PILLAR OF PHYSICS EDUCATION
Vol. 15 (2), 2022, page.123-131
ISSN (Print) : 2337-9618
ISSN (Online) : 2684-8880

THE DEVELOPMENT OF THE KNOWLEDGE'S DIMENSIONS AND LEVELS OF COGNITIVE PROCESSES FOR PHYSICS LEARNING IN SENIOR HIGH SCHOOL

Illyyum Maryumi[1], Amali Putra[1]*, Gusnedi[1], Wahyuni Satria Dewi[1]

[1] *Department of Physics, Universitas Negeri Padang, Jl. Prof. Dr. Hamka Air Tawar, Padang, 25131, Indonesia*
Corresponding author. Email: amali.unp@gmail.com

ABSTRACT

The competencies that students need from each learning in school are the increase in knowledge and changes in attitudes in line with improving their thinking processesHowever, the facts in the field, educators still find various obstacles in analyzing competencies to implement this integration, which is indicated by the description of teacher learning tools that impact the quality of student knowledge competency achievement. The purpose of this research is to produce an analysis model of the integration of the dimensions of Knowledge and Cognitive Process Levels in Circular Motion material for High School Physics Learning, which is poured into the resulting learning device products. This research is included in Research And Development (R and D) by applying the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), which is only reduced to the development stage. This study involved 6 product validators, 3 UNP Physics Education lecturers as experts, and three education practitioners from physics teachers in Pesisir Selatan Regency. The results of data analysis after product refinement obtained the percentage of device validation values generated for lesson plans, teaching materials, and evaluation instruments according to a team of experts and a team of practitioners, respectively, with final scores of 68.48 and 74.86, which are theoretically included in the valid category. Thus this product can be used in high school physics learning to get the results of the field feasibility test on the aspects of practicality and effectiveness.

Keywords : *Physics Learning; Knowledge; Cognitive Process; Integrated; Learning Media.*

I. INTRODUCTION

The development of natural science and technology in the 21st century is swift. The results of innovation and technological sophistication have resulted in various equipment that can meet almost all human needs. Both household needs, transportation, information, communication, scientific development, and entertainment. So that life feels more beautiful, more advanced, and modern. Advances in technology have produced many machines and intelligent robots that replace human muscle work to do human work lighter and of better quality. To overcome this, technological sophistication can be used in the world of education. In the world of 21st-century education, it must also experience changes to train students, especially in the field of skills. These skills will be a provision for students to face technological changes that will be increasingly sophisticated. In-Law no. 20 of 2003 concerning the National education system, it is hoped that all students can develop all their potential and provisions [1].

Every learning carried out in education generally aims to increase knowledge and improve students' thinking skills [2]. With adequate knowledge, each individual will be able to adapt to the environment wherever he is. Increased understanding of students should be in line with increasing thinking skills. In the 2013 curriculum, it is expected that learning can lead to the diversity of knowledge that will be obtained by students through the dimensions of knowledge and cognitive processes based on Bloom's revised taxonomy. Thus, to achieve this goal, learning should be designed using a combination of 4 knowledge dimensions and six cognitive level processes[3].

In Bloom's revised taxonomy, there are four knowledge dimensions and six levels of cognitive processes. The four dimensions of knowledge consist of factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge. Real knowledge functions as a problem solver containing essential elements, namely symbols, related to specific information. Procedural knowledge that contains explicit and implicit schemas,

theories or models in cognitive psychology models. Procedural knowledge is how to do something in procedures or steps regarding collective skills, techniques, algorithms, and methods. Metacognitive knowledge is knowledge in the form of students' awareness and responsibility for their knowledge and thoughts[3].

Meanwhile, the cognitive processes in Bloom's revised taxonomy consist of 6 levels of cognitive processes, namely remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6) [2]. The six cognitive processes can be described as follows: 1) The ability to remember is the retrieval of relevant knowledge from memory; 2) The ability to understand is the construction of meaning from the learning process, including oral, written, and picture communication; 3) The ability to apply is an activity to perform or use procedures in unusual situations; 4) The ability to analyze is the ability to break down the material into its parts and determine how the parts are connected between parts, structure, and overall purpose; 5) The ability to evaluate is the ability to make judgments based on criteria and standards, and 6) the ability to create is the ability to put elements together to form a coherent or functional whole and rearrange the elements into a new pattern or structure[3].

