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Development Of Problem Based Learning Oriented Science Module with Concept Map For VII Class Students SMP N 1 KEC. GUGUAK

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Abstract – Based on the results of interviews with science teachers, teachers tend to use lecture and discussion methods in learning, besides the teaching materials used are not in accordance with learning needs.Based on the results of student questionnaire analysis, it is known that the appearance of the teaching materials used is less attractive, thus affecting learning motivation. Students also stated that the concept map presented was not yet fully in accordance with the scope of the material being studied and as many as 73% of students stated that the language in the books used was difficult to understand. This has an impact on the low understanding of the material and the ability to connect students' concepts. This can affect the learning achievement of students on the material being studied. Based on this, a development research was carried out which aims to produce a science module oriented problem based learning with concept mapsvalid, practical, and effective. This development research uses the Plomp development model which consists of three stages, namely initial investigation, prototyping, and assessment. The research subjects were students of class VIISMP N 1 Kec. Guguak. The object of the research is the class VII science module. The data were analyzed descriptively and experimentally by presenting the data contained in the field. The results showed that the IPA module oriented problem based learning with concept mapsobtained a value of 88.51% with a very valid category. The practical value of student responses is 91.63% in the very practical category and the teacher's response value is 94.20% in the very practical category. This practicum module is categorized as effective because the experimental class shows an increase in competence in knowledge, attitudes, and skills. Based on this, it can be concluded thatProblem Based Learning Oriented Science Module Accompanied by Concept Maps for Class VII Students of SMP N 1 Kec. Guguak can be declared valid, practical and effective.

Keywords – Science Module, Problem Based Learning, Concept Map.

I. PRELIMINARY

Education is a universal activity in human life. Education aims to develop one's potential and change behavior for the better. The progress of a country depends on the education of its citizens.

The role of education is very important in realizing a complete and independent human being and is beneficial to the environment. With education, humans can develop their abilities so that quality human resources are formed.

One of the government's efforts to improve the quality of education in Indonesia is to make improvements to the education curriculum. The curriculum used today is the 2013 curriculum, which is a form of improvement from the previous education curriculum. In the 2013 curriculum, learning targets are not only competencies, but also the character development of students.

The Scientific Approach is an approach used in learning in the 2013 Curriculum which is believed to be the golden footbridge for the development of students' attitudes, knowledge, and skills competencies (Budiiyanto (2016: 46). The scientific approach is designed so that students actively construct concepts, laws or principles through stages. observing, formulating problems, formulating hypotheses, collecting data, analyzing data, drawing conclusions and communicating concepts, laws or principles found (Sufairoh, 2016: 116).

Science is one of the subjects affected by curriculum changes. The implementation of science learning in the 2013 curriculum is not only to master some knowledge, but also to provide sufficient space for the development of scientific attitudes, practice problem solving processes, and their application in real life (Depdiknas, 2005: 65).

Based on an interview with Mrs. Metica Safitri, S.Pd. as a science teacher for class VII SMP N 1 Kec. Guguak, it is known that the school has implemented the 2013 Curriculum. In practice, the teacher has not been optimal in implementing the learning model recommended in the 2013 Curriculum. Teachers tend to use lecture and discussion methods in learning, so learning tends to be student-centered. This results in students being less motivated and less actively participating in learning. The available teaching materials are also not in accordance with the learning needs of students.

The teaching materials used are science textbooks from the Ministry of Education and Culture of the Republic of Indonesia in 2017 and LKS from publishers. The results of the analysis of the teaching materials indicate that critical thinking skills training has not been optimally empowered. Students have not been trained to solve their own problems. Teachers also have not made their own teaching materials that can train students to think critically.

