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Validation Analysis of Learning Development on Optic Material with Core Learning Model

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Abstract. This research is an activity process to produce learning tools that are developed in valid optical material, with the development path using the CORE learning model. The tools developed are syllabus, lesson plans, textbooks, worksheets and Critical Thinking AbilityTest. However, in this paper, it is only focused on the validation test process through construct and content validation tests on the development of the device made. The final result of this research is to produce a valid learning device development product.

Keywords: *Validation, Learning Tools, CORE*

1. Introduction

Teachers have a role to play in improving the quality of education. As good educators, teachers are expected to have in-depth knowledge and understanding of the material being taught. However, adequate knowledge is not enough to build students' understanding well without adequate preparation before teaching. Through good knowledge and the right way of teaching will help students to more easily build their understanding of the material delivered by the teacher. The combination of deep knowledge of the material and knowledge of the right way to teach is referred to by Shulman as pedagogical content knowledge[1]. One of the pedagogical competencies that teachers must have is their ability to develop the curriculum. Teachers will appear to be able to develop the curriculum if the teacher is able to make a syllabus that is in accordance with the curriculum, able to make lesson plans that are in accordance with the syllabus to discuss certain teaching materials so that students can achieve learning objectives, and teachers can follow the learning sequence by paying attention to learning objectives. Given the role of learning tools in determining the achievement of learning objectives, good or valid learning tools are needed. Ideally, learning device developers need to double-check with experts, especially regarding the accuracy of content, subject matter, suitability for learning objectives, physical design and others. Meanwhile, before being used in learning activities, learning devices should have valid status. Likewise, the learning tools developed in this study, namely the Syllabus, Learning Implementation Plan, Teaching Book, Student Activity Sheet, and Critical Thinking Ability Test to measure students' critical thinking skills, will go through a validation process by experts[2].

From this background, the researcher wants to develop a device using the CORE model which is modified into four stages. The development of learning tools that can improve students' critical thinking skills is the CORE model learning tool. The CORE model (Connecting, Organizing, Reflecting and Extending) consists of four processes (1) Connecting (C) where students are invited to connect old information with new information to be learned, (2) Organizing (O) which can facilitate students to organize their knowledge, (3) Reflecting (R) where students are trained to be able to explain back the information that has been obtained, and (4) Extending (E) which leads students to the expansion of knowledge[3]. The CORE model is a learning model that adheres to the theory of constructivism which is able to make students independent in building their own knowledge. The CORE learning model provides opportunities for students to search or find their own meaning of everything learned, so that students can master a concept based on their level of cognitive development. The characteristics of the CORE learning model emphasize the thinking ability of student learners. Some research results show that the CORE learning model can improve students' critical thinking skills, because students are given the opportunity to actively build their own knowledge[4].

In the research, the problem focused on is the analysis of the validation of devices developed with the CORE learning model in optical materials. The formulation of the problem proposed by the author in general from this research is how the development of the CORE learning model device in optical material is valid?

2. Result and Discussion

The results of the analysis of the validity of learning devices conducted by 3 (three) expert validators (lecturers in Physics Education, FIP ITSNU Pasuruan) and Table 1.

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Table 1. Learning Device Validity Analysis Results

Learning Instruments	Average Score (%)	Criteria
Silabus	87,57	Very Valid
RPP	84,80	Quite Valid
Bahan Ajar	86,71	Very Valid
LKS	86,84	Very Valid
Tes Kemampuan Berpikir Kritis	87,66	Very Valid

Based on this table, it is obtained that the learning tools developed have very valid criteria, except for the lesson plans with moderately valid criteria. However, overall the learning tools have been feasible to be applied in learning with the condition of making revisions or improvements to certain parts, especially in the lesson plan[5][6].

The results of syllabus validation can be seen overall that the syllabus developed has an average value of 87.57% which includes very valid criteria. The average reliability value shows 94.44% with reliable criteria and the average value of the predicted practicality response reaches 100% which includes very good criteria. This means that the syllabus is feasible to be implemented in learning.

The syllabus has undergone various revisions or improvements based on the validator's suggestions and input, including making improvements to the operational verbs of the Competency Achievement Indicator (IPK) which are adjusted to the derivatives of Bloom's taxonomy operational verbs C4, C5 and C6. In preparing the GPA, you must choose the right operational verbs. These operational verbs play an important role in formulating learning objectives, in accordance with basic competencies and achievement indicators so that the concept of material is conveyed effectively. In addition, improvements have also been made to the adjustment of learning time and selection of learning resources[7].