Permendikbud No. 103 of 2014 states that learning is a process of developing each student's potential and character building as a result of the synergy between education that takes place in schools, families, and communities[4]. Learning physics can be defined as a process of growing students' ability to understand the concepts, principles, and laws of physics. Good physics learning must meet the elements of good learning as well. The essential elements in good learning are 1) students who learn, 2) teachers who teach, 3) learning materials, and 4) the relationship between teachers and students [5]. To support the achievement of learning, teachers must use learning tools to make teaching and learning easier. Learning devices are all tools and materials used by educators in the learning process [6]. According to Permendikbud No. 22 of 2016 concerning Basic and Secondary Education Process Standards, the preparation of learning tools is part of learning planning which includes the Learning Force Design (RPP), media/teaching materials, and sources, and assessment instruments.[7]

The Learning Implementation Plan (RPP) is a short-term plan used as an estimate or projection of what things will be done in learning activities [8]. Teaching materials are a set of materials arranged in a structured manner, resulting in creating an environment or atmosphere that allows students to learn [9]. While the evaluation instrument, also referred to as an assessment instrument, is all things used in learning activities to facilitate teachers in carrying out their duties to achieve goals effectively and efficiently [10].

If we look at the results of the physics learning process applied in the field, it has not achieved the expected results. Difficulty in understanding the material in physics learning is indicated by students' inability to answer questions that are case analysis and questions for abilities: explaining, distinguishing, describing, finding, and formulating. As a result, based on the results of the daily assessment (PH), the Circular Motion material in the 2020/2021 school year has a lower average PH value than other materials. The data are presented in Table 1.

Table 1. The Data on Daily Assessment Values for Class XI Physics Subjects Academic Year 2020/2021

Data	Senior High School 1 Ranah Pesisir	Senior High School 2 Ranah Pesisir	Senior High School 1 Linggo Sari Baganti
	X Science 2	X Science 1	X Science 1
Total Student	35	24	35
Minimu Completeness Criteria	75	75	75
Maximal score	78	80	75
Minimal score	65	63	50
Average	74,69	72,00	65,51

Sourse: (Physics teacher in Senior High School 1, 2 Ranah Pesisir dan 1 Linggo Sari Baganti)

The low student learning outcomes can be seen from the table that the low daily assessment among the three K.D is found in K.D 3.6 and K.D 4.6. So, the low achievement of student learning outcomes indicates that the quality of planning, implementation and evaluation of learning processes and outcomes is still of low quality. For this reason, it is necessary to develop learning products and processes and practice them in the field, especially in related schools.

The results of the analysis of the documentation of teacher learning tools in the form of lesson plans, teaching materials, and evaluation instruments developed by the teacher indicate that the integration of 4 knowledge dimensions and six levels of cognitive processes is still not optimal. Knowledge assessment is still dominated by conceptual knowledge, with the support of factual knowledge, which is still not balanced. The evaluation of procedural knowledge is still very low, and the assessment of metacognitive knowledge shows the lowest number one. The expression of this statement is presented by the graph in Figure 1.

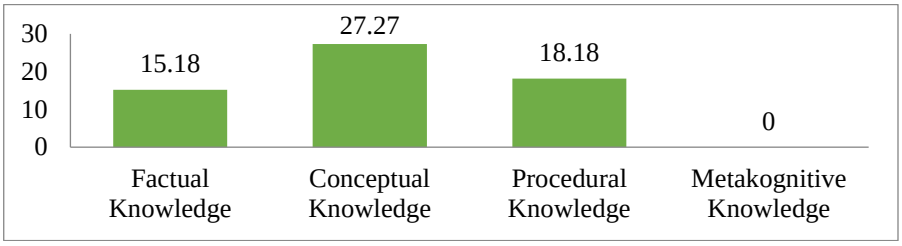

Fig 1. Percentage of Availability of Knowledge Dimensions in Teaching Materials in Schools

The learning tools made by the teacher are teaching materials concerning the six levels of cognitive process exercises, showing that the exercises applied are still dominated by low-level thinking skills, which are dominated by the ability to understand and the ability to apply, followed by the ability to apply. Meanwhile, high-level cognitive process training for the ability to analyze is still low, followed by the ability to be creative, while the ability to evaluate tends to show the lowest percentage. The expression of this statement is presented by the graph in Figure 2.

