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DEVELOPING A PROJECT-BASED LEARNING (PJBL)-BASED HEALTH PROMOTION LEARNING MATERIAL IN THE FACULTY OF MEDICINE UNIVERSITAS NEGERI GORONTALO

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Abstract

This study describes the design and development of a Project-Based Learning (PjBL)-based health promotion learning material to elevate student collaboration and participation. The type of the study was research and development using the ADDIE model. Data collection techniques included interviews, questionnaire distribution, and observation. Results indicated that the developed Project-Based Learning (PjBL)-based health promotion learning book was reliable according to experts' validation of the content, media, and language aspects. The content aspect achieved a mean score of 95.23%, while the media and language mean scores were 99.09% and 81.10%, respectively. We tested the learning book's effectiveness by comparing students' pretest and posttest scores, which pointed out that the latter was higher. The sum of the posttest scores was 1,539, with a mean of 29.59, while that of the pretest scores was 1,117, with a mean of 21.48. As implied by the scores, students presented enhanced scores in the posttest. Additionally, the statistical test results showed an Asymp. Sig. of 0.000, which was smaller compared to $\alpha = 0.05$. It brought about a conclusion that Ha was accepted and suggested a difference between students' pretest and posttest scores after the use of the Project-Based Learning (PjBL)-based health promotion learning material. The learning material was thus effective in escalating students' learning outcomes. Eventually, as the final product from analyzing the ADDIE model application and Project-Based Learning (PjBL) implementation, we created a new model, the SRI model, which stood from Situational Analysis (S), Research and Reflection (R), and the Implementation of Health Promotion Strategies (I).

Keywords: Learning Book, Project-Based Learning (PjBL), ADDIE Model.

INTRODUCTION

Medical education calls for high-quality learning materials to be able to deliver the knowledge and skills necessary for medical students. That is, the learning materials have to be understandable, adjusted to students' needs and their diverse learning styles, and adhere to the latest developments in medical sciences (Ningtyas, 2019).

Learning materials are critical to medical education and play a crucial role in allowing medical students to apprehend and put medical theories and knowledge into practice. In addition, they enable students to comprehend materials efficiently, improve learning quality, maintain learning consistency, increase efficiency and effectiveness, and motivate students to learn.

As such, developing good learning models is essential to promote the quality and effectiveness of the learning process. A good learning model must be with a carefully made design and well-arranged preparation to ensure the materials delivered are understandable for students. In this study, we propose a health promotion learning material using the Project-Based Learning

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(PjBL) method because of its features which can elevate learning effectiveness and students' engagement in the learning process. Among the features are developing problem-solving skills, enhancing students' participation, developing creativity and innovations, bolstering collaborative and communicative skills, and cultivating independence and responsibility.

Project-Based Learning (PjBL) focuses on learning projects challenging students to solve real problems or create salutary products in a real-life context. The Project-Based Learning (PjBL) method is a fine-tuned version of the Problem-Based Learning (PBL) one. Project-Based Learning (PjBL) is a training strategy oriented to the Contextual Teaching and Learning Processes or CTL (Arthur et al., 2001), a learning concept which aids teachers in associating learning materials with real-life situations. Additionally, the concept encourages students to deploy and implement the owned knowledge in their lives, enhancing their roles as members of society.

Furthermore, Project-Based Learning (PjBL) emphasizes students' activities of generating learning products using the skills of researching, analyzing, making, and presenting the products based on real experiences (Irman & Waskito, 2020; Pan et al., 2021; Wijayanti et al., 2016). The addressed products are generated from students' projects and can be either services or goods in the form of designs, schemes, papers, artworks, technological/craft works, and others. Through the application of Project-Based Learning (PjBL), students will have the opportunity to practice planning, holding activities following the plan, and presenting or reporting the activity results (Logan et al., 2021; Mutakinati et al., 2018).

Considering the elucidated background, we carried out a study titled "**Developing a Project-Based Learning (PjBL)-Based Health Promotion Learning Material in the Faculty of Medicine Universitas Negeri Gorontalo**." Through this study, we made a Project-Based Learning (PjBL)-based health promotion learning material design which could escalate students' participation and collaboration, especially in the Faculty of Medicine Universitas Negeri Gorontalo.

