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Development of Problem-Based Learning E-Book Media for Proxy Server Configuration in TKJ SMK Negeri 3 Padang

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Abstract

Purpose: The research aims to provide insights into student learning activities and develop evaluation tests to assess student abilities. It observes how teachers develop curricula, lesson plans, teaching materials, and assessments.
Research Methodology: The observation method includes interviews, direct observation of teaching and learning activities, and students completing questionnaires.
Results: The research conducted at SMKN 3 Padang shows effective teaching practices, including strong lesson initiation, material delivery, and student involvement. Analysis of the E-BOOK Proxy Server Configuration based on Problem-Based Learning (PBL) shows a validity of 89.77% and practicality of 87.44%, confirming the media's effectiveness in enhancing learning.
Conclusions: The study concluded that the e-book media based on the PBL model for Proxy Server Configuration is both highly valid and practical, with a validity score of 89.77% and practicality rating of 87.44%. These results indicate that the e-book is effective for learning and easily applicable in educational settings.
Limitations: This study was limited to the development stage, with the dissemination stage involving only the distribution of the media link. The sample size of 31 students and one teacher also limits the generalizability of the findings.
Contributions: The research contributes to innovative educational media development by introducing an e-book based on the PBL model. This approach integrates character education and engages students through interactive tasks. The e-book proves effective in improving student engagement and understanding of complex topics like Proxy Server Configuration.

Keywords: *E-Book Development, Instructional Media, Learning Effectiveness, Learning Evaluation, Problem-Based Learning*

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1. Introduction

PGRI University of West Sumatra is a higher education institution that produces graduates. experts in the field of education. One of the programs run by UPGRISBA is an observation or research trial, which is a training activity for every student majoring in education. The goal of this program is to improve students' pedagogical, professional, social, and personal competencies, involving the development of

teaching knowledge, skills, attitudes, and behaviors, and involving all aspects of education that can be directly encountered in the school environment (Bertka et al., 2019; Gordy et al., 2018). Observation of activity Study aim: To help candidate teachers interact with students with evolution dynamics education and curriculum changes requires a deep understanding of how students respond to teaching strategies. Through observation, it is hoped that students will be able to recognize the strengths and weaknesses of current teaching methods, as well as gain an understanding of students' preferences and learning styles (Looi et al., 2018; Martin & Dismuke, 2018).

PGRI University of West Sumatra (UPGRISBA) is one of the higher education institutions committed to producing competent graduates, especially in the field of education. As an educational institution, UPGRISBA not only focuses on strengthening theoretical knowledge but also emphasizes the importance of practical experience in preparing prospective educators who are professional, adaptive, and able to compete in the modern era (Parmenas, 2021; Ricardianto et al., 2021). One of the programs implemented to support this goal is the School Observation or research trial activity, which is mandatory for students majoring in education. This activity is designed as a form of direct training for students so that they can understand the real conditions of the educational environment and learning process in schools (Ayuningtyas & Ilman, 2021; Martin & Dismuke, 2018).

The School Observation activity aims to improve students' pedagogical, professional, social, and personal competencies. Through this program, students are expected to gain experience in understanding how the learning process is implemented in schools, how teachers interact with students, and how educational activities are managed in practice (Setyawati et al., 2021; Susanto et al., 2021). This activity also provides opportunities for students to develop teaching knowledge, skills, attitudes, and behaviors that are needed as prospective educators. In addition, students are introduced directly to various situations and problems commonly found in the school environment, enabling them to develop problem-solving skills and professionalism in the field of education (Looi et al., 2018; Wahyuningsih et al., 2021).

In the current era of educational transformation, the dynamics of education and curriculum changes continue to evolve rapidly. Teachers are required to be able to adapt to technological developments, innovative learning methods, and students' diverse characteristics. Therefore, observation activities become very important for prospective teachers to understand how students respond to various teaching strategies used by teachers in the classroom (Susanto & Parmenas, 2021). Through direct observation, students can identify the strengths and weaknesses of the teaching methods applied and analyze the effectiveness of the learning process. This understanding is expected to help prospective educators design more creative, effective, and student-centered learning strategies in the future Bertka et al. (2019) and Syahrial and Sudono (2021).