The results of the lesson plan validation can be seen overall that the lesson plan developed has an average value of 84.80% (quite valid criteria). According to this criterion, it is necessary to make minor improvements to certain parts. The average reliability value shows 92.67% (reliable criteria) and the average value of the predicted practicality response reaches 100% (very good criteria). This means that the lesson plan is feasible and meets the requirements to be implemented in learning[8].

The lesson plans have undergone various revisions or improvements based on the validators' suggestions and inputs, including making improvements by displaying the components of higher order thinking skills (HOTS) in each step/phase of learning in the lesson plans based on the CORE learning model. The application of HOTS in learning activities is very important to lead students to a higher level of learning. The application of HOTS in learning can be in the form of skills in connecting different concepts, interpreting, solving problems, choosing problem-solving strategies, finding new methods, arguing, and making the right decisions. In the lesson plan, in each learning step, HOTS indicators are raised, including the ability to problem solve, critical thinking, creative thinking, reasoning, and decision making.

The next improvement is the improvement in formulating learning objectives needs to add elements of Audience (A), Behavior (B), Condition (C) and Degree (D). This is in accordance with the opinion that learning objectives in the 2013 curriculum are developed by paying attention to Audience, Behavior, Condition and Degree. Learning objectives that are compiled must pay attention to students as learning subjects, refer to specific behavioral achievements in basic competencies, are learning efforts that can help students to achieve learning behavior in basic competencies, and are the quality of student success that can be expressed qualitatively and quantitatively[9][10].

Feasibility of Teaching Materials (Material Analysis) Based on the validation results, it can be seen overall that the teaching materials developed have an average value of 86.71% (very valid criteria). The average reliability value shows 92.61% (reliable criteria) and the average value of the predicted practicality response reaches 100% (very good criteria). This means that the teaching materials have met the requirements and can be implemented in learning.

Teaching materials have undergone various revisions or improvements based on validator suggestions and input, including making improvements to the concept map on the material analysis used. The use of concept maps is very useful in facilitating learning. Simply put, a concept map is a collection of concepts that are usually connected by one or more connecting words so as to create a meaningful relationship between these concepts in realizing learning objectives. Concept maps have a function as a graphic tool for organizing and representing knowledge and an instrument that helps organize and organize knowledge.

Based on the validation results, it can be seen overall that the LKS developed has an average value of 85.84% which includes very valid criteria. The average reliability value shows 92.38% with reliable criteria and the average value of the predicted practicality response reaches 100% which includes very good criteria. This means that the LKS is suitable for implementation in learning.

The LKPD has undergone various revisions or improvements based on validator suggestions and input, including adjusting the stages or phases in the LKS with the stages or phases in the CORE learning model. It has been explained previously that the CORE learning model. The Connecting (C) stage in the CORE learning model is placed at the beginning of the LKS when presenting the problem. This allows students to do critical thinking activities (basic clarification) to connect the knowledge they already have in predicting or hypothesizing the answer to the problem presentation. Furthermore, the Organizing (O) stage in the CORE learning model plays a role when performing work procedures in experiments. Related to this, students are directed to utilize all the knowledge that has been collected to assemble tools and materials, and think of effective and efficient ways to carry out experimental procedures to obtain precise and accurate experimental data. At the next stage of the CORE learning model, the Reflecting (R) stage takes place when students process the experimental data and answer reflection questions. Activities at this stage students are directed to reflect back related to the theory and basic concepts of harmonic vibrations that have been owned in order to complete data processing and answer reflection questions. The last CORE learning model stage, Extending, is displayed when entering the stage of providing conclusions on the LKS. Learners are challenged to make further explanations that are easily understood by themselves and their friends. Information exchange between groups allows learners to expand their knowledge about harmonic vibration material.

The results of instrument validation can be seen overall that the critical thinking skills assessment instrument (KBK) developed has an average value of 87.66% which includes very valid criteria. The average reliability value shows 94.09% with reliable criteria and the average value of the predicted practicality response reaches 100% which includes very good criteria. This means that the KBK test instrument is suitable for implementation in learning.

The KBK test instrument has undergone various revisions or improvements based on validator suggestions and input, including showing that the questions developed are based on HOTS (Higher Order Thinking Skills) assessment principles. Teachers in making HOTS assessment instruments require mastery of teaching materials, skills in writing questions (question construction), and creativity in choosing stimulus questions according to the situation and conditions of the area around the education unit.

The KBK assessment instrument contains a 10-item question to measure the level of critical thinking skills of students which includes questions with Bloom's taxonomy level in accordance with the indicators of critical thinking skills.

3. Conclusion

Physics learning tools based on the CORE learning model on Optical materials that have been developed have fulfilled content validation and construct validation. This states that it has produced a valid learning tool.

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