METHOD

This study employed the ADDIE development model, which was composed of five steps, i.e., Analyze, Design, Develop, Implement, and Evaluate, and produced a learning material processed through some steps aligned with the learning model to determine its reliability. Data were collected using three instruments, namely interviews, questionnaires, and tests. Quantitative data were analyzed by comparing data with the defined validation criteria in Table 1.

Table 1: Validation Criteria

No.	Mean Percentage (%)	Validation Level
1	75.01-100	Very Valid
2	50.01-75.00	Moderately Valid
3	25.01-50.00	Invalid
4	00.00-25.00	Very Invalid

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RESULTS AND DISCUSSION

Results

A. Validation Results of the Health Promotion Learning Book

1. Content Aspect Validation

The expert's validation results concerning the learning book's content aspect are demonstrated in Table 2, which exhibits a mean percentage of 95.23%. Referring to validation criteria based on the validation level scale, the Project-Based Learning (PjBL)-based health promotion learning book was **very reliable**.

Table 2: Content Aspect Validation

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Material suitability with Basic Competencies	13	15	86.60	Very Valid
2	Material accuracy	20	20	100.00	Very Valid
3	Motivation for curiosity	10	10	100.00	Very Valid
4	Presentation techniques	9	10	90.00	Very Valid
5	Presentation supporting features	25	25	100.00	Very Valid
Mean				**95.23**	

2. Media Aspect Validation

The expert's validation results of the media aspect are indicated in Table 3. The validation was taking into account three sub-aspects, which were the learning book's size, cover design, and content design. The expert gave a mean score of 99.09 to the aspect, and hence, we could categorize the Project-Based Learning (PjBL)-based health promotion learning book as **very reliable** according to validation criteria based on the validation level scale.

Table 3: Media Aspect Validation

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Learning book's physical size	10	10	100	Very Valid
2	Learning book's cover layout	18	20	90	Very Valid
3	Attractive and readable fonts	15	15	100	Very Valid
4	Learning book's cover illustration	10	10	100	Very Valid
5	Layout consistency	10	10	100	Very Valid
6	Harmonious layout elements	15	15	100	Very Valid
7	Complete layout elements	10	10	100	Very Valid
8	Supportive layout for easy understanding	10	10	100	Very Valid
9	Book's simple content typology	10	10	100	Very Valid
10	Readily read typology	15	15	100	Very Valid
11	Supportive book content typography for easy understanding	10	10	100	Very Valid
Mean				**99.09**	

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3. Language Aspect Validation

Table 4 points out the expert's validation results of the language aspect which covered six indicators: straightforward, communicative, dialogical and interactive, conforming to students' development levels, with sequent and integrated flow of thoughts, and using terms, symbols, or icons. In Table 4, the mean percentage of the content aspect validation is 81.10%. Referring to validation criteria based on the validation level scale, the Project-Based Learning (PjBL)-based health promotion learning book was **very reliable**.

Table 4: Language Aspect Validation

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Straightforward	13	15	86.60	Very Valid
2	Communicative	9	10	90.00	Very Valid
3	Dialogical and interactive	8	10	80.00	Very Valid
4	Conforming to students' development levels	8	10	80.00	Very Valid
5	With sequent and integrated flow of thoughts	7	10	70.00	Moderately Valid
6	Using terms, symbols, or icons	8	10	80.00	Very Valid
Mean				**81.10**	

B. Test of the Health Promotion Learning Book

1. Small Group Test

The small group test was conducted on 52 undergraduate medical students and resulted in students' responses or validation related to the practicability of the Project-Based Learning (PjBL)-based health promotion learning book. The validation was concerned with material presentation and benefit aspects, and the results are presented in Table 5. In Table 5, the overall mean percentage of students' responses or validation of the Project-Based Learning (PjBL)-based health promotion learning book was 85.58%, showing that the book was classified as **very practical** according to practicability criteria.

