed using Canva, a cloud-based graphic design platform, chosen for its ability to accommodate navigation, multimedia integration, and two-way interactivity without requiring programming skills (no-code development). Recent studies confirm the effectiveness of Canva as an interactive learning medium across educational levels and subjects, whether in increasing learning interest [37], learning outcomes [38]–[40], or the ease of integrating interactive multimedia without technical programming expertise [41]–[43], while also complementing the trend of using digital quiz-based applications such as Quizizz for learning evaluation [44].

Several previous studies reinforce the relevance of developing PBL-based e-modules. Kadir *et al.* [45] developed a Canva-assisted PBL-based e-module on the topic of environmental change for tenth-grade students using the ADDIE model, with validation results of 76% from the media expert and 87% from the content expert, and found it to be practical and effective in improving learning outcomes. Rohmatulloh *et al.* [46] developed a PBL-based interactive e-module to improve junior high school students' mathematical critical thinking skills, with results that were valid, practical, and significantly effective. Habsy *et al.* [47] demonstrated that PBL combined with brainstorming techniques in group guidance was effective in improving elementary school students' understanding of Pancasila Education. Several other classroom action studies, such as Cahyati *et al.* [48], Rizki *et al.* [49], and Al Fatiyah and Desyandri [50], also demonstrated that PBL supported by video, Wordwall, and Powtoon media improved elementary school students' Pancasila Education learning outcomes. Meanwhile, Triana [51] developed a PBL-based digital comic for Pancasila Education with very feasible validation results, and Daulay [14] and Devi *et al.* [15] developed PBL-based and Canva-based e-modules on Pancasila values at the elementary school level with similar results. Based on this synthesis, no study has been found that specifically develops a PBL-based Pancasila Education e-module on the topic of Indonesia as a State of Law for the junior high school level, so this study fills that gap.

2.1. Concept of Learning Outcomes and Subject Matter

Learning outcomes represent lasting changes in cognitive, affective, and motor capabilities resulting from the intervention of learning experiences. This study specifically focuses the measurement of learning outcomes on the students' cognitive domain, given that field phenomena show that students tend to memorize legal articles textually in order to pass exams but fail to grasp the philosophical essence of why these rules bind citizens. Referring to the revised Bloom's Taxonomy [52], the assessment instruments in the e-module are designed to guide students from lower-order thinking toward Higher Order Thinking Skills (HOTS), measured through interactive true/false quizzes and associative multiple-choice questions.

The subject matter in the e-module is organized into two main scopes aligned with the Phase D Learning Outcomes of the *Kurikulum Merdeka*. The first scope discusses the essence of the State of Law according to Article 1 Paragraph (3) of the 1945 Constitution [53], covering three main characteristics, namely the supremacy of law, the guarantee of human rights, and an independent judiciary, which are made concrete through four types of norms in society (religious, moral, courtesy, and legal) and a contextual case study in the form of a viral vlog about a school-rule violation by the fictional character "Budi." The second scope examines the hierarchy of national laws and regulations based on Law No. 12 of 2011 as amended by Law No. 13 of 2022 [54], [55], from the 1945 Constitution of the Republic of Indonesia to Regency/City Regional Regulations, accompanied by three important legal principles for resolving regulatory conflicts, namely *Lex Superior Derogat Legi Inferiori*, *Lex Specialis Derogat Legi Generali*, and *Lex Posterior Derogat Legi Priori*. Strengthening understanding in these two scopes is in line with findings from civic education studies that students' legal awareness grows optimally through contextual learning that links formal norms with the social realities of students' daily lives, rather than through a doctrinal approach alone [7], [56], [57].

3. METHOD

This study used a Research and Development (R&D) approach aimed at designing, developing, and testing an interactive Pancasila Education e-module based on Problem Based Learning (PBL) using the Canva digital platform. The study applied a mixed-methods approach with an embedded experimental design [58], in which quantitative data (expert validation scores, practicality questionnaires, and pre-test and post-test results) served as the primary data, while qualitative data (field notes, interviews, and validators' comments) served as supporting data for improving the product during the development process.

The study was conducted at SMP Bani Abdillah Bogor, Bogor Regency, West Java Province, in the even semester of the 2025/2026 academic year over six months (December 2025–May 2026). The research subjects were 30 eighth-grade students whose learning outcomes on the topic of Indonesia as a State of Law were still below the Learning Objective Achievement Criteria (KKTP), with average cognitive scores over the past two years of 67.2 and 65.3, whereas the KKTP set by the school was 75.