The teacher's statement regarding the condition of teaching materials that are not in accordance with learning needs is in line with the results of the questionnaire distributed to students. Based on the results of student questionnaire analysis, it is known that the appearance of the teaching materials used is less attractive, thus affecting learning motivation. Students also stated that the concept map presented was not yet fully in accordance with the scope of the material being studied and as many as 73% of students stated that the language in the books used was difficult to understand. This has an impact on the low understanding of the material and the ability to connect students' concepts.

In the 2013 Curriculum, students are expected to be able to think critically and present their own problems. Learning begins with problem solving by students, so that students will understand the subject matter. However, based on the results of interviews, the teacher stated that students had difficulty in presenting problems so that the concept of the lesson was difficult to understand. Students tend to be silent and only accept what is conveyed by the teacher.

One solution that can be done to overcome these problems is to make teaching materials in the form of modules in which there is a learning model that can stimulate students' critical thinking skills. The module is an independent teaching material that includes a series of learning experiences that are planned and systematically designed to help stude^^nts achieve learning outcomes (Mulyasa, 2009: 232). Modules are designed according to the characteristics of students, learning needs and communicative language. The module provides flexibility for direct and distance learning, allowing students to study independently at home, and provide direct feedback to students (Sejpal, 2013: 169).

The use of teaching materials must be supported by a learning model that suits the needs of students so that an increase in competence can occur (Mulyasa, 2009: 157). One of the learning models that can be applied to stimulate students' critical thinking skills is a problem-based learning model or Problem Based Learning (PBL). The PBL model can provide opportunities for students

to explore collecting data to solve problems, so that students are able to think critically, analytical, systematic, and logical in finding alternative problem solving (Solo, 2012).

The PBL learning model is a model that makes problems as the starting point of the learning process. The problems presented come from everyday life that can be raised by teachers and students (DeGraff and Kolmof, 2003: 657). The PBL model significantly increases the competence of students in the aspect of conceptual development and places students as the center of learning (Akınoglu and Tandogan 2007: 71). The application of the PBL model directs students to be able to think critically about a problem (Ersoy and Baser, 2014: 3495). The PBL model also improves conceptual problem-solving skills and quantitative problem-solving skills (Bilgin, Senocak, and Sozbilir, 2009: 153).

Learning with this model has the potential to increase the independence of students through problem solving that is meaningful for the lives of students, so that students are more motivated and understand the interrelationships between the concepts studied and everyday life (Sani, 2014: 127-128).

The difficulty of students in understanding the material and connecting the concept of the lesson can be overcome by the use of concept maps in the learning model. The use of concept maps in the PBL learning model will be more optimal in improving students' understanding of the material. Concept map is a method to show the structure of knowledge (Asan, 2007: 187).

Based on these problems, it shows the need to develop teaching materials in the form of problem-based learning-oriented modules accompanied by concept maps. The module was developed as an effort to improve critical thinking skills, problem solving and learning outcomes in students. From this, the researcher has conducted a study entitled "Development of Problem Based Learning Oriented Science Modules Accompanied by Concept Maps for Class VII Students of SMP N 1 Kec. Guguak".

II. METHOD

This research was conducted at SMPN 1 Guguak District, Lima Puluh Kota Regency. The research subjects were students of class VII. Collecting data using interview guidelines, questionnaires, and observation sheets. Data analysis was carried out descriptively, qualitatively which included data collection, data analysis, data presentation and drawing conclusions.

III. RESULTS AND DISCUSSION

The value of the results of the validity of the problem-based learning oriented science module accompanied by concept mapping by the validator includes:

Didactic Aspect

In the didactic aspect, the problem-based learning-oriented science module with concept maps was declared valid by the validator with a validity value of 91.67 with very valid criteria. Based on the criteria on the didactic aspect, it is known that the science module developed is in accordance with the curriculum used.

Construct Aspect

In the construct aspect, the problem-based learning-oriented science module with concept maps was declared valid by the validator with a validity value of 88.09 with very valid criteria. Based on the criteria on the construct aspect, it can be stated that the problem-based learning-oriented science module with concept maps has been equipped with a clear identity and systematically arranged. The use of language, the science module developed is in accordance with the rules of good and correct Indonesian and the terms used in the module are correct.