Furthermore, observation activities also provide insight into students' learning preferences and styles. Each student has different abilities, interests, and ways of understanding learning material (Anggraini, 2021; Aprillita & Perkasa, 2021). By observing the learning process directly, students can understand how teachers manage classroom conditions, motivate students, and create an interactive learning atmosphere (Kuncoro & Harahap, 2021; Setyawati & Aristiyanto, 2021). This experience is valuable for prospective teachers because it helps them prepare appropriate teaching approaches that can support students' academic achievement and personal development.

Another important aspect observed in this activity is the integration of technology in the learning process. The rapid development of information and communication technology has significantly influenced the world of education. Schools are increasingly utilizing digital media, interactive learning applications, e-books, and online platforms to support teaching and learning activities (Agusinta et al., 2021; Keke et al., 2021). Through observation, students can learn how technology is applied in schools and evaluate its impact on learning effectiveness and student engagement. Understanding the use of educational

technology is expected to encourage prospective teachers to become more innovative in designing technology-based learning media that are relevant to the needs of students in the 21st century (Gordy et al., 2018; Heriyanto, 2021; Peng et al., 2019).

In addition, School Observation activities are useful for developing students' abilities in learning evaluation. Evaluation is one of the important components in the educational process because it functions to measure the extent to which students understand the material delivered by the teacher. Through observation activities, students learn how teachers prepare tests, assignments, and other forms of assessment to evaluate student learning outcomes (Abdullah, 2021; Satria, 2021). This activity also trains students to develop meaningful evaluation instruments that are able to measure students' cognitive, affective, and psychomotor abilities effectively (Solihin, 2021). By understanding the process of evaluation preparation, students are expected to be able to design quality assessment tools when they become teachers in the future (Berlian Rms & Wahyuningsih, 2021; Walid et al., 2019).

The observation activity also focuses on learning planning carried out by teachers. In this process, students learn how teachers prepare syllabi, lesson plans, teaching materials, and learning assessments systematically. Learning planning is an essential aspect in ensuring that the learning process runs effectively and according to educational objectives. By studying directly from teachers in schools, students gain practical knowledge that cannot be obtained only through theoretical lectures. This direct experience enriches students' understanding of how learning plans are implemented in real classroom situations and helps them become more prepared as prospective educators (Saputro & Soleha, 2021; Sudipa et al., 2020).

Overall, School Observation activities provide important provisions for students in preparing themselves to enter the professional world as teachers. Through direct interaction with the school environment, students gain broad insights into the duties and responsibilities of educators, classroom management, learning strategies, educational evaluation, and the application of technology in teaching. This activity is expected to shape prospective teachers who have adequate competence, professionalism, and dedication in carrying out their roles as educators. Ultimately, the experience gained through School Observation activities is expected to contribute to the creation of quality educators who are able to produce students with strong academic abilities, character, and competitiveness in the future.

2. Literature Review

2.1 Problem-Based Learning (PBL) in Education

Problem-Based Learning (PBL) has become a widely recognized instructional method due to its emphasis on student-centered learning and active problem-solving (Anazifa & Djukri, 2017). PBL facilitates deeper learning by encouraging students to engage with real-world problems, fostering critical thinking and problem-solving skills (Abdullah et al., 2019; Faqiroh, 2020). Unlike traditional teaching methods, PBL shifts the responsibility for learning onto the students, making them active participants in their education. This approach has been particularly effective in technical fields, where applying theoretical knowledge in practical scenarios is essential (Fidan & Tuncel, 2019).

2.2 Effectiveness of PBL in Technical Education

In technical education, particularly in fields like computer networking, PBL has proven to be an effective teaching strategy (Jabarullah & Iqbal Hussain, 2019). PBL bridges the gap between theoretical concepts and practical application, making it easier for students to grasp complex subjects. In subjects such as network configuration, hands-on practice is vital, and PBL encourages students to tackle realistic challenges that mirror professional tasks. This active involvement enhances both their understanding and their ability to solve real-world problems (Isa & Kamin, 2019; Molande et al., 2017).