The product development procedure integrated the Rowntree Model [24] as the basic framework for compiling the subject matter and the Lee & Owens Model [25] as the technical framework for producing the digital media, elaborated into six phases. Phase 1 (Assessment & Analysis) analyzed needs gaps, student characteristics, and the availability of digital infrastructure. Phase 2 (Planning & Design) prepared a tiered concept map of the material and the technical product specifications, namely 34 pages (screens) on the Canva platform. Phase 3 (Writing & Editing) compiled the material script, including the contextual case study "*Vlog Viral dan Aturan Sekolah*" (Viral Vlog and School Rules) featuring the fictional character "Budi" as a trigger for problem-based discussion, as well as an assessment instrument of 25 test items. Phase 4 (Development) produced the digital e-module integrating text, infographics, instructional videos, and interactive quizzes, followed by validation by three experts. Phase 5 (Implementation) conducted gradual user trials, namely a one-to-one trial (1 teacher and 3 students) and a small-group trial (15 students), with product revisions at each stage. Phase 6 (Evaluation) conducted a large-scale field trial with 30 students using a One-Group Pretest-Posttest design to measure the product's effectiveness, followed by final refinement (final freezing) before the e-module was declared ready for dissemination.

The data collection instruments consisted of: (1) expert validation sheets using a 1–5 Likert scale completed by the content expert (Dr. Ibrahim Fajri, S.H., M.E.I.), the media expert (Dr. Umi

Fatonah, M.Pd.), and the instructional design expert (Prof. Dr. Nurdin Ibrahim, M.Pd.); (2) student response questionnaires on a 1–5 Likert scale to measure product practicality in the one-to-one, small-group, and large-scale field trials; and (3) objective pre-test and post-test items whose validity and reliability had been tested. Of the 25 items tried out on 34 students, 20 items were valid (point-biserial correlation coefficients exceeding the t-table value of 2.037 at the 0.05 significance level) with a KR-20 reliability coefficient of 0.8755 (Very Strong category), so the instrument was declared feasible for measuring learning outcomes.

The product trials were designed in stages to verify the feasibility of the e-module comprehensively, starting with expert judgment involving three validators according to their fields of expertise, followed by limited user tests (one-to-one and small-group trials) to detect text-readability problems and navigation function issues, and finally a field trial using a pre-experimental One-Group Pretest-Posttest design in one class. Trial subjects were determined using purposive sampling, comprising three experts (content, media, and instructional design), three students in the one-to-one trial representing high, medium, and low ability, 15 students in the small-group trial with diverse digital literacy, and 30 students in the large-scale field trial. Product revision was carried out in a data-driven manner in three stages, namely Revision Stage I (conceptual and technical improvements based on expert input), Revision Stage II (operational improvements based on the one-to-one and small-group trial results), and Revision Stage III (final refinement based on the large-scale field trial results).

Qualitative data were analyzed using the interactive model of Miles and Huberman [59] through data reduction, data display, and conclusion drawing, and were used as the basis for product revision. Quantitative feasibility data were analyzed by calculating score percentages using the formula of Sugiyono [60], categorized as Very Good (90–100%), Good (75–89%), Fair (65–74%), Poor (55–64%), and Very Poor (0–54%). The product's effectiveness was analyzed using the Normalized Gain (N-Gain) formula [61], namely the difference between the post-test and pre-test scores divided by the difference between the ideal score and the pre-test score, categorized as High ($g > 0.7$), Medium ($0.3 \leq g \leq 0.7$), and Low ($g < 0.3$), and complemented by a paired-sample t-test to examine the statistical significance of the improvement in learning outcomes at a significance level of $\alpha = 0.05$.

4. RESULTS AND DISCUSSION

4.1. Development Procedure of the E-Module

The e-module was developed through six phases that continuously integrated the Rowntree and Lee & Owens models. In the Assessment & Analysis phase, it was found that students' average cognitive scores on the topic of Indonesia as a State of Law over the past two years were 67.2 and 65.3, both below the KKTP of 75. The needs analysis also showed that 97.8% of students stated they strongly needed a Canva-based interactive e-module, and 87.0% preferred digital teaching materials equipped with images, videos, infographics, and easy-to-use navigation. In the Design phase, a tiered content framework and a learning strategy based on the five PBL syntax steps were prepared. The assessment instrument of 25 items was tried out on 34 students and yielded 20 valid items with a KR-20 reliability of 0.8755 (Very Strong). In the Development phase, a 34-page e-module was produced on the Canva platform, which was then validated by three experts and tested gradually (one-to-one, small-group, and large-scale field trials) before being frozen as the final product that had been proven effective.