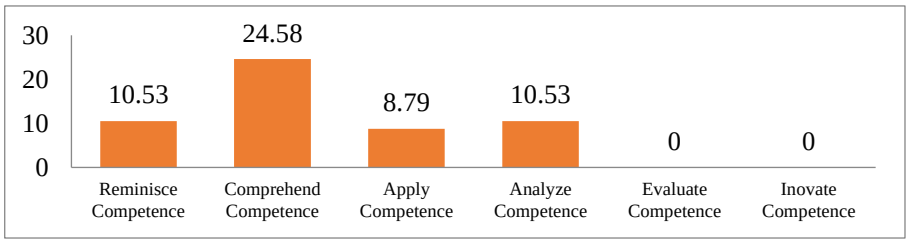

Fig 2. Availability of Cognitive Process Levels in Teaching Materials in Schools

About the teacher's learning approach, the students' higher-order thinking skills have not been well developed, and this can be seen when the teacher asks about the mastery of the subject matter, which begins with the words why, why, and how, students tend not to be able to answer. But if students are asked light questions within the limits of students' memory, generally, students can be answered. Implementing the 5M aspect of the scientific approach has also not gone well; learning has not changed much from the habit of telling to learning that is oriented towards finding out.

The other learning tools, namely evaluation instruments, have not trained the level of cognitive processes proportionally where the ability exercises that are taught only include remembering, understanding, and applying only. While the ability to analyze, evaluate, and create/create is also not visible. Even the existing evaluation instruments have not been entirely designed and developed based on a combination of 4 knowledge dimensions and six levels of cognitive processes. This data can be seen in Figure 3.

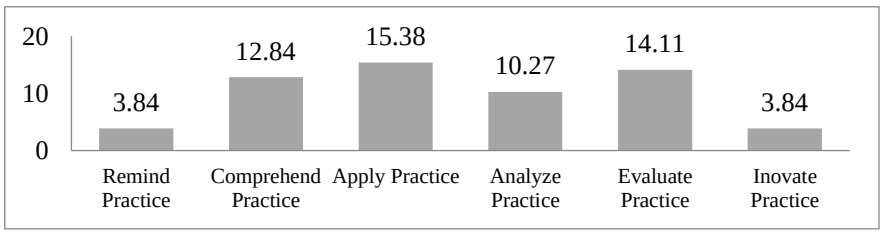

Fig 3. Availability of Cognitive Process Levels in Evaluation Instruments in Schools

The scientific learning approach used is still not optimal; it can be seen from the existing RPP regarding the learning approach used, most of which tend to use the lecture method, while demonstrations and other methods are also not very visible. This data can be seen in Figure 4.

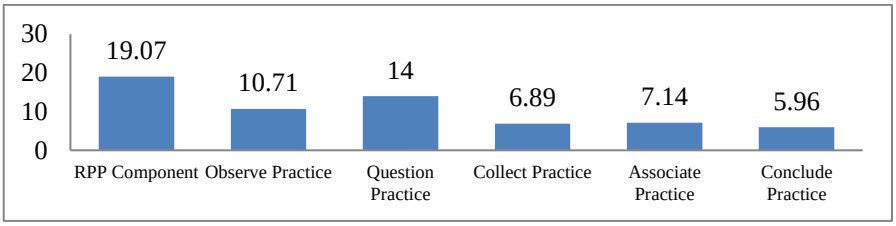

Fig 4. Availability of Scientific Approach in Lesson Plans at School

The results of interviews and discussions with teachers at 3 sample schools in physics lessons on circular motion material, it was revealed that the existence of teacher learning tools that were not oriented to the fulfillment of the combination of the four dimensions of knowledge and six levels of cognitive processes, about the diversity (complexity) of this knowledge in terms of the fulfillment of 4 dimensions of knowledge and six levels of cognitive processes [11]. This shows that the quality of students' competence in learning physics is still categorized as low. [12].

II. METHOD

This type of study is research and development (R&D) methods. R&D is one of the research methods that can be used to research, design, produce, and test the validity of the products that have been produced [13]. R&D can also be used as a strategy or process for developing and validating educational products in the form of designs or models of implementing educational curriculum that is used partially or wholly, including planning, implementing, and evaluating learning. The products developed in this research are lesson plans, teaching materials, and evaluation instruments oriented to the dimensions of knowledge and cognitive processes of circular motion material for high school physics learning. [14]

The development model in this study takes the ADDIE model. The ADDIE model consists of five stages, including: (1) Analysis is a stage related to analyzing the work situation and environment with the aim of finding out what products need to be developed; (2) Design is the stage carried out to design the products needed or to be produced; (3) Development is a stage related to the activities of making products and testing the products that have been produced; (4) Implementation is a stage related to product use activities; and (5) Evaluation is the stage related to the activity of assessing the extent to which the products that have been developed are in accordance with the desired product specifications. In this study, the development stage used was only up to the third stage, namely development [15].

