The Feasibility of Developing PBL-Based E-Module in Communication Psychology Course

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Abstract. The purpose of this study was to determine the feasibility of PBL-based e-module in the Communication Psychology course in the Guidance and Counseling study program, Fakultas Ilmu Pendidikan, Universitas Negeri Medan. This study is a research and development using the ADDIE model, namely analysis, design, development, implementation and evaluation. Regarding product feasibility, material expert gave a value with a percentage of 96.1% which is included in the very valid category and media expert gave a value of 91% with a very valid category. These indicate that the e-module was eligible for testing on research trial subjects.

Keywords: Development, PBL-Based E-Module, Feasibility

1 Introduction

Education as a process of interaction and experience that shapes the character, attitude, and intellectual abilities of individuals. Education is the key to preparing a generation that is able to solve problems amidst social change [1]. Furthermore, education is an ongoing effort to explore the potential of students as a whole. Education does not only focus on academic achievement, but also on character development, creativity, and life skills [2]. Then, education is a process of transforming noble values and knowledge that are the basis for the formation of national character and mentality. Education must provide space for students to recognize their identity in a social and cultural context [3]. The next opinion defines education as an important instrument for creating a just and prosperous society. Education is a means of empowerment that aims to improve critical thinking and participation in social life [4]. Another opinion defines education is a process that seeks welfare and social justice through individual empowerment. Education should go beyond the cognitive aspect and give students the freedom to think critically and independently in achieving life goals [5]. Based on several expert opinions above, it can be concluded that education is not only for intellectual development, but also to shape character and equip students to play an effective role in society.

Education in its application certainly has a purpose. The purpose of education is to form a generation with character, critical thinking skills, and the ability to adapt to social and technological changes. Education is expected to not only produce graduates who are academically intelligent but also have social and ethical sensitivity [6]. Furthermore, the purpose of education is to develop the unique potential of each child. Education aims to not only create individuals who are competent in academics but also those who have life skills, creativity, and positive attitudes, so that they can contribute to society [7]. Then, the purpose of education

is to form individuals who understand national values and morality. Education aims to help students develop their identity and foster a sense of love for their homeland, and a sense of responsibility for diversity in society [8]. The next opinion sees the purpose of education as an effort to create an inclusive and just society. Education is expected to empower students to be able to think critically, understand social issues, and play an active role in building a harmonious and prosperous life [9]. Another opinion states that the purpose of education is to create an independent and just society. Education must build critical awareness in individuals so that they can solve life's problems independently, have freedom of thought, and fight for social welfare [10]. Based on several expert opinions above, it can be concluded that the goals of education include character development, social sensitivity, critical thinking skills, and the formation of individuals who are independent and responsible for the social environment.

The purpose of education and universities are closely related. Education aims to develop individuals who are not only academically intelligent, but also have character, life skills, and the ability to contribute positively to society. Universities as higher education institutions function as places that direct students towards achieving these educational goals through formal education, character development, research, and professional and social activities. To achieve these educational goals, teaching materials play a key role in the educational process at universities. Effective teaching materials are designed to help students achieve their educational goals by providing the knowledge, practical skills, and insights needed to develop both personally and professionally. With a variety of materials covering theory, practice, and ethics, universities play a role in developing a generation that is intelligent, competent, creative, and socially responsible. Teaching materials are a set of systematic, complete, and easy-to-understand materials that aim to help educators and students achieve learning objectives [11]. Furthermore, teaching materials are a set of learning materials consisting of messages and media that are arranged logically and systematically [12]. Then, teaching materials are materials designed to help educators and students achieve learning objectives in an effective way [13]. The next opinion defines teaching materials as all forms of materials used to deliver lessons, including textbooks, modules, and technology-based teaching materials [14]. Another opinion says that teaching materials are learning materials that are arranged systematically and include various forms, from text to visual technology that supports learning [15]. Based on several expert opinions above, it can be concluded that teaching materials are a set of materials that are arranged in a structured, complete and systematic manner with the main aim of making it easier for educators and students to achieve learning objectives.

