

VALIDITY OF THE ELECTRONIC ENRICHMENT BOOK "SITINJAU LAUIK FROM THE PERSPECTIVE OF PHYSICS"

Julia Virji¹, Desnita², Hidayati³, Selma Riyasni⁴

^{1, 2, 3, 4}Universitas Negeri Padang, Jl. Prof. Dr. Hamka, Air Tawar Padang, Sumatera Barat, Indonesia
Email: juliavirji99@gmail.com

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Abstract. Education is basically an investment in human resource development that is indispensable in society. One of the important skills that must be possessed in the era of globalization is the ability to solve problems. Students are considered to be able to solve problems if they are able to understand, choose strategies, and then apply them in problem solving. But in reality, students' problem-solving skills are still low. Therefore, learning resources are needed that can train problem-solving skills. One of the learning resources that can be developed is electronic enrichment books. This study uses the R&D research method. The model used in this study is the 4-D model. The population in this study is 78 students in grade XI Phase F for the 2024/2025 school year. The sample of this study was carried out by random sampling with the research subject of physics lecturers of FMIPA UNP with a total of 3 lecturers. Based on the results of the research of the electronic enrichment book entitled "Sitinjau Lauik from the Perspective of Physics" which was developed, a validity score was obtained from 3 experts with an average score of 0.82 with very valid criteria. Based on this, electronic enrichment books that are developed and arranged in such a way can be used as a physics learning resource that trains the problem-solving skills of high school students.

Keywords: Validation, Enrichment Book, Sitinjau Lauik, 4-D Model

Abstrak. Pendidikan pada dasarnya merupakan investasi pengembangan sumber daya manusia yang sangat diperlukan dalam masyarakat. Salah satu keterampilan penting yang harus dimiliki di era globalisasi adalah kemampuan memecahkan masalah. Siswa dianggap mampu memecahkan masalah apabila mampu memahami, memilih strategi, dan kemudian menerapkannya dalam pemecahan masalah. Namun kenyataannya kemampuan pemecahan masalah siswa masih rendah. Maka diperlukan sumber belajar yang dapat melatih kemampuan pemecahan masalah. Salah satu sumber belajar yang dapat dikembangkan adalah buku pengayaan elektronik. Penelitian ini menggunakan metode penelitian R&D. Model yang digunakan dalam penelitian ini adalah model 4-D. Populasi dalam penelitian ini adalah siswa kelas XI Tahap F tahun ajaran 2024/2025 yang berjumlah 78 orang. Sampel penelitian ini dilakukan secara random sampling dengan subjek penelitian dosen fisika FMIPA UNP dengan jumlah 3 orang dosen. Berdasarkan hasil penelitian buku pengayaan elektronik berjudul "Sitinjau Lauik dari Sudut Pandang Fisika" yang dikembangkan diperoleh skor validitas dari 3 ahli dengan skor rata-rata 0,82 dengan kriteria sangat valid. Berdasarkan hal tersebut, buku pengayaan elektronik yang dikembangkan dan disusun sedemikian rupa dapat dijadikan sebagai sumber belajar fisika yang melatih kemampuan pemecahan masalah siswa SMA.

Kata Kunci: Validasi, Buku Pengayaan, Sitinjau Lauik, Model 4D

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INTRODUCTION

Education is basically an investment in human resource development that is indispensable in society. In this era of globalization, human resources who have thinking skills such as logical thinking, systematic, creative and able to solve problems are urgently needed. Problem-solving skills are very useful skills for students in daily life. Students are considered to be able to solve problems if they can understand, choose strategies, and then apply them in solving problems (Agsya et al., 2019). These abilities can help students in analytical thinking in making decisions and improve critical thinking. Students who do not have problem-solving skills will certainly experience difficulties in solving a problem. This proves that problem-solving skills are very important for students to have.