The subjects in this study were three lecturers of the Physics Department, FMIPA UNP, and three physics teachers at the State Senior High School in Pesisir Selatan Regency, which included SMA Negeri 1 Ranah Pesisir, SMA Negeri 2 Ranah Pesisir, and SMA Negeri 1 Linggo Sari Baganti. While the objects in this study are learning tools (RPP, teaching materials, and evaluation instruments) oriented to the dimensions of knowledge and cognitive processes of circular motion material for high school physics learning. The research instrument was in the form of a questionnaire sheet for needs analysis, an instrument validation sheet, and a product validation sheet for product validation that had been made. The validation data will be processed using the following formula:

$$P = \frac{S}{N} x100\% \qquad (1)$$

In the assessment criteria using a Likert scale that ranges from 0-100%. Validation value 0%-20% is categorized as invalid, 21%-40% can be categorized as Less Valid, for 41%-60% is categorized as Fairly Valid, while 61%-80% is categorized as Valid, and 81%-100% categorized as very valid [16].

III. RESULT AND DISCUSSION

This study aims to produce an integrated knowledge dimension and cognitive process level based on the results of a needs analysis focused on circular motion material for high school physics learning as outlined in the learning tools, namely; RPP, Teaching Materials, and Evaluation Instruments. This research follows the R&D step that takes the ADDIE development down to stage 3, where each stage is Analysis, Design, and Development.

The analysis phase is carried out through preliminary studies, field studies, and literature studies. The initial study aims to see whether research is essential to do through reviewing articles in journals related to the variables in the study. The article review results show that there is still a need for developing learning tools that are oriented to the dimensions of knowledge and cognitive processes. The field study aims to see the

implementation of the 2013 Curriculum in physics learning at selected high schools. The field study results in high school showed that the existing physics learning tools in schools were only in the good available category based on the dimensions of knowledge and cognitive processes. In addition, in the field study, it was found that the Circular Motion material has a lower average Daily Assessment (PH) value compared to other materials. While the study of literature helps collect theories related to learning tools.

The design stage aims to produce designs for learning materials, GPA, essential materials, and all components of the conceptual model book, lesson plans, teaching materials, and evaluation instruments that will be developed. The resulting design must get approval from the supervisor for further development. At this stage, it is produced that the material to be developed is circular motion material. Circular motion material was chosen because it has the characteristics of understanding which is quite complicated for students because it applies several other physics materials. In addition, the material has a lower average PH value than different materials in the field study. It can be seen from table 1, namely the student daily assessment table.

The development stage aims to develop the designs that have been produced in the previous step. Each learning device has been developed using components according to the theory at the analysis stage.

1) RPP Validation Results

RPP validation was only carried out to practical teams from the three schools that were sampled. Validation is carried out using a lesson plan validation instrument that assesses component aspects. The scientific approach (5M) includes Observing Exercises, asking questions, trying/gathering information, reasoning/associating, and communicating learning outcomes. The results of the RPP validation can be seen in Figure 5.

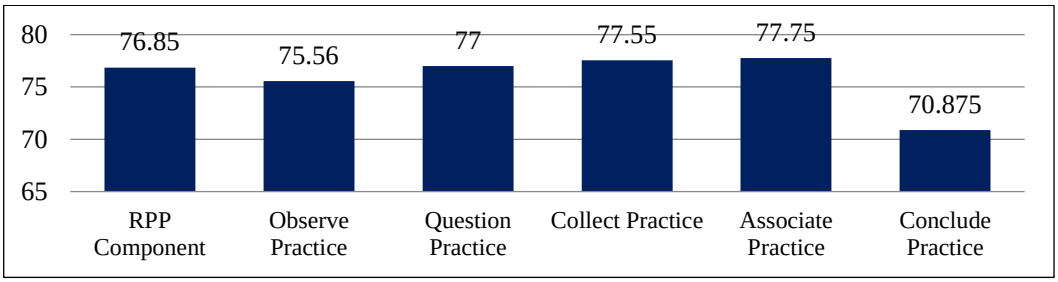

Fig 5. The Practitioners Result of RPP Validation

In Figure 5, the average validation results from all aspects of the RPP, according to the practical team get a score of 75.93%. That means the validation results can be concluded that the overall aspects of the lesson plan are considered to be in the valid category and can be used for high school physics learning.