4.2. Validity and Reliability of the Test Instrument

Before being used as the pre-test and post-test instrument, the 25 items were tried out on 34 students to determine their validity and reliability. Item validity was tested using the point-biserial correlation coefficient, compared with the t-table value at 32 degrees of freedom and a significance level of 0.05 ($t\text{-table} = 2.037$). The results showed that 20 of the 25 items (numbers 2, 3, 4, 5, 7, 8, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, and 25) were valid, whereas 5 items (numbers 1, 6, 9, 11, and 17) were invalid. Four of the five invalid items (numbers 1, 6, 11, and 17) could not distinguish students who understood the material from those who did not because all students answered them correctly ($p = 1.000$), while one item (number 9) was invalid because it did not

correlate with the total score (point-biserial $r = 0$). Furthermore, the reliability test using the Kuder-Richardson 20 (KR-20) formula yielded a coefficient of 0.8755, which falls in the Very Strong category, so the test instrument was declared consistent and feasible for measuring students' cognitive learning outcomes on the topic of Indonesia as a State of Law.

4.3. Feasibility of the E-Module

The feasibility of the e-module was measured through expert validation and user practicality trials. The results of the validation by the three experts are presented in Table 1.

Table 1. Summary of expert validation results

Validator	Field of Expertise	Percentage	Category
Dr. Ibrahim Fajri, S.H., M.E.I.	Content Expert	99.1%	Very Good
Dr. Umi Fatonah, M.Pd.	Media Expert	96.2%	Very Good
Prof. Dr. Nurdin Ibrahim, M.Pd.	Instructional Design Expert	90.97%	Very Good
Overall Average	–	95.42%	Very Good

The content expert gave the highest rating (99.1%), with four of the five assessment aspects (Self Instructional, Stand Alone, Adaptive, and User Friendly) obtaining a perfect score of 100%, while the Self Contained aspect obtained 95.0%. The media expert gave a score of 96.2%, with the Media Attractiveness aspect reaching 100%, but the Media Organization aspect (92.5%) was noted for improvement regarding ease of navigation between pages. The instructional design expert gave a score of 90.97%, noting that the design of learning activities could still be improved in interactivity. Overall, the average validation by the three experts reached 95.42% (Very Good category), indicating that the e-module is highly feasible for use as a learning medium.

The practicality trials were conducted gradually in line with the formative evaluation principles of Lee & Owens, as presented in Table 2.

Table 2. Summary of practicality trial results

Trial Stage	Number of Respondents	Average Percentage	Category
One-to-One	1 teacher + 3 students	91.0%	Very Good
Small Group	15 students	92.2%	Very Good
Field Trial (Large Scale)	30 students	93.1%	Very Good

Practicality scores increased consistently at each stage, from 91.0% in the one-to-one trial to 93.1% in the large-scale field trial, indicating that gradual revisions based on user input (fixing navigation buttons, correcting typographical errors, and adjusting the display on various screen sizes) successfully improved the product's practicality. All trial stages reached the Very Good category, with the lowest individual score of 78% in the field trial, which was still in the Good category, so overall the e-module was considered consistently practical to use under various learning conditions and among students with diverse levels of digital literacy.

4.4. Cost and Development Efficiency Analysis

One practical advantage of choosing Canva as the production platform is development cost efficiency. Unlike conventional interactive multimedia development, which generally requires paid software and programming experts, the entire e-module production process in this study, from pre-production (script and storyboard preparation) and production (visual design and multimedia integration) to post-production (trials and field implementation), could be carried out independently by the researcher at a relatively affordable cost. This efficiency provides empirical evidence that high-quality digital learning innovation does not necessarily depend on the size of the budget, in line with findings from various studies on the ease of integrating Canva for teachers without a programming background [42], [43], so similar development models could potentially be replicated by other teachers with limited resources in various schools.

4.5. Effectiveness of the E-Module on Student Learning Outcomes

The effectiveness of the e-module was measured using a One-Group Pretest-Posttest design with 30 eighth-grade students, analyzed using the Normalized Gain (N-Gain) formula and a paired-sample t-test. A summary of the results is presented in Table 3.