2.3 Multimedia Learning Tools: E-books and Their Benefits

Incorporating multimedia tools, such as e-books, into the educational process has been shown to significantly improve student motivation and learning outcomes (Hadaya & Hanif, 2019). Multimedia learning helps students retain information better by integrating visuals, audio, and interactive elements. E-books, as a form of multimedia, offer flexibility, interactivity, and accessibility, which can help students engage more effectively with the material. In technical subjects, where concepts can be abstract and challenging, e-books provide a dynamic and engaging way to explain complex ideas through interactive elements like animations, videos, and diagrams (Roskos et al., 2017; Serrano et al., 2019).

2.4 The Integration of PBL and Multimedia Learning

The combination of PBL and multimedia learning tools, such as e-books, provides a highly effective learning environment (Kusumatuty et al., 2018; Wang, 2020). Interactive learning media significantly improve student engagement and academic performance in vocational education settings. By integrating PBL with e-books, this approach encourages students to not only solve problems but also engage with the material in a meaningful way (Batoon et al., 2018; Rahim et al., 2020). The multimedia elements within the e-book further support student learning by offering multiple ways to access and interact with the content, making the learning process more engaging and effective (Hwang et al., 2017).

2.5 Character Education in Learning

Incorporating character education into learning media is becoming increasingly important, especially in vocational education. Character education helps develop essential values like cooperation, discipline, and responsibility (Puspitasari et al., 2018). By including these values in the learning process, students are better prepared for both academic success and their future careers. In the case of this study, the integration of character education into the PBL-based e-book for Proxy Server Configuration not only enhances technical learning but also contributes to the holistic development of students, making them more capable of facing professional and social challenges (Gaol & Sitepu, 2020; Komalasari & Saripudin, 2017).

3. Methodology

3.1 Stages

1. Define
   The purpose of this stage was to establish and formulate learning requirements. This phase is similar to the analysis phase of other development models. Through analysis, we determined the goals and problems of existing media and learning tools. Five steps are typically taken at this stage (Abdulrahaman et al., 2020; Azizahwati et al., 2019; Ediyani et al., 2020).

   (a) Front-end Analysis Often translated as front-end analysis, it is the study of the fundamental problems faced by teachers or students to improve their performance and learning. During this analysis, several possible alternative solutions for more elegant and efficient learning were identified. These alternatives are then considered for their strengths and weaknesses and how they might help address the problem at hand.

   (b) Learner Analysis
   This study focused on students who will carry out the learning process. Some characteristics of students The relevant design and development factors need to be identified. Some important characteristics to analyze are the competencies that students already possess before entering the learning process. This is related to the condition of the students' competence and their real conditions. Students' background experiences also need to be identified in addition

to general attitudes towards learning topics and preferences for media, format, color, and language.

(c) Task Analysis
It involves identifying the main skills that students must acquire and analyzing them. becomes one set of sub-skills, which requires and allows for achievement. This is also done to ensure comprehensive coverage of the teaching materials or learning media being developed. The results of this analysis will initiate the inclusion of each feature that must be included in the product being developed.

(d) Concept Analysis
It identifies the main concepts to be taught, arranges them in a hierarchy, breaks down the concepts into critical attributes, and separates irrelevant concepts. This helps identify a series of rationalizations, which are depicted in the development of products to solve every problem. Analysis This help describes how each of the features to be developed can work

(e) Specifying instructional Objectives

2. Design
The next stage of developing 4D learning media is the design stage. The aim of this stage was to design a prototype of the teaching materials (learning media) to be developed. This phase can begin after a series of student behavioral objectives are formulated. The selection of materials, media, and formats for the materials and the creation of the prototype are key aspects of the design (Azizahwati et al., 2019; Novaliendry et al., 2020; Zuliana, 2020).