2) Results of Teaching Materials

a) Validation Results of Analysis of the Complexity of Knowledge Dimensions in Teaching Materials

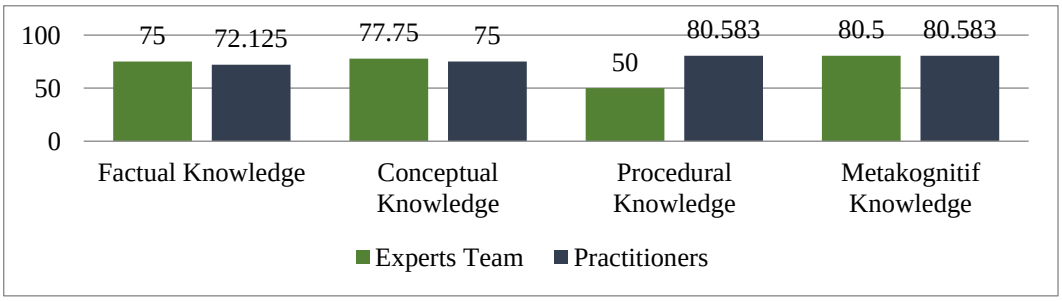

Fig 6. The results of the validation of the analysis of the complexity of the knowledge dimension in teaching materials

In Figure 6, the average validation results from the complexity aspect of the knowledge dimension, according to the expert team got a score of 70.81%. The practical team got a score of 76.927% so that the results

of the validation can be concluded from the aspect of the complexity of the dimensions of knowledge in teaching materials that are categorized as valid and can be used for high school physics learning.

b) Validation Results of Analysis of Cognitive Process Levels in Teaching Materials

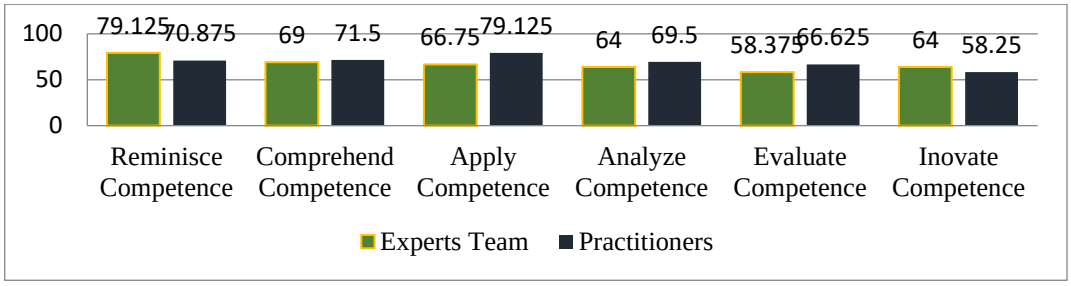

Fig 7. Validation Results Analysis of the scope of cognitive processes in teaching materials

In Figure 7, according to the expert team, the average validation results from cognitive process level coverage got a score of 69.31%. The practical team got a score of 69.31%. The validation results can be concluded from the aspect of cognitive process levels in teaching materials categorized as valid and can be used for high school physics learning.

c) Validation Results of the Fulfillment Analysis of Aspects of Teaching Material Requirements

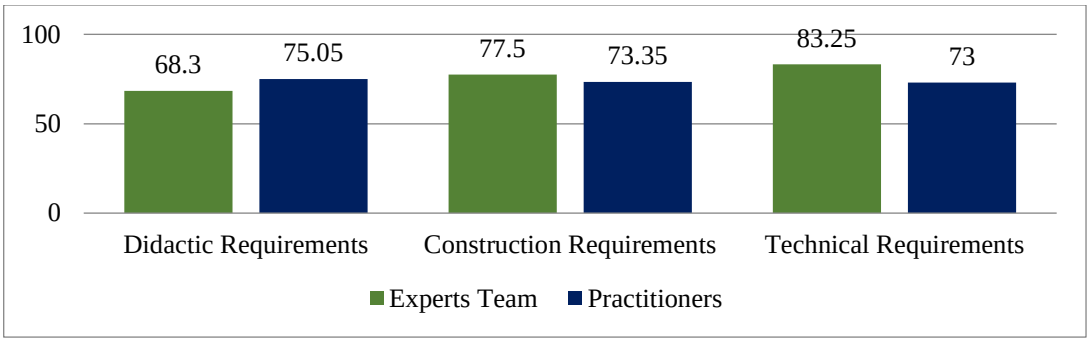

Fig 8. The results of the validation of the fulfillment of aspects of the requirements of teaching materials

Based on Figure 8, according to the expert team, the average validation results from teaching material requirements got a score of 76.35%. The practical team got a score of 73.8% so that the results of the validation can be concluded from the aspect of the requirements for teaching materials that are categorized as valid and can be used for high school physics learning.