Table 3. Summary of e-module effectiveness test results

Component	Value
Number of students (n)	30
Average pre-test score	18.73
Average post-test score	19.73
Mean difference	1.00
N-Gain	0.8167 (81.67%) – High/Effective category
Students in the High N-Gain category	26 students (86.7%)
Students in the Medium N-Gain category	2 students (6.7%)
Students in the Low N-Gain category	2 students (6.7%)
t-value	–2.2756
p-value (Sig. 2-tailed)	0.0304
Paired t-test conclusion	Significant ($p < 0.05$)

The average pre-test score of 18.73 out of an ideal score of 20 increased to 19.73 in the post-test. Although students' initial scores were relatively high, the e-module still succeeded in improving learning achievement, which indicates a meaningful accomplishment because it filled comprehension gaps among students who were already close to full mastery of the material. The N-Gain calculation yielded an average of 0.8167 (81.67%), which falls into the High as well as Effective category because it is above the 76% threshold [61]. A total of 26 of the 30 students (86.7%) reached the High N-Gain category, while 2 students (6.7%) experienced a decrease in scores, which is presumably due to situational factors such as fatigue or lack of concentration when taking the post-test rather than to the ineffectiveness of the e-module. The paired t-test yielded a t-value of –2.2756 with a p-value of 0.0304, which is smaller than the significance level of $\alpha = 0.05$, so the improvement in learning outcomes between the pre-test and post-test was statistically significant.

The high N-Gain value is closely related to the success of the PBL approach integrated into the e-module. The “Budi” case study, which raises the issue of a viral vlog and violation of school rules, succeeded in arousing students' curiosity to understand the legal provisions on freedom of expression on social media, such as Article 28J Paragraph (2) of the 1945 Constitution [53] and Article 27 Paragraph (3) of the Electronic Information and Transactions (ITE) Law on defamation. This phenomenon made abstract legal material more contextual and meaningful for students, in line with findings that adolescents' legal awareness grows more effectively through real case-based contextual learning than through normative memorization [6], [56]. In addition, the true/false interactive quizzes distributed at several strategic points in the e-module provided instant feedback in line with the principle of operant conditioning in behaviorist theory [26], thereby strengthening students' understanding and learning motivation.

These findings are consistent with the studies of Kadir *et al.* [45] and Rohmatulloh *et al.* [46], which demonstrated that PBL-based e-modules effectively improve learning outcomes in other subjects, as well as the study of Habsy *et al.* [47], which showed that PBL is highly suitable for Pancasila Education because the characteristics of its material demand critical, contextual, and solution-oriented thinking. The pattern of improved learning outcomes through PBL found in this study is also consistent with several experimental studies at the junior high school level in other subjects, which, meta-analytically or quasi-experimentally, showed a significant effect of PBL on critical thinking skills and learning outcomes [30]–[32], [35], thereby strengthening the generalization that PBL is a learning model adaptable across subjects and educational levels. What distinguishes this study is its specificity in packaging doctrinal formal legal material into a PBL-based e-module using a digital case study relevant to adolescents' lives in the social media era, while also demonstrating that a cloud-based graphic design platform such as Canva can be used by teachers to develop high-quality interactive learning media without requiring programming expertise or paid software.

4.6. Relation to Relevant Studies and Research Contribution

The effectiveness findings in this study are in line with the study of Kadir *et al.* [45] on a Canva-assisted PBL-based e-module on the topic of environmental change, which likewise showed highly valid results and effectiveness in improving learning outcomes, albeit in a different field of study (science), thus demonstrating that the PBL framework integrated into digital e-modules is applicable across subjects. A similar pattern was also found in the study of Rohmatulloh *et al.* [46], in which the high validity of the product from experts correlated positively with the high effectiveness in improving learning outcomes, a pattern confirmed in this study by the average expert validation of 95.42% followed by a very high N-Gain of 81.67%. The study of Habsy *et al.* [47], which demonstrated the effectiveness of PBL combined with brainstorming in Pancasila Education at the elementary school level, further strengthens the argument that PBL is highly suited to the characteristics of Pancasila Education material, which demands critical, contextual, and solution-oriented thinking. Meanwhile, the effectiveness of Canva as a production medium in this study reinforces the findings of several recent studies on the advantages of Canva in increasing students' interest and learning outcomes across educational levels [37], [39]–[41].