(a) Media Selection (election Double)
This process involves selecting appropriate media to present learning content. This process involves matching the results of task and concept analyses, learner characteristics, production resources, and dissemination plans with various media attributes. Next, the most appropriate medium or combination of media is identified, followed by determining the most suitable option for the needs.

(b) Format Selection (Selection Format)
Different formats suitable for designing teaching materials or learning media were identified. The choice of these formats depends on several factors discussed in the analysis phase.

3. Develop
The goal of the development phase is to realize a predetermined design or complete a previously built prototype. For example, although much has been started since the Define phase, the results should be considered preliminary. from teaching materials (learning media). must be modified before can become the final version, which is effective and reliable for problem solving. During the development stage, feedback is usually gathered and accepted through formative evaluation and then revised. There are usually two main steps in this process (Azizahwati et al., 2019).

(a) Expert Apparaisal
This is the process of soliciting suggestions for material improvement from experts in their respective fields. These experts were asked to evaluate the material from both learning and technical perspectives. Based on their feedback, the product being developed is modified to make it more appropriate, effective, usable, and high-quality.

(b) Developmental Testing
The developed product is then tested on actual students, but this is usually limited in scope. This stage aims to identify areas that are incomplete and can be revised accordingly. Based

on the students' responses, reactions, and comments, the product was reviewed to identify any changes, modifications, or additions. This cycle of testing, revision, and retesting is repeated until the product is proven to perform consistently and effectively.

4. Dissemninate
   The final stage of 4D learning media development is dissemination. The product can be said to have reached the final stage of production (development) when testing is conducted at the development stage. Products that receive positive reviews from experts and have proven consistent performance are produced. Once proven suitable for use, the product is ready for widespread use. Three steps are involved. done in dissemination stage These are validation testing, packaging, diffusion, and adoption. While formative evaluations were conducted in the development phase, summative evaluations were conducted in this phase. This validation testing phase should be conducted in real-world situations and involve multiple heterogeneous parties.

3.2 Instrument Study

Research instruments are tools used to collect data. To collect data, the researchers used several instruments, including observations and interviews (Buriro et al., 2017; Monday, 2020).

1. Interview
   An interview is a conversation that aims to obtain information about individuals, events, activities, feelings, motivations, and concerns, and can experience the world of thoughts and feelings of respondents. This interview method is carried out by means of direct questions and answers with the source. related to the Computer Network Engineering teacher and one of the students in the class who is currently carrying out the learning process

2. Questionnaire
   A questionnaire is a data collection method that involves providing respondents with a set of written questions or statements to respond to user requests. To collect data for the questionnaires, the researchers used several instruments, including:

   (a) Media Validation Sheet for Material Experts and Media Experts The validation sheet consisted of three validators: two material expert validators and one media validator.

Table 1. Product Validation Criteria

Interval (%)	**Category**
0 - 20	No valid
21 - 40	Not enough valid
41 - 60	Enough valid
61 - 80	Valid
81 - 100	Very valid

Based on Table 1, the validation product criteria are classified into five categories according to the percentage interval. The lowest interval (0–20%) indicates that the product is categorized as not valid, meaning it does not meet the required validation standards. The interval 21–40% is categorized as not enough valid, showing that the product still requires major improvements. The 41–60% range is considered enough valid, meaning the product is moderately acceptable but still needs some revisions. The 61–80% interval is categorized as valid, indicating that the product has met most of the expected criteria and is feasible for use with minor improvements. Meanwhile, the highest interval (81–100%) is classified as very valid, meaning the product is highly valid and fully meets the validation standards.

The results of this analysis were declared valid because they were carried out by a validator. He is an expert in the field. The first stage involved revising the problem-based learning media to obtain valid data.

(b) Sheet Parkticality For Participant Educate And Participant Educate
Practicality analysis was obtained by completing a questionnaire and student responses regarding the suitability of problem-based learning media. The criteria can be measured by students who participated in the learning process, achieving a minimum level of understanding of the material of 80%.