2) The Result of Teaching material Validation

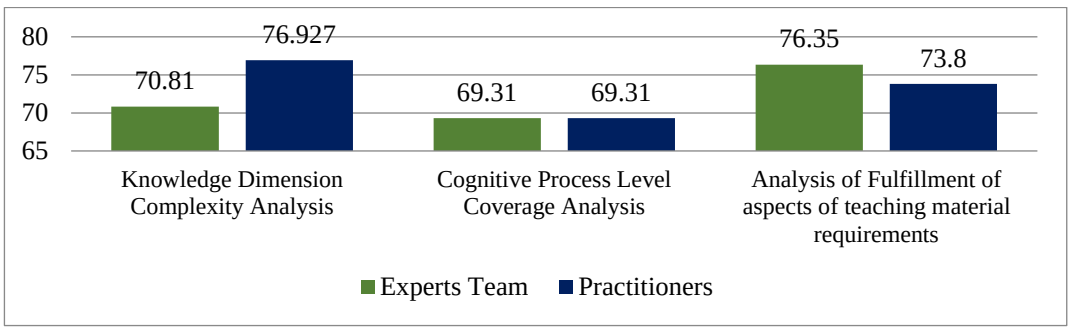

Fig 9. The result of teaching material validation

In figure 9, according to the expert team, the average validation results of teaching materials score 72.16%. The practical team gets a score of 73.35% so that the results of the validation can be concluded from the teaching materials categorized as valid and can be used for high school physics learning.

3) The result of evaluation instrument Validation

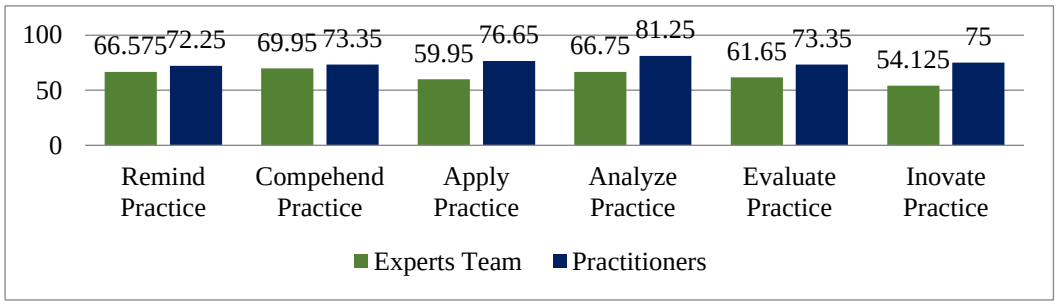

Fig 10. The ratio of evaluation instrument validation

In Figure 10, the average validation result of the evaluation instrument, according to the expert team got a score of 63.167% and the practical team got a score of 75.31% so that the results of the validation can be concluded that the evaluation instrument is categorized as valid and can be used for high school physics learning.

4) The Result of Learning Media Validation

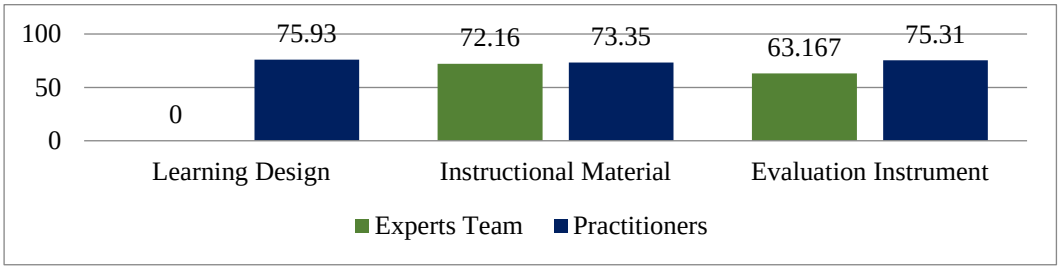

Fig 11. The ration of Learning media validation

In Figure 11, according to the expert team, the validation of the conceptual model of the learning device got a score of 67.66%, and the practical team got a score of 75.53%. Where the lesson plans are only assessed by the practical team, so overall a score of 71.60% is obtained, so that the validation of the conceptual model of learning tools oriented to the dimensions of knowledge and the level of cognitive processes developed is considered valid and can be used for high school physics learning.