There are many types of teaching materials that can be used in the learning process. Printed teaching materials such as books, modules, and student worksheets are still important components in the learning process. Printed teaching materials are considered to have more value in helping students understand the material independently [16]. Furthermore, digital teaching materials include e-books, learning videos, and presentations that can be accessed online. These teaching materials are increasingly important in the digital era, allowing students to learn anytime and anywhere [17]. Then, blended learning materials combine online teaching materials with face-to-face. This allows students to gain a flexible learning experience, as well as optimize the role of teachers in the learning process [18]. The next opinion says that project-based teaching materials encourage students to learn through direct practical activities. This method not only improves technical skills but also critical and collaborative thinking skills [19]. Based on several expert opinions above, it can be concluded that the types of teaching materials show a variety of methods that are adjusted to the needs and developments of technology. The diversity of teaching materials offers a more adaptive and appropriate approach to meet the various needs of modern learning.

The use of digital technology is an important part of 21st century learning. Technology not only functions as a medium, but also as a tool that supports innovation, expands access to information, and enables more interactive and personalized learning [20]. Furthermore, project-based and problem-based learning are important approaches in 21st century learning. This approach encourages students to learn through practical experiences and real-world problem solving, which helps them develop critical thinking skills and the ability to work in teams [21].

Based on the result of observations on the Communication Psychology course that has been running in the Guidance and Counseling Department of Medan State University, it was found that the low mastery of students in understanding the material was due to the lack of literature or references. To overcome this problem, a teaching material is needed that is relevant to 21st century learning and interesting for students not only in studying at university but also in independent learning at home so that their learning outcomes increase and become better, namely PBL-based e-module.

E-modules are defined as multimedia teaching materials that utilize technological devices to enhance student engagement in learning. E-modules help in project-based learning by providing structured and technology-based instruction, so students are more likely to follow the learning stages and complete projects [22]. Furthermore, e-modules are electronic teaching materials that are systematically organized and interactive to support the learning process, where students can access content through digital devices such as computers, tablets, or smartphones. E-modules are equipped with interactive elements, such as videos and quizzes, which increase students' engagement and help them understand concepts deeply [23]. Then, E-modules are digital learning devices that can be used for both distance and face-to-face learning. E-modules present material independently by including various multimedia formats that facilitate students in learning according to their individual rhythms and needs [24]. The next opinion defines Afriani and Maulida (2020): E-modules are electronic-based learning modules that allow students to learn independently and flexibly, with material presentation complemented by interactive media. E-modules increase students' learning motivation as they can access the material and practice through quizzes or question exercises anytime and anywhere [25].

Another opinion defines e-modules are defined as problem-based learning digital teaching materials designed to train students' critical thinking skills. With this approach, e-modules not only provide information, but also guide students through a series of tasks and problems that direct them to problem solving [26]. Based on the definition of e-modules from experts in the last five years, it can be concluded that e-modules are forms of digital-based teaching materials designed to support independent, flexible, and interactive learning. E-modules leverage digital and multimedia technologies to present material more engagingly and easily accessible to students through a variety of devices, such as computers, tablets, or smartphones

From the description above, the researchers conducted research on the development of PBL-based e-module in the Communication Psychology course.

2   Research Method

The method used is Research & Development (R&D). R&D is a research method used to produce certain products, as well as to test the effectiveness of these products. The R&D process includes a series of systematic stages aimed at developing products that are useful and can be applied in real life, such as teaching materials, learning tools, or other educational media [27]. Furthermore, R&D is a method that aims to develop new products or improve existing products

through a scientific research process. R&D products in the field of education include various forms of digital media, e-learning applications, and other learning tools that are relevant to modern needs [28].

The development model used in this study is ADDIE (Analysis, Design, Development, Implementation, and Evaluation). The ADDIE model was chosen because of the relevance of the ADDIE model in the digital era. This is in line with the opinion that the ADDIE model is relevant in the digital era because it can be applied in the development of digital content such as e-learning and interactive learning. This model provides a clear structure for designing digital teaching materials that are attractive, interactive, and in accordance with the demands of modern learning [29]. The ADDIE development model uses several stages as shown in the following figure.

Fig. 1. Addie Development Model

This research was conducted in the Guidance and Counseling study program, Faculty of Education, State University of Medan for 11 months starting from January to November 2024. The subjects of this study consist of several elements, namely material expert as validators or those who provide suggestions or comments on the material, media expert as validators or those who provide suggestions or comments on the media and trial subjects who are selected randomly with the hope that they can be a source of data from representatives of semester III students in the 2024/2025 academic year at the Guidance and Counseling Faculty of Education, State University of Medan for the effectiveness of the product developed.