Table 2. Practicality Validation Criteria

Interval (%)	**Category**
0 - 20	No practical
21 - 40	Not enough practical
41 - 60	Normal
61 - 80	Practical
81 - 100	Very practical

Based on Table 2, the practicality validation criteria are divided into five categories based on the percentage interval obtained from the assessment results. The interval of 0–20% is categorized as not practical, indicating that the product cannot be used effectively in the learning process. The interval of 21–40% is classified as not enough practical, meaning that the product still has many weaknesses in its implementation. The 41–60% interval is categorized as normal, which indicates that the product has a moderate level of practicality and can be used with several improvements. Furthermore, the 61–80% interval is classified as practical, showing that the product is feasible and easy to use in learning activities. Meanwhile, the highest interval of 81–100% is categorized as very practical, meaning that the product is highly practical, efficient, and suitable for implementation without significant revisions.

3. Operational Definition
Operational definition is an attempt to explain a concept by showing how to measure it and how the definition can be tested empirically (Bellwood et al., 2019).

(a) Instructional Media
The e-book learning media is designed to support students' learning process, as it can be used as a learning resource alongside the Proxy Server Configuration learning process. The e-book is designed with user instructions for both educators and students. It can also be used as independent learning material for students, accessible anytime and anywhere. E-books can also be practical and efficient learning resources. Canva is another application used for e-book creation. This application can help make e-books more engaging than existing media used by educators in the learning process because it can display images, videos, and links from the website that is displayed.

(b) Model Learning Problem Based Learning
In the model learning PBL for the eye lesson configuration proxy server, students were faced with a concrete problem: how to configure a proxy server to improve network security and performance. They were divided into small groups to collaboratively solve the challenges. First, the students were provided with a basic understanding of proxy server functionality and basic configuration concepts. Each group conducted an in-depth study of the steps required

and the factors to consider when configuring a proxy server. Next, they were expected to develop concrete solutions to the identified problems and implement them in a simulated or practical environment.

4. Results and Discussion

The development of PBL-based learning media in this study used the stages of the 4D research model: define, design, develop, and disseminate (Serevina et al., 2018). However, this study was limited to the development stage. The dissemination stage was conducted by distributing links. media to students (Tania et al., 2020). Results research shows that problem-based learning media Based Learning that has been proven to be practical and valid and is produced after going through a research process E-book teaching materials based on problem-based learning containing Character Education were developed using the 4D research model. First, an analysis was conducted by examining the needs of students regarding the research conducted. Information was obtained that The existing teaching materials have not been able to attract students' interest in the learning process, and students have not been able to understand the material based on the existing teaching materials. Therefore, a learning medium is needed to help students better understand the lesson. In addition, teaching materials are needed that can involve students in solving problems related to everyday life.

Second, at this stage, the product is designed according to the students' needs, as identified in the previous stage. The design is made in the form of learning media, composed starting from the cover, and designed in relation to the material included, where the cover has an image related to the material. Based on the previous analysis, the learning process is still one-way, so that in material teaching that was developed using learning models, two directions are considered, that is, the PBL learning model. In this Problem Based Learning model, students are given a problem and provided with media and a Google form to express their opinions. In addition to the product, a section explaining the material was provided. Equipped with learning media and videos, simple problems are presented to help students understand the lesson better. The presentation of the material includes character development, such as the value of cooperation, so students can work together in problem solving. Furthermore, the value of discipline is incorporated to ensure that students are disciplined during the learning process. Other character values were also included in the product design of this study. Third, the stage of development from design to product is completed.