The results in the study are the results obtained at each stage carried out using the ADDIE model [17]. This research is focused on Senior High School 1, 2 Ranah Pesisir, and 1 Linggo Sari Baganti because these three high schools have implemented learning with the 2013 Curriculum. In reality, they have not optimized the demands of learning physics as mandated by the curriculum. The selected high schools represent school categorization through the stratified random sampling technique [18]. It was divided into three categories of schools namely high, medium, and low. It was obtained from school accreditation data and National Exam scores. Senior High School 1 Ranah Pesisir represented the high category, Senior High School 1 Linggo Sari Baganti represented the medium category, and Senior High School 2 Ranah Pesisir represented the low category.

The results of this study in the form of applying the dimensions of knowledge and levels of cognitive processes in the form of learning tools (Learning design, Teaching Materials and Evaluation Instruments) have adjusted between theories related to learning tools and the 2013 Curriculum [5]. The products that have been developed have met the development criteria, namely in the validation stage by three expert team validators and three practitioner team validators. Therefore, the product can be used in learning.

The analysis phase is carried out through preliminary studies, field studies, and literature studies [17]. The initial study aimed to see whether research is essential to do through reviewing articles in journals that relate to the variables in the study. The results showed that there is still a need for developing learning tools that are oriented to the dimensions of knowledge and cognitive processes. The field study aims to see the implementation of the 2013 Curriculum in physics learning at selected high schools. The results of field studies in high school

showed that the existing physics learning tools in schools were only in the sufficient available category based on the dimensions of knowledge and cognitive processes. In addition, in the field study, it was found that the circular motion material has a lower average PH value compared to other materials. The study of literature is useful for collecting theories related to learning tools.

The design stage aims to produce designs for learning materials, GPA, essential materials, and all components of the conceptual model book, lesson plans, teaching materials, and evaluation instruments to be developed [17]. The resulting design must get approval from the supervisor for further development. At this stage, it was produced that the material to be developed is circular motion material. Circular motion material was chosen because the material has the characteristics of understanding which is quite complicated for students. In addition, it is the application of several other physics materials. In addition, in the field study, the material also has a lower average PH value than other materials.

The development stage aims to develop the designs that have been produced in the previous stage [17]. Each learning device has been developed using components according to theory at the analysis stage. After the learning tools are developed, a product feasibility test is carried out through aspects of validation by a team of experts and a team of practitioners. A validation feasibility test is obtained through an assessment using a validation instrument. During the product validation process, it continues to be revised until it is in the valid or very valid criteria [16].

After being validated in each aspect, learning tools oriented to the dimensions of knowledge and cognitive processes of circular motion material for high school physics learning get a valid assessment from experts. The same result was also get from practitioners. To sum up, learning tools can be used for high school physics learning.

Learning tools in the form of lesson plans, teaching materials, and evaluation instruments oriented to the dimensions of knowledge and cognitive processes of circular motion can be used as learning media by teachers and learning resources for students in learning physics. Learning tools oriented to the dimensions of knowledge and cognitive processes can be developed by other researchers and physics teachers on other physics materials. In this study, only a validation test was carried out by an expert team of 3 lecturers from the Department of Physics, FMIPA UNP and a team of learning practitioners in the field, 3 physics teachers at 3 high schools in Pesisir Selatan Regency, West Sumatra. For maximum results, it can be done with more physics teachers in a wider area. In this study, it was only carried out until the validation (development) stage. For maximum results, it can be continued until the evaluation stage. Then it will get a more perfect learning device than this research.

IV. CONCLUSION

Based on the results of the research conducted, it can be concluded that the form of the model of the results of the analysis of the complexity of the dimensions of knowledge and cognitive processes of circular motion material for high school physics learning uses the ADDIE development model which is reduced to the development stage to produce lesson plans, teaching materials, and evaluation instruments that can be used in high school physics learning. The complexity of the dimensions of knowledge and cognitive processes of Circular Motion material for high school physics learning developed based on the needs analysis results is valid.

REFERENCES

[1] C. S. Chai and S.-C. Kong, "Professional Learning for 21st Century Education," *J. Comput. Educ.*, vol. 4, no. 1, pp. 1–4, 2017, doi: 10.1007/s40692-016-0069-y.

[2] E. Surya, "Application of Problem Based Learning to Students ' Improving on International Journal of Sciences : Application of Problem Based Learning to Students ' Improving on Mathematics Concept of Ability," vol. 4531, no. May, pp. 261–269, 2017.

[3] A. Motlhabane, "Unpacking the South African physics-examination questions according to blooms' revised taxonomy," *J. Balt. Sci. Educ.*, vol. 16, no. 6, pp. 919–931, 2017, doi: 10.33225/jbse/17.16.919.

[4] D. Carless and D. Boud, "The development of student feedback literacy: enabling uptake of feedback," *Assess. Eval. High. Educ.*, vol. 43, no. 8, pp. 1315–1325, 2018, doi: 10.1080/02602938.2018.1463354.

[5] U. N. Padang, "Conceptual Model Of Learning Materials Oriented To The Dimensions Of Knowledge And Cognitive Processes In Balance And Rotational Dynamics For High School Physics Learning," vol. 14, no. 2, pp. 138–145, 2021.

[6] L. Pandey and Devendra Ameta, "Effect of Constructivist Based Training on Learning and Teaching : An Experiment in Classroom," *J. Educ. Pract.*, vol. 8, no. 13, pp. 67–72, 2017.

[7] E. Fabra-Brell and F. J. Romero-Naranjo, “Body Percussion: Social Competence Between Equals Using the Method BAPNE in Secondary Education (Design Research),” *Procedia - Soc. Behav. Sci.*, vol. 237, no. June 2016, pp. 1138–1142, 2017, doi: 10.1016/j.sbspro.2017.02.168.

[8] K. K. Leang and S. Devasia, “Design of hysteresis-compensating iterative learning control for piezo-positioners: Application to atomic force microscopes,” *Mechatronics*, vol. 16, no. 3–4, pp. 141–158, 2006, doi: 10.1016/j.mechatronics.2005.11.006.

[9] S. Ramadhan, D. Mardapi, Z. K. Prasetyo, and H. B. Utomo, “The development of an instrument to measure the higher order thinking skill in physics,” *Eur. J. Educ. Res.*, vol. 8, no. 3, pp. 743–751, 2019, doi: 10.12973/eu-jer.8.3.743.

[10] S. A. Peranginangin, S. Saragih, and P. Siagian, “Development of Learning Materials through PBL with Karo Culture Context to Improve Students’ Problem Solving Ability and Self-Efficacy,” *Int. Electron. J. Math. Educ.*, vol. 14, no. 2, pp. 265–274, 2019, doi: 10.29333/iejme/5713.

[11] I. Pgri Bali, “Higher Order Thinking Skills Assessment (Hots) I Wayan Widana,” vol. 3, no. 1, pp. 32–44, 2017.

[12] A. Putra, “Physics Learning Oriented Content Complexity and Cognitive Process for Improving Student Scientific Competence on High School in Padang,” in *The International Conference on Mathematics, Science, Education and Technology (Icomset)*, 2015, pp. 144–150.

[13] K. Saidi and C. Mongi, “The effect of education, R & D and ICT on economic growth in high income countries,” *Econ. Bull.*, vol. 38, no. 2, pp. 810–825, 2018.

[14] R. A. Fabio and G. E. Towey, “Long-term meditation: the relationship between cognitive processes, thinking styles and mindfulness,” *Cogn. Process.*, vol. 19, no. 1, pp. 73–85, 2018, doi: 10.1007/s10339-017-0844-3.

[15] R. S. Nadiyah and S. Faaizah, “The Development of Online Project Based Collaborative Learning Using ADDIE Model,” *Procedia - Soc. Behav. Sci.*, vol. 195, pp. 1803–1812, 2015, doi: 10.1016/j.sbspro.2015.06.392.

[16] P. Farage, R. P. Zandonadi, V. C. Ginani, L. Gandolfi, R. Pratesi, and Y. K. de Medeiros Nóbrega, “Content validation and semantic evaluation of a check-list elaborated for the prevention of gluten cross-contamination in food services,” *Nutrients*, vol. 9, no. 1, pp. 1–17, 2017, doi: 10.3390/nu9010036.

[17] S. C. Wibawa, “the Design and Implementation of an Educational Multimedia Interactive Operation System Using Lectora Inspire,” *Elinvo (Electronics, Informatics, Vocat. Educ.*, vol. 2, no. 1, pp. 74–79, 2017, doi: 10.21831/elinvo.v2i1.16633.

[18] A. S. Acharya, A. Prakash, P. Saxena, and A. Nigam, “Sampling: why and how of it?,” *Indian J. Med. Spec.*, vol. 4, no. 2, 2013, doi: 10.7713/ijms.2013.0032.