Table 5: Learning Book Validation by Students

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Material presentation	3,344	3,900	85.74	Very Practical
2	Benefit	3,110	3,640	85.43	Very Practical
Mean				**85.58**	

2. Large Group Test

a. Lecturers' Validation of the Developed Learning Book's Effectiveness

The lecturers' validation of the Project-Based Learning (PjBL)-based health promotion learning book's effectiveness was mindful of two indicators, i.e., material presentation and benefits of the learning book. Results in Table 6 demonstrate that the overall mean validation score given by lecturers to the Project-Based Learning (PjBL)-based health promotion learning

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book was 87.02%. The book was therefore categorized as **effective** based on effectiveness criteria.

Table 6: Learning Book Validation by Lecturers

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Material presentation	265	300	88.33	Very Effective
2	Benefit	240	280	85.71	Very Effective
Mean				**87.02**	

b. Students' Learning Outcomes According to Pretest and Posttest Scores

Students were given a pretest for measuring their initial competencies and knowledge regarding health promotion before using the developed learning book and posttest for examining any changes after the treatment. The comparison results of students' pretest and posttest scores served as a reference for defining the developed learning book's effectiveness. Students' pretest and posttest results are demonstrated in Table 7.

Table 7: Comparison of Students' Pretest and Posttest Scores

Test	N	Sum of the Scores	Max. Score	Min. Score	Ideal Score	Mean
Pretest	52	1,117	27	17	26	21.48
Posttest	52	1,539	30	24	26	29.59

As we can observe in Table 7, the posttest score, with a sum of scores of 1,539 and a mean of 29.59, was higher relative to the pretest one, with a sum of scores of 1,117 and a mean of 21.48. These scores attested to students' higher posttest results, indicative of the Project-Based Learning (PjBL)-based health promotion learning book's effectiveness in elevating their learning outcomes. To identify the difference between the two test results, we performed a paired sample t-test, and the results are presented in Table 8.

Table 8: Paired Sample T-Test Results

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of The Difference				
				Lower	Upper			
Pair 1 PRETEST-POSTTEST	-7.750	2.611	.362	-8.477	-7.023	-21.402	51	.000

The statistical test results in Table 8 exhibit a significant difference between pretest and posttest data collected after using the Project-Based Learning (PjBL)-based health promotion learning book. The acquired Asymp. Sig. was 0.000, which was smaller than $\alpha = 0.05$, leading us to a conclusion that H_a was accepted, or there was a difference between pretest and posttest results after the use of the Project-Based Learning (PjBL)-based health promotion learning book.

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C. Project-Based Learning (PjBL)-Based SRI Model

1. Project-Based Learning (PjBL) Model's Effectiveness for Undergraduate Medical Students

a. Lecturers' Validation of the Project-Based Learning (PjBL) Implementation

Lecturers' validation results of the Project-Based Learning (PjBL) implementation for the health promotion course are indicated in Table 9, which points out a validation percentage score ranging between 85-90% at a mean of 87.5%. The learning implementation was thus considered **very effective** based on the criteria for interpreting lecturers' questionnaire scores.

Table 9: Lecturers' Validation of the Project-Based Learning (PjBL) Implementation

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Identifying and determining problem topics	18	20	90.0	Very Effective
2	Designing the product	17	20	85.0	Very Effective
3	Producing and presenting	17	20	85.0	Very Effective
4	Evaluating	18	20	90.0	Very Effective
Mean				**87.5**	**Very Effective**

b. Students' Validation of the Project-Based Learning (PjBL) Implementation

Table 10 shows students' validation results of the Project-Based Learning (PjBL) implementation for the health promotion course, namely a percentage score ranging between 85%-90% at a mean of 86.43%. Following the criteria for interpreting students' questionnaire scores, the learning implementation was **very effective**.

Table 10: Students' Validation of the Project-Based Learning (PjBL) Implementation

No.	Indicators	Scores		Percentage (%)	Validation Level
		Acquired	Maximum		
1	Identifying and determining problem topics	231	260	88.84	Very Effective
2	Designing the product	223	260	85.76	Very Effective
3	Producing and presenting	224	260	86.15	Very Effective
4	Evaluating	221	260	85.00	Very Effective
Mean				**86.43**	**Very Effective**

2. Project-Based Learning (PjBL)-Based SRI Model Design

We created a new model product, the SRI model, from the observation of the ADDIE model application and Project-Based Learning (PjBL) implementation.