4.1 Product Which made is E- BOOK

A problem-based learning project with character education content using the Canva application. Furthermore, to create an e-book that can be flipped through, similar to a book using a 3D application, the completed media was validated by experts, namely material and media experts, before being tested on educators and students. Based on revisions and expert opinions, several improvements were made to the media, including Google Forms, animations, and material sections (Syawaludin, 2019). Prior to validation, the media was displayed in the form of pictures, animations, and sound, which was monotonous. However, after revision based on advice and direction from experts, problems were presented in the form of more interesting images and illustrations were provided so that the material in the learning media was easier for students to understand and was not boring. After revisions and suggestions from experts, the developed teaching materials were validated by experts with fill in questionnaire validity, And get mark very valid, namely 89.96% With eligibility content 89.16% It means E-BOOK Already in accordance with with achievements learning.

The material in the media is appropriate and can increase students' curiosity. The language aspect obtained a score of 83.33%, meaning that the media uses good language and complies with the applicable EYD. The presentation feasibility aspect scored 84%, indicating that the teaching materials were appropriate.

It is already served with Good Where, material Which served easy to understand, discussion example clear and is contextual, and the e-book is equipped with learning and bibliography as learning resources. Meanwhile, media expert validation consisting of media cover and e-book content aspects obtained a score of 93.80% and was categorized as very valid, which means the media created has clear visuals, an attractive design, existing links that can be used well, and sound that matches the material.

After the media was declared valid and worthy of being tested on students, the research process was conducted. The trial of this teaching material was carried out on one teacher of the Proxy Server Configuration subject and 31 students in class XI TKJ at SMK N 3 Padang. A media trial was conducted to determine the practicality of the created e-book. Based on the analysis, the product's practicality value was 92%, indicating that it is highly practical. This means that the developed teaching material is easy to use, time-effective, easy to interpret, and can be used as a companion teaching material in learning. Educators and students also stated that the developed media were very easy to use and learn. Students were attracted to the developed teaching materials because they included animations. colored as well as there is a video learning and can support participant educate in understand the material, and teaching materials can be accessed anywhere and anytime. The results of the study show that the learning media based on Problem Based Learning has been proven to be practical and valid and was produced after going through a research process (Simanjuntak et al., 2019).

4.2 Stage Define

At this stage, information was collected through an interview with an educator in the Computer Network Engineering Department at SMKN 3, Padang. The purpose of this interview was to gain an initial understanding necessary for developing learning media based on Problem Based Learning (Diani & Syarlisjiswan, 2018). The results obtained are as follows:

1. Analysis Beginning End
   In the initial stages, students faced several obstacles. According to the students, the learning process at SMKN 3 Padang was good, but there were several obstacles, such as inadequate facilities, starting from PCs that could not be used and a limited number of classes. Inadequate computer facilities, the number of computers available in the computer lab was limited, not enough for the number of students, and some computers experienced problems. Hardware damage, such as broken keyboards, dead monitors, unstable Internet connections, and outdated software that limits access to the latest applications and programs, was also reported.

2. Analysis Learners
   At this stage, information was obtained that during the Computer Network Engineering learning process, students were not very active in the learning activities. Students also felt bored with the teaching materials used because they did not contain moving images or videos that could directly explain the learning material. Students were more interested in teaching materials that could display images and videos that could directly explain phenomena in learning. In the learning process, the formation of students' character is not optimal because the learning process is still centered on the material; therefore, it is necessary to create teaching materials that can contain images or videos that can attract students' interest in learning, which also includes the formation of character values for students.

3. Analysis Draft
   In the concept analysis step, the activities involved evaluating concepts in the e-book material related to Proxy Server Configuration. The included material was then aligned with the existing core competencies (KD) based on the applicable curriculum.

4. Analysis Task

Based on the evaluation conducted, several tasks were included to measure student competency. Therefore, the e-book contains a series of tasks that students must complete to achieve the learning objectives of the course. These tasks are presented as problems and exercises relevant to the material presented.