In fact, in the field, it turns out that students' problem-solving skills are still low. This is evidenced by the test results given to grade XI students in three schools in Solok Regency, namely SMAN 1 Bukit Sundi, SMAN 1 Lembang Jaya, and SMAN 2 Lembang Jaya. The test questions totaled 20 essay questions on global warming and environmental pollution material based on the indicators of the problem-solving ability of Polya model students. This test was given to 78 students in grade XI as can be seen in Figure 1

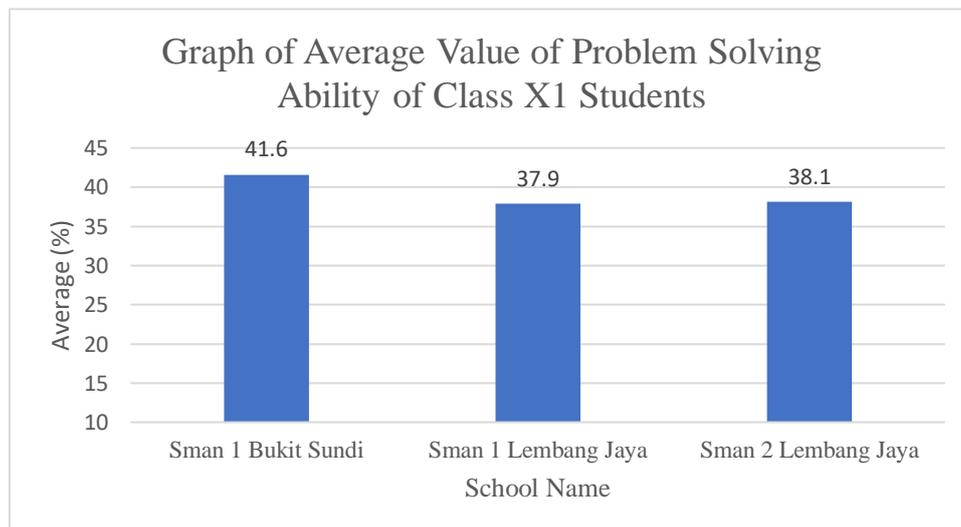


Figure 1. Graph of average grades of problem-solving ability of grade XI students

Based on Figure 1. It can be seen that the average score of students' problem-solving skills in the three schools is still low. The highest average score obtained was only 41.6% at SMAN 1 Bukit Sundi and the lowest average score was at SMAN 1 Lembang Jaya with an average score of 37.9%. The results of this test prove that students' ability to solve problems is still low. This is also in line with research conducted by Wardani (2020) in his research stating that the average problem-solving ability possessed by students today is still low and unsatisfactory.

Based on interviews conducted by researchers with physics teachers in three schools in Solok Regency, the causes of students' low problem-solving skills include the lack of students' ability to apply mathematics to physics problems, students easily give up if given a problem and feel satisfied with the answer, the learning methods applied by teachers have not fully made students understand the subject matter and the limitations of teaching resources and materials.

During the learning process, teachers only use Student Worksheets (LKPD) obtained from the Subject Teacher Conference (MGMP) and then modified according to the needs and character of students, but there are also those that are directly used without being re-modified by teachers. Based on interviews conducted by the researcher to grade XI students in three schools as many as 12 students. There were 83% of students who said that the teaching materials used by teachers were not able to train students' problem-solving skills and 17% of students said that the teaching materials used by teachers were able to train students' problem-solving skills. This proves that the resources and teaching materials used by teachers during the learning process have not been able to train students in problem-solving skills.

One of the solutions that can be done is the development of resources and materials that can train problem-solving skills independently. Teaching materials have a very high influence and role in the learning process. Teaching materials play a role in helping to achieve learning so that students are skilled, creative, and innovative to find the material they learn on their own (Asrizal, 2019). The resources and teaching materials that need to be developed by teachers are certainly learning resources that are able to train students in solving problems. Learning resources that can facilitate students' problem-solving skills are learning resources in which there are activities that build student knowledge to solve a problem (Hamidah & Ardiansyah, 2023). These teaching resources and materials are able to relate students' real-world problems so that the implementation of learning is achieved and train students' problem-solving skills. One of the resources and teaching materials that teachers can develop is physics enrichment books.

Physics enrichment books are one of the learning resources that can be used by teachers in addition to lesson textbooks, where enrichment books are very useful to complement teachers' materials in the learning process. Teachers can use enrichment books to increase students' knowledge and insights, assist teachers in conveying subject matter that is still lacking and provide enrichment to students who have reached KKM (Diani et al., 2023).

