LEARNING MODULE DEVELOPMENT MATHEMATICS LOADED CULTURE WEAVING BAMBOO FOR INCREASE THINK CRITICAL STUDENTS OF MADRASAH ALIYAH NEGERI (MAN) 1 KERINCI

Elvina Asmi

IAIN (Institut Agama Islam Negeri) Kerinci
e-mail : vinafahera@gmail.com

ABSTRACT

Study This aiming For know How develop module learning mathematics loaded culture wicker bamboo For increase think critical student Madrasah Aliyah Negeri (MAN) 1 Kerinci. Methods research used is study development (*research and development*). The model used in development This is the ADDIE model. The results of the study show that module learning developed mathematics have effectiveness with very critical category reviewed from aspect give explanation simple, build skills basis, conclude, give explanation continue, and set strategies and tactics. On the ability think after given learning with use module obtained score 82.28% with very critical category. Can concluded that ability think critical student after use module mathematics loaded culture wicker bamboo six meetings is very critical.

Keywords : *Module, Mathematics, Culture Weaving Bamboo, Thinking Critical, MAN 1 Kerinci*

INTRODUCTION

Development knowledge knowledge not can separated with rapid progress technology. Technology Now This has Lots show tremendous progress usual (Mokyr, J., 1992). His presence has give enough impact big towards the world of education. The role of science knowledge and technology are very important for institution education, especially in activity learning use increase quality education .

Dahar (2011) Education plays a role important in to make smart life nation. One of the component important in A education That is learning. Learning is a process of change behavior behavior. This is in line with Gagne's opinion that Study is a process in which a organization changed behavior behavior. In other words, learning This aiming For give help to students so that the acquisition process occurs knowledge, mastery skills as well as formation attitudes towards students (Chebii, R, 2011). One of the component important support the occurrence change behavior in demand the is a teacher.

Basically formation character started from the nature given Divine, who then to form teak self and behavior. In the process alone, divine nature This is greatly influenced by circumstances environment, so that environment own sufficient role big in to form teak self and behavior (Bryant, R. L., 2013). Character education This No made into standard curriculum, but rather accustomed to through the learning process (Sleeter, C., & Carmona, J. F., 2017). In addition That about facilities and infrastructure, education character This No own special facilities and infrastructure, because what is needed is a process of awareness and habituation.

In development education now, education character become theme warm For applied through institution formal education (Damon, W. (Ed.), 2013). In the process of education culture and character nation, in general active participant educate develop potential himself, carrying out the process of internalization, and appreciation values become personality they in socialize in society, develop life a more society prosperous, and develop life dignified nation (Dewi, E. R., & Alam, A. A., 2020). Concept education culture and character nation Still nature general, so that Still need creative ideas in its development.

In the era of autonomy this , the government area , including school , actually to obtain great opportunity For develop various appropriate programs with his needs , including develop draft implementation education character said . The essence education character That Alone is planting value , need exemplary and must get used to it , don't you taught . To make it easier planting mark mentioned , it is necessary formulated in a way simple in accordance with level education That Alone .

Success in build character students , in general automatic will help success build character nation . Therefore That progress a the nation will also depends How the character of the people , their abilities his intelligence , excellence think its citizens , the synergy of its leaders , and so on . With thus can concluded that education character is important in building morals and personality nation .

Mathematics is one of the compulsory subjects for elementary and secondary school levels. One of the important things that is part of the purpose of learning mathematics is to develop critical thinking skills. Critical thinking is a process of using thinking progress effectively that can help someone to create, evaluate and make decisions about what is believed or done. Critical thinking can help students understand how to view themselves, how to view the world and how students relate to others. Critical thinking is a life skill, not only developed by everyone, therefore critical thinking must be taught in schools in order to face the increasingly modern era.

However, in reality, based on observations of the learning process in class XI of Madrasah Aliyah Negeri (MAN) 1 Kerinci, learning on the material of two-dimensional geometry found several problems faced by students, including difficulty in distinguishing geometric plane shapes, still confused in using the formulas they know when solving problems. Some students are often confused in using concepts they already know, for example when students are asked to work on problems they have difficulty in choosing the appropriate solution. Only a few students have dared to express their opinions, namely by asking questions. The description above shows that students' critical thinking skills in dealing with mathematical problems are still lacking and need to be improved.

The selection of strategies, approaches, methods and learning models has a big role in teaching and learning activities. The abilities that are expected to be possessed by students will be determined by the relevance of the use of strategies, approaches, methods and learning models that are in accordance with the objectives. Djamarah, S. B., & Zain, A. (2006) teachers are the learning component that has the longest quantity of face-to-face meetings with students in class. Therefore, teachers have a big role in implementing educational learning. The learning process must have educational value, meaning that every learning process must have a determined direction and purpose. Teachers must consciously prepare learning activities systematically by utilizing facilities and infrastructure.

To get the right learning media, a teacher is required to be able to design a learning media that suits the students' conditions. Teachers must be able to choose and vary the learning media. The learning media that is developed must be able to help and direct students to find their own understanding. One of the media that can be developed by teachers is a module. Mulyasa (2007) a module is a printed media that contains learning materials on a topic that is arranged systematically, operationally and directed for use by students accompanied by guidelines for its use. Thus, the use of modules can help students learn thoroughly because they are arranged systematically. In addition, Sumiati, E., & Gunawan, O. S. (2007) a module is an individual teaching material that aims to increase the effectiveness and efficiency of learning in schools.

From the results of the author's initial research in the field on August 25, 2015 with Mr. Dafri Hayani, S.Pd, Mrs. Linda Tesmeri, S.Pd, and Mrs. Yessy Gusminalita, S.Pd, as mathematics teachers at Madrasah Aliyah Negeri (MAN) 1 Kerinci, information was obtained that for mathematics learning in schools most of them use mathematics textbooks provided by the school and students tend to only expect information from teachers, textbooks that contain long and convoluted material, so that students find it difficult to understand the material presented in them.

The learning process that takes place still uses conventional methods, namely lectures, students only listen and take notes from the teacher's explanation so that students feel bored and less motivated to learn. In addition, students become less informative because it takes a long time to construct their knowledge so that what is required by the competencies that must be achieved in the curriculum, namely students can ultimately improve their process skills, has not been met. This of course does not support active learning. Bekerman, Z., Burbules, N. C., & Silberman-Keller, D. (Eds.) (2006) Students who only listen to the material from the teacher, the achievement of learning outcomes obtained by students is around 30%, while for optimal results it will be better when students do reading, viewing, listening, and doing something. Likewise in the assessment process, the level of student completion is mostly seen from the results of the exam obtained and less consideration of other assessment aspects such as affective and psychomotor.

Learning success does not only depend on the environment and learning conditions but also on students' prior knowledge. This knowledge cannot be transferred completely from the teacher's mind to the students, but is actively built by the students themselves through real experiences. Brines, M., Patel, N. S., Villa, P., Brines, C., Mennini, T., De Paola, M., ... & Cerami, A. (2008) *contextual learning (CTL)* strategy is a learning concept that helps teachers relate the material to be taught to the students' real world and encourages students to make connections between the knowledge they have and its application in their daily lives.

To overcome these problems, it is necessary to develop materials that contain cultural elements in the hope that they can help improve students' understanding and motivation, as well as teaching materials that can help students to be more active, creative and able to think critically in learning. In an effort to improve the quality of student learning, in this study the author wants to maximize the role of learning modules developed in schools which can later be used as additional learning modules so that the material taught is conveyed and can improve students' critical thinking.

With thus expected learning No only at the level cognitive but touching on internalization and experience real in life student everyday life in society . Implementation of the learning process mathematics whose material lifted from values culture local in nature mathematics , culture raised in research This is culture craft wicker bamboo in Kerinci , precisely in Bunga Tanjung Village Subdistrict Review Sea . Crafts loaded inside module and linked with learning mathematics that is material geometry dimensions two .

Through module This expected student own skills life so that they Can succeed in his life and society . Education and culture is something whole and comprehensive , valid in a society and education is need fundamental for every individual in society . One of the things that can bridge between culture and education is linked learning with background their culture , because they do based on what they see and feel .

METHOD

This type of research is research *and development* . The model used in this development is the ADDIE model. The selection of this model is based on several reasons, namely (1) The model is descriptive, showing clear and precise steps to produce a product, (2) The development stages in this model are the same as the standard development stages, (3) The ADDIE model has been used widely and has been proven to provide good results.

Zhao, Z., Emzir, M., & Särkkä, S. (2021) in education the main purpose of development research is not to formulate or test theories, but to develop effective products for use in schools. Products are developed to find out certain needs with detailed specifications Richey, R. C., & Klein, J. D. (2014) call it design and development research *which* defines it as follows:

The systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and noninstructional products and tools and new or enhanced models that govern their development .

and development methods are research methods used to produce certain products and test the effectiveness of these products. This is one of the a type of pragmatic research that offers a way to test theories and validate practitioners that are continuously carried out essentially through unchallenging traditions. A way to establish new procedures, techniques, and tools based on a methodical analysis of specific cases. The activities carried out in this study were to develop a mathematics learning module containing bamboo weaving cultural education to improve students' critical thinking.

RESULTS AND DISCUSSION

The data analyzed in this study were data obtained from filling out student response and comment instruments during small group tests, and teacher response instruments regarding the use of mathematics learning modules containing bamboo weaving culture.

In this study, the instruments used were qualitative questionnaires and interviews, the data and interview data were analyzed using the Miles and Hiberman model. The data obtained were then presented to see the suitability of the module in learning and the attractiveness of the material presented so that it could make students interested in studying the learning material contained in the module. In addition, it is also expected to help students become easier in understanding the learning material of two-dimensional geometry.

The data analyzed in this study were data obtained from filling out student response and comment instruments during small group tests, and teacher response instruments regarding the use of mathematics learning modules containing bamboo weaving culture.

In this study, the instruments used were qualitative questionnaires and interviews, the data and interview data were analyzed using the Miles and Hiberman model. The data obtained were then presented to see the suitability of the module in learning and the attractiveness of the material presented so that it could make students interested in studying the learning material contained in

the module. In addition, it is also expected to help students become easier in understanding the learning material of two-dimensional geometry.

Effectiveness can show how someone successfully obtains and utilizes learning methods to obtain good results. Effectiveness is not only oriented towards goals but also towards the process of achieving goals. Effectiveness means the ability of an institution to implement a planned learning program and the ability to achieve the results and goals that have been set. The process of implementing the program in an effort to achieve these goals is designed in a conducive and attractive atmosphere for students.

To test the effectiveness of the mathematics learning module containing bamboo weaving culture, researchers used observation techniques and written tests. The initial effectiveness test will be filled out by students before learning and the final test will be done by students after learning using the mathematics learning module containing bamboo weaving culture on two-dimensional geometry material to reveal how effective students' critical thinking is after using the module created.

The results of students' critical thinking skills before learning using the module for each indicator obtained an average value of 82.28 with the category "Very critical". The results of the analysis of students' critical thinking skills using the mathematics module containing bamboo weaving culture can be seen below:

Table 1 : *Students' Critical Thinking Skills in Learning*

No	Indicator	Learning Activities					
		Average	Category	Average	Category	Average	Category
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Analyzing questions	75.5	Currently	89.4	Tall	94.42	Very high
2.	Focusing questions	72.74	Currently	91.62	Very high	93.86	Very high
3.	Identifying assumptions	73