Table 11: Implemented Learning Model's Correlation with the SRI Model

SRI Model	Project-Based Learning (PjBL) Model
Situational Analysis	1. Starting with an essential question 2. Designing a project plan
Research and Reflection	1. Creating a schedule
Implementation of Health Promotion Strategies	1. Monitoring students and the progress of the project 2. Assessing the outcome 3. Evaluating the experience

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Discussion

A. The Developed Project-Based Learning (PjBL)-Based Health Promotion Learning Book's Effectiveness for Enhancing Undergraduate Medical Students' Participation and Collaboration

We distributed questionnaires to two respondent groups, namely course lecturers and 2nd-semester undergraduate medical students, with the results showing mean scores of 87.50% and 86.43% from lecturer and student groups, respectively. Referring to our study of learning effectiveness with Project-Based Learning (PjBL), we decided to put the learning model into effect in a university environment, particularly for the health promotion course. In correspondence with the decision, we were thus in view of the necessity of engendering one whole learning concept, which we then described as the SRI model. The SRI model comprised three learning steps, each of which was grounded on relevant theoretical bases, as suggested in Table 12.

Table 12: The SRI Model's Learning Steps and the Theoretical Bases

SRI Model's Steps	Description	Scientific Base
Situational Analysis	The step involved situational analysis to apprehend the relevant health context requiring immediate solutions.	Situational analysis was an essential approach to planning health promotion because it enabled health problem identification and understanding of effective community needs.
Research and Reflection	Related to this step, students undertook a serious study of the chosen health issue and contemplated their findings to gain a better comprehension.	Research and reflection were two key elements in active learning helpful for obtaining deeper apprehension and implementing theoretical concepts in a real context.
Implementation of Health Promotion Strategies	This step engaged the implementation of health promotion strategies planned in projects, e.g., socialization, campaigns, or other educational activities.	Scientific evidence-based health promotion practices were proven effective for positively affecting behaviors and distributing accurate and relevant health information.

With the help of the SRI model, which we had synchronized with Project-Based Learning (PjBL), for the health promotion course, we were expecting that medical students could be involved actively in learning and develop collaborative and participative skills required in teamwork concentrating on community health promotion. We believed that improving students' participation in Project-Based Learning (PjBL) for the health promotion course was an essential measure to bring about meaningful and effective learning experiences.

B. Evaluating the Developed Project-Based Learning (PjBL)-Based Health Promotion Learning Book for Enhancing Undergraduate Medical Students' Participation and Collaboration

Experts' validation was targeted on content, media, and language aspects, and the results demonstrated mean scores of 95.23%, 99.09%, and 81.10% for media, content, and language aspects, respectively. The three aspects were categorized as **very reliable** according to

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validation criteria, affirming the high reliability of the Project-Based Learning (PjBL)-based health promotion learning book for increasing students' collaborative and participative skills.

CONCLUSION

This study's focal point was to engender a design of a Project-Based Learning (PjBL)-based health promotion learning material which could promote students' participation and collaboration levels. Results exhibited that the developed Project-Based Learning (PjBL)-based health promotion learning book was very reliable, as confirmed by experts' validation of the book's content, media, and language aspects. The content aspect had a mean score of 95.23%, while media and language obtained mean scores of 99.09% and 81.10%, respectively. The learning book's effectiveness was tested by comparing students' pretest and posttest scores, which indicated that the latter was higher. The sum of the posttest scores was 1,539 at a mean of 29.59, while that of the pretest scores was 1,117 at a mean of 21.48. From the two scores, we could identify an increase in the first one. In addition, the statistical test generated an Asymp. Sig. of 0.000, which was smaller compared to $\alpha = 0.05$, and accordingly, H_a was accepted, or there was a difference between pretest and posttest scores after students used the Project-Based Learning (PjBL)-based health promotion learning book. To conclude, the Project-Based Learning (PjBL)-based health promotion learning book was effective in elevating students' learning outcomes.

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