Data collection techniques in this study were observation, questionnaires and tests. Observations will be carried out to obtain information on problems related to learning so that the products to be developed are in accordance with the results of the observations. Observation as a method of collecting data by observing objects or phenomena directly in the field. Observations can be carried out in a participatory or non-participatory form, depending on the role of the researcher in the field and their involvement in the situation being observed [30]. Meanwhile, the questionnaire are used to collect validation data from material expert and validation data from media expert regarding the product being developed. A questionnaire is a data collection tool in the form of a series of questions given to respondents to collect data objectively. The importance of the suitability of the questionnaire to the research objectives and the ease for respondents to answer it [31]. The questionnaire for material and media experts was compiled using Likert scale. Strongly Agree (SS) is scored 5, Agree (S) is scored 4, Less Agree (KS) is scored 3, Disagree (TS) is scored 2 and Strongly Disagree (STS) is scored 1. Meanwhile, the tests are to collect data on students learning outcome before and after participating in learning with the PBL-based e-module that was developed. Tests as a systematic and objective measuring tool to determine learning outcomes. Tests are developed through structured

procedures, starting from planning, creating questions, to processing test results to obtain valid and reliable information about student abilities [32]. In this study, there are 2 types of tests compiled by researchers, namely: pretest and posttest. Pretest as a preliminary assessment given to determine students' initial knowledge. This pretest provides a clear picture of students' strengths and weaknesses in new subject matter, so that teachers can design more appropriate learning experiences [33]. Meanwhile, the posttest is the final evaluation that aims to measure changes or developments in students' knowledge and skills after they have completed the subject matter. This posttest provides important data for educators to evaluate the effectiveness of learning and the level of achievement of goals [34]. The questionnaires and tests compiled by researchers were first tested for validity by experts. After being declared valid, the questionnaires and tests can be used as data collection instruments.

The data analysis techniques used are qualitative and quantitative descriptive analysis techniques. Qualitative descriptive analysis techniques are obtained from suggestions or responses from material and media experts. While quantitative descriptive analysis techniques are obtained from the percentage results of material and media expert assessments and student learning outcome scores.

To determine the feasibility of the developed PBL-based e-module, the formula is used: $Vs = \Sigma x/\Sigma n \times 100\%$. Then Vs is consulted with the module validity percentage classification to determine whether the developed product is declared valid or invalid.

Table 1. Classification of Percentage of Validity of E-Module

Validity Level	Validity Criteria
$85,01\% \le Vs \le 100,00\%$	Very valid or can be used without revision
$70,01\% \le Vs \le 85,01\%$	Quite valid or usable but needs minor revisions
$50,01\% \le Vs \le 70,00\%$	Less valid, recommended not to use because it needs major revision
$01,00\% \le Vs \le 50,00\%$	Invalid or may not be used

To determine the effectiveness of the PBL-based e-module developed, the N-Gain formula is used. N-Gain as an indicator of learning achievement that measures the increase in learning outcomes from pretest to posttest. This N-Gain formula is applied in various contexts, such as evaluating learning modules or new teaching methods, and is categorized into high, medium, and low based on the scores generated [35]. The formula used is as follows:

N Gain = (Posttest Score − Pretest Score) / (Ideal Score − Pretest Score)

Then N-Gain is consulted with the N-Gain Interpretation Category. The N-Gain interpretation categories are High: if the N-Gain value > 0.7, Medium: if 0.3 < N-Gain ≤ 0.7 and Low: if N-Gain ≤ 0.3.

This category refers to the level of effectiveness of improving student learning outcomes after a particular learning intervention. The high category indicates that there is a significant increase in student understanding or skills, medium indicates a moderate increase, and low indicates a minimal or insignificant increase [36]

3 Results and Discussion
3.1 Results

The research results in this article only consist of the analysis, design and development stages because the research was still at the development stage when this article was written. At the development stage, a feasibility test was conducted by material and media experts on the PBL-based e-module that was developed. The results of the media expert assessment are as follows:

Table 2. Material Expert Validation Results

No.	Statement	Evaluation					X
		SS	S	KS	TS	STS	
	Accuracy of Content						
1	The content of the material in the PBL-based e-module is in accordance with the concepts that apply in the field of science.	✓					5
	Accuracy of Content Coverage						
2	The material is presented sequentially according to the order and stages of the material.	✓					5
3	Accuracy of PBL-based e-module materials	✓					5
4	The breadth of PBL-based e-module material	✓					5
5	Presentation of PBL-based e-module contents	✓					5
	Content Digestibility						
6	Depth of PBL-based e-module material	✓					5
7	The integrity of the PBL-based e-module material concept	✓					5
8	PBL-based e-modules are clearly explained	✓					5
9	PBL-based e-modules are presented systematically.	✓					5
10	The content format of the PBL-based e-module is orderly and consistent		✓				4
11	Topics in PBL-based e-modules are related	✓					5
	Linguistics						
12	The language used is communicative		✓				4