Technical Aspect

In the technical aspect, the problem-based learning-oriented science module with concept maps was declared valid by the validator with a validity value of 88.51 with very valid criteria. Terms or criteria for technical aspects related to writing, pictures, and appearance in the manufacture of a product (Trianto, 2012). In the technical aspect criteria, it is stated that the science module developed uses a type and size of letters that can be read clearly, and the use of punctuation marks is appropriate. The presentation of images in the IPA module has sizes and explanations that can be read clearly. In addition, problem-based learning-oriented science modules with concept maps have also been prepared with an attractive color combination display.

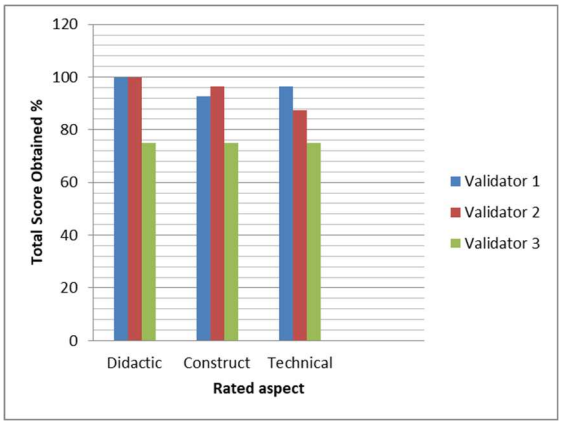

Figure 1. Validation Percentage Results

The value of practicality results is related to the ease of using the module by teachers and students in learning activities. The practical assessment of the problem-based learning-oriented science module with concept maps is carried out in stages starting from small group assessments, large group assessments or field tests, and assessments by science teachers. The practicality of this IPA module is seen in terms of ease of use, efficiency of use, attractiveness, easy interpretation, and equivalence.

Table 1. Small Group evaluation Percentage Results

No	Aspect	Value(%)	Category
1	Ease of Use	89,60	Very practical
2	Usage Efficiency	91,67	Very practical
3	Attractiveness	97,90	Very practical
4	Easy to Interpret	87,50	Very practicals
5	Have Equivalence	93,75	Very practical
Average Practicality Score		92,08	Very practical

The results of the small group practicality (Small Group Evaluation) got an average score of 92.08 with a very practical category. Furthermore, the practicality assessment by teachers and students with an average practicality value of 94.20 by teachers and 91.63 by students in the very practical category. Based on the results of the field test and assessment by the teacher of the problem-based learning-oriented science module along with the developed concept map, it shows that the module can help students to develop thinking skills and problem solving skills.

Table 2. Teacher Practical Results

No	Aspect	Value(%)	Category
1	Ease of Use	95,83	Very practical
2	Usage Efficiency	100	Very practical

3	Attractiveness	87,50	Very practical
4	Easy to Interpret	87,50	Very practicals
5	Have Equivalence	100,00	Very practical
Average Practicality Score		94,20	Very practical

Table 3. Students Practical Results

No	Aspect	Value(%)	Category
1	Ease of Use	90,66	Very practical
2	Usage Efficiency	92,24	Very practical
3	Attractiveness	90,94	Very practical
4	Easy to Interpret	92,52	Very practicals
5	Have Equivalence	91,81	Very practical
Average Practicality Score		91,63	Very practical

The value of the results of the effectiveness of the problem-based learning-oriented science module with concept maps can improve the cognitive, affective, and psychomotor abilities of students in the very effective category.

IV. CONCLUSION

From the data analysis that has been carried out, it is concluded that the problem-based learning-oriented science module with concept maps is categorized as very valid by the validator, very practical by teachers and students, and very effective for students to use in science learning because it can improve cognitive, affective, and cognitive abilities. psychomotor.