The creation of enrichment books is not only limited to printed books, but also available in electronic form. Teaching materials packaged in electronic form make it easy to combine with various media, including text, images, animations, videos, and audio (Herawati and

Muhtadi, 2018). One of the locations that can be used as a reference for making electronic enrichment books is the Sitinjau Lauik Pathway. The Sitinjau Lauik Line is one of the access routes used to enter and exit the city of Padang. The unique geographical characteristics and physical phenomena that occur along this road can be used as a reference for teaching materials that are relevant and interesting for students. Physics concepts that can be observed along the Sitinjau Lauik Path include frictional forces, gravitational forces, normal forces, acceleration, momentum and impact, and motion. Based on the facts and analysis of the needs that have been described, a source and teaching materials are needed that can improve students' problem-solving skills in the form of electronic enrichment books. Therefore, the researcher is interested in researching the validity of the Sitinjau Lauik electronic enrichment book from a physics point of view.

METHOD

The type of research used is research and development (R&D). According to Borg and Gall (1998), research and development is a process/method used to validate and develop products. The development model used in this study is the 4-D model. This development research is used to produce Sitinjau Lauik electronic enrichment book products from a physics perspective with the aim of being a learning resource. The components of the validity of Sitinjau Lauik enrichment books from a physics perspective include aspects of material substance, book design, visual communication display, software utilization (Ministry of National Education, 2010) and indicators of problem-solving ability (Polya, 1973). The validator's assessment of each of the questions assessed was then analyzed using the validity index proposed by Aiken's V , which was formulated as follows:

$$V = \frac{\sum S}{n(c-1)} \text{ with } S = r - l_0$$

Information:

V = validator consensus index

S = the smallest score in the category used and set by the validator

r = number given by the validator

l_0 = lowest score (in this case =1)

c = the highest validity rating number (in this case = 5)

n = number of validators

The criteria used in the validation assessment are based on the Aiken's V scale in table 1. below:

Table 1. Product validity criteria

Interval	Category
$\leq 0,4$	Less Valid
$0.4 < V \leq 0.8$	Valid
$0.8 < V$	Highly Valid

(Retnawati, 2016)

RESULTS AND DISCUSSION

At the development stage, validation is carried out by experts to find out whether the product developed is feasible or not suitable for use. According to Sugiyono (2014), validation is a process of activities that evaluate the design of a product. The enrichment book was validated by 3 validators. The assessment of the physics knowledge enrichment book "Sitinjau Lauik According to the Perspective of Physics" to improve the ability of high school students to solve problems was assessed using a validation instrument. The validation instrument used consists of covering five aspects, namely the substance of the material, book design, visual communication display, software utilization and problem-solving ability indicators.

Table 2. Results of electronic enrichment book validation

Aspects	Aiken's V Index	Category
Material Substance	0,85	Highly Valid
Book Design	0,87	Highly Valid
Visual Communication Display	0,91	Highly Valid
Software Utilization	0,82	Highly Valid
Problem-Solving Capabilities	0,67	Valid
Average	0,82	Highly Valid

Based on Table 2. The results of the product validity show that the developed electronic enrichment book is very valid. The results of this assessment are used to determine the feasibility of the electronic enrichment book that has been designed and revised to the electronic enrichment book that has been made. Based on the results of the product validity assessment of the 5 assessment components, the highest results were obtained in the assessment of visual communication display because the display of enrichment books made in electronic versions because electronic books are more effective to be used as learning resources (Permatasari, 2022). The lowest result was in the problem-solving ability assessment component because in the questions in the case peel and the material in the electronic enrichment book, there must be an indicator of concept understanding according to Polya

(1973). The average validity value of the electronic enrichment book is 0.82 with a very valid category according to the Aiken's V index

CONCLUSION

Based on the results of the research of an electronic enrichment book entitled "Sitinjau Lauik from the point of view of physics" which has been developed, a validity score from 3 experts with an average score of 0.82 with very valid criteria. Based on this, electronic enrichment books that are developed and compiled in such a way can be used as a physics learning resource that trains the problem-solving skills of high school students

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