No	Assessment Aspects		X
13	Use of short and concise words	✓	4
14	Use of effective sentences according to students	✓	5
15	Sentences according to Indonesian EYD	✓	5
16	Proper use of symbols and terms	✓	4
Components of the PBL Framework			
17	The problems presented make students interested in building their own knowledge.	✓	5
18	Contains instructions that direct students to study individually or in groups.	✓	5
19	There is a framework of PBL that guides students to discover concepts and helps solve problems.	✓	5
20	Provide opportunities for students to convey or present results related to a problem presented	✓	5
21	There are tests or questions that can be presented as evaluation and independent practice for students.	✓	5
	ΣX		101
	Σn		105
	Vs		96,1%

Based on the table above, it can be seen that Based on the results in the table above with a percentage of 96.1% in the "Very Valid" category. Therefore, the PBL-based e-module is suitable for testing on research trial subjects. The results of the media expert assessment are as follows:

Table 3. Media Expert Validation Results

Indicator	No	Assessment Aspects	Evaluation					X
			SS	S	KS	TS	STS	
Screen Design Display Aspect	1.	The composition of the colors of the writing against the background color is correct and the writing can be read clearly.	✓					5
	2.	The proportional layout of the front cover (text and image layout) is correct.		✓				4

Aspect	No.	Statement			Score
	3.	Clarity of e-module title	✓		5
	4.	The attractiveness of the cover design	✓		5
	5.	The design of the e-module displayed (colors, images/ illustrations, letters) has an attractive appeal.		✓	4
Ease of Use Aspect	6.	The learning e-module is presented sequentially according to the order of the e-module parts.		✓	4
	7.	E-module is easy to operate using a smartphone or other electronic device.	✓		5
	8.	Ease of searching e-module pages		✓	4
	9.	Instructions for using the e-module are clear and not confusing.		✓	4
	10.	The videos in the e-module can be accessed	✓		5
	11.	Navigation buttons on quizzes and final evaluations work well	✓		5
	12	The links in the e-module can be accessed properly	✓		5
Benefit Aspect	13.	The learning steps in the e-module make it easier for students to learn independently.	✓		5
	14.	The use of e-modules makes it easier for educators in the teaching and learning process.	✓		5
Graphic Aspects	15.	The font size used is easy to read clearly		✓	4
	16.	The type of font used is easy to read clearly		✓	4
	17.	The image illustration used is clear (not blurry)		✓	4
	18.	The video runs smoothly (no stuttering) and can be seen clearly (not blurry)	✓		5
	19.	The video narration is clearly audible and understandable	✓		5
		ΣX			87
		Σn			95
		Vs			91%

Based on the table above, it can be seen that Based on the results in the table above with a percentage of 91% in the "Very Valid" category. Therefore, the PBL-based e-module is suitable for testing on research trial subjects.

3.2 Discussion

The developed e-module was then tested for its feasibility by experts, namely material and media experts. Based on the results of the validation by material experts, with the aspects assessed being the accuracy of the content, the accuracy of the coverage of the content, the digestibility of the content, the language, and the components of the PBL framework, a percentage of 96% was obtained with a very valid category. Then the results of the validation by media experts, with the aspects assessed being the appearance of the screen design, the aspect of ease of use, the aspect of usefulness, and the aspect of graphics, a percentage of 91% was obtained with a very valid category. Based on the results of the validation by material and media experts on the PBL-based e-module developed by the researcher, it was declared feasible to be used for testing on students.

4 Conclusion

Based on the results of the validation by material experts, with the aspects assessed being the accuracy of the content, the accuracy of the coverage of the content, the digestibility of the content, the language, and the components of the PBL framework, a percentage of 96% was obtained with a very valid category. Then the results of the validation by media experts, with the aspects assessed being the appearance of the screen design, the aspect of ease of use, the aspect of usefulness, and the aspect of graphics, a percentage of 91% was obtained with a very valid category. Based on the results of the validation by material and media experts on the PBL-based e-module developed by the researcher, it was declared feasible to be used for testing on students.

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