What distinguishes this study from previous studies is its specificity in developing an e-module for the topic “Indonesia as a State of Law,” which is doctrinal and often feels distant from the lives of junior high school students, whereas similar previous studies mostly targeted science and mathematics or applied PBL to Pancasila Education at the elementary school level through Classroom Action Research (CAR) supported by media such as Wordwall and Powtoon. By packaging abstract and formal legal material into a PBL-based e-module that uses digital case studies relevant to adolescents' lives in the social media era, this study succeeded in bridging the gap between the legal theory written in textbooks and the everyday behavioral realities faced by students. The use of the cloud-based Canva platform is also an important methodological contribution because it demonstrates that developing a high-quality e-module does not require expensive paid software or complex programming skills, so that even teachers with basic digital literacy can develop high-quality interactive learning media, and the results of this study could potentially be widely replicated in other schools.

4.7. Research Implications

The results of this study have complementary theoretical and practical implications. Theoretically, this study provides empirical evidence that integrating two instructional development models, namely the Rowntree Model as the framework for subject-matter substance and the Lee & Owens Model as the technical framework for digital media production, yields a product that is pedagogically strong as well as technically robust. This study also broadens the literature on the application of PBL in civic and legal education subjects, which has so far been applied mostly in science and mathematics, while strengthening the argument that no-code graphic design platforms such as Canva can accommodate the technical needs of multimedia development without programming expertise [29].

Practically, the finding that 97.8% of students stated they strongly needed an interactive e-module indicates the need for a paradigm shift in the design of Pancasila Education teaching materials in the *Kurikulum Merdeka* era, from a printed textbook-based expository format toward an interactive, problem-based digital format, in line with the characteristics of today's digital native generation [1], [3]. This implication calls for transforming the teacher's role from an information transmitter to a learning facilitator and requires school policy support in the form of adequate digital infrastructure and sustained teacher professional development programs. Beyond the academic dimension, this e-module also contributes to cultivating legal awareness from an early age through contextual case studies close to adolescents' lives in the social media era, in line with the view that strengthening young people's legal awareness requires a contextual, interactive approach that does not rely solely on normative memorization [7], [8], [57], [62], while also aligning with the goal of the *Kurikulum Merdeka* to shape the Pancasila Student Profile that reasons critically.

5. CONCLUSION

The Pancasila Education e-module based on Problem Based Learning (PBL) on the topic of Indonesia as a State of Law was developed through six phases that integrated the Rowntree Model as the framework for compiling the subject-matter substance and the Lee & Owens Model as the technical framework for digital media production, from needs analysis, planning and design, writing and editing, product development, and gradual implementation, to large-scale field evaluation. The resulting e-module was declared highly feasible based on the validation by three experts, with an average of 95.42% (Very Good category), and on the practicality trial results, which increased consistently from 91.0% in the one-to-one trial to 93.1% in the large-scale field trial. In terms of effectiveness, the e-module was proven to improve students' cognitive learning outcomes, as shown by the increase in the average score from the pre-test (18.73) to the post-test (19.73), an average N-Gain of 0.8167 (High/Effective category), and a statistically significant paired t-test result ($p = 0.0304 < 0.05$). Thus, this PBL-based Pancasila Education e-module has been proven valid, feasible, practical, and effective for use as a learning medium to improve the learning outcomes of eighth-grade junior high school students.

This study has several limitations that need to be candidly acknowledged. First, the One-Group Pretest-Posttest design did not involve a control group, so the improvement in learning outcomes cannot be fully attributed solely to the e-module without the influence of other factors such as test repetition effects. Second, the scope of subjects was limited to 30 students at one school and one topic, so the results cannot necessarily be generalized directly to other school contexts or subject matter. Third, learning outcomes were measured immediately after the intervention, so long-term retention of understanding is unknown. Fourth, the product's effectiveness was measured only in the cognitive domain through objective tests, while the affective and psychomotor domains, including the internalization of legal awareness, were not evaluated using specific instruments. Fifth, this cloud-based e-module depends entirely on the availability of an internet connection and digital devices, so its implementation in schools with limited infrastructure may face technical obstacles.

Based on these limitations, several recommendations are proposed for various parties. For Pancasila Education teachers, this e-module can be used directly as an alternative learning medium, while still accompanying students during initial use so that they understand the navigation flow and PBL-based learning. For students, the e-module is recommended for independent study by first completing the pre-test and making sincere use of the learning reflection features. For schools, support in the form of adequate internet connectivity and encouragement for teachers of other subjects to develop similar media are needed. For future researchers, it is recommended to add a comparison control group to the research design, expand the subjects and scope of material to schools with more diverse characteristics, measure the long-term impact on students' legal awareness, and develop e-modules with additional gamification elements such as points, badges, and leaderboards to increase students' learning motivation and engagement more broadly.

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