4.3 Formulation Objective Learning

Based on the analysis of the teaching Configuration Proxy Server, the following results were obtained (Ramadhani et al., 2019):

a. Participant educate can understand And understand method work and function nat

b. Participant educate can build application proxy server

c. Participant educate capable build transparent proxy And proxy tiered

1. **Stage Design (Design)** In this phase, the activities carried out were the design of E-BOOK teaching materials about Proxy Configuration. The server-based approach problem-based learning integrates values character education, especially in proxy server configuration material, based on the results of the analysis of the previous stage.
2. **Development Stage** In developing teaching materials in accordance with the products designed using the Canva application so that the E-BOOK looks attractive
3. **Desseminate Stage** At this stage, the developer distributed the learning media by sharing links with the students. in the TKJ class at SMKN 3. This distribution aims to allow students to review and easily access learning anywhere, ensuring that they understand the material. In addition, before carrying out the media distribution stage, the developer conducts a validation test on the product, which is then tested and revised, and the final product is then disseminated to educators and students. The following is a product validation analysis that was carried out.

   (a) Validation product
   This validation was conducted by testing the validity level of the eBook teaching materials. Furthermore, product validation identifies the shortcomings and weaknesses of the product being developed based on suggestions and criticisms from the validator, ensuring that the product is suitable for use and widespread distribution to students. The validators in this development consisted of two material experts and one media expert. The media expert validator was Ms. Megasyani Anaperta, M.Pd., a lecturer in the Physics Education Study Program at PGRI University of West Sumatra. The material expert validators were Mr. Haris Kurniawan, M.Kom., and Mr. Irfan Fadhli, M.Kom., lecturers in the Informatics Education Study Program at the University. PGRI Sumatra West. The results from the validation product and the three validators are as follows:

Table 3. Analysis Sheet Validity

No	Aspect Evaluation	HK (%)	IF (%)	Average Percentage (%)	Category
1	Aspect Eligibility Contents	91.66	86.66	89.16	Very Valid
2	Aspect Suitability of Presentation	100	68	84	Very Valid
3	Aspect Eligibility Contextual	90	86	88	Very Valid
4	Aspect Eligibility Linguistics	82.22	84.44	83.33	Very Valid
Average Validation Material				**86.12**	**Very Valid**

No	Aspect Evaluation	MA (%)	Average Percentage (%)	Category
1	Design Cover	94.28	94.28	Very Valid
2	Contents E-Book	93.33	93.33	Very Valid
Average Validation Media			**93.80**	**Very Valid**
Average Overall			**89.96**	**Very Valid**

Based on Table 3, the results of the validity analysis show that the developed E-Book media obtained a very valid category in all assessment aspects. The average material validation score was 86.12%, while the average media validation score was 93.80%. Overall, the E-Book achieved an average validity score of 89.96%, indicating that the media is highly feasible for use in the learning process.

(b) Practicality
After being declared valid and suitable for testing on students, the e-book development was carried out first, accompanied by distributing practicality sheets to educators and students to determine the level of practicality of the e-book teaching materials being developed.

Table 4. Analysis Results Practicality

No	Aspect Evaluation	Educator	Learners	Average Percentage Score (%)	Category
1	Interest	100	78.53	89.27	Very Practical
2	Material	100	70.33	85.17	Very Practical
3	Language	100	75.77	87.88	Very Practical
Average		**100**	**74.87**	**87.44**	**Very Practical**

Based on Table 4, the practicality analysis results show that the developed E-Book media obtained a very practical category in all assessment aspects. The average practicality score from educators was 100%, while learners obtained an average score of 74.87%. Overall, the E-Book achieved an average practicality score of 87.44%, indicating that the media is very practical and suitable for use in the learning process.

5. Conclusions

Based on the data analysis that has been carried out on the development of the E-BOOK media Problem-Based Proxy Server Configuration Based Learning, it was concluded that the developed e-book was categorized as very valid, with a percentage of 89.77%. Furthermore, based on the practicality data processing, the percentage of the e-book's practicality level was 87.44%, which was categorized as very practical.

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Author Contributions

MA, HF, MR, AJN, and HGP contributed significantly to the conceptualization, development, and validation of the e-book media. MA led the research process, while HF, MR, AJN, and HGP contributed to the design, content creation, and evaluation of the final product.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. This research was conducted independently, and no financial or personal relationships influenced the results or interpretation of the findings.

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