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REFERENCE

[1] Akınoglu dan Tandogan, R. O. 2007. *The Effects of Problem-Based Active Learning in Science Education on Students' Academic Achievement, Attitude and Concept Learning. Eurasia Journal of Mathematics, Science & Technology Education*. 3(1), 71-81.

[2] Asan. A. 2007. *Concept Mapping in Science Class: AStudy of Fifth Grade Students. Journals Educational Technology and Society*. 10(1). 186-195.

[3] Bilgin, I., Senocak, E. dan Sozbilir, M. 2009. *The Effect of Problem Based Learning Instruction on Universuty Students performance of Conceptual and Quantitatuv Problem and Gas Concept. Eurasia Journal of Mathematic, Science, and Technology Education*. 5(2). 153-164.

[4] Budiyanto, M., Agus K., LudWaluyo, Ali M. 2016. *Implementasi Pendekatan Saintifikdalam Pembelajaran di PendidikanDasardi Malang*. *Proceeding Biology Education Conference.*13(1). 46-51.

[5] De Graff, E. dan Kolmof. 2003. *Characteristic of Problem Based Learning.International Journal Engng Ed*. 19(5). 657-662.

[6] Depdiknas. 2005. *Landasan Teori dalam Pengembangan Metode Pengajaran*. *Materi Pelatihan Terintegrasi Ilmu Pengetahuan Alam*. Jakarta: Depdiknas Dirjen Pendasmen Direktorat Pend. Lanjutan Pertama.

[7] Ersoy, E. dan Baser, N. 2014. *The Effect of Problem Based Learning Method in Higher Education on Creative Thinking*. *World Conference on Educational sciences*. 1877(0428). 3494-3498.

[8] Kemendiknas. 2010. Bahan Pelatihan Penguatan Metodologi Pembelajaran Berdasarkan Nilai-nilai Budaya untuk Membentuk Daya Saing dan Karakter Bangsa. Jakarta: Kemendiknas, Badan Penelitian dan Pengembangan Pusat Kurikulum.

[9] Kwan, A. 2009. *Problem based learning*. *The Routledge international handbook of higher education*, 91-107.

[10] Lai, E.R. 2011. *Critical Thingking: A Literature Review*. Pearson Education, Inc.

[11] Lufri. 2007. *Kiat Memahami Metodologi Melakukan Penelitian*. Padang: Universitas Negeri Padang.

[12] Mulyasa, E. 2009. *Kurikulum Tingkat Satuan Pendidikan*. Bandung: Remaja Rosdakarya.

[13] Peraturan Menteri Pendidikan dan Kebudayaan Nomor 65 Tahun 2013 tentang standar proses, model pembelajaran yang diutamakan dalam implementasi Kurikulum 2013.

[14] Plomp, Tjeerd., and Nieveen, N. 2013. *Educational Design Research: An Introduction.*

[15] Sani, R. A. 2014. *Pembelajaran Saintifik untuk Implementasi Kurikulum 2013*. Jakarta: Bumi Aksara.

[16] Sejpal, K. 2013. *Modullar Method of Teaching*. *International Journal of Research in Education*. 2(2). 169-171.

[17] Sufairoh. 2016. *Pendekatan Saintifik & Model Pembelajaran K-13. Jurnal Pendidikan Profesional*. 5(3). 116-125.

[18] Sukardi. 2012. Evaluasi Pendidikan Prinsip dan Operasionalnya. Yogyakarta: Bumi Aksara.

[19] Susilo, AB., Wiyanto, & Supartono. 2012. *Model Pembelajaran IPA Berbasis Masalah Untuk Meningkatkan Motivasi Belajar dan berpikir Kritis Siswa SMP. Unnes Science Education Journal 1* (1):13-20.

[20] Yong. 2009. Student's Motivatioanal Orientations And Their Associations With Achievement In Biology. *Journal Of Science* 1 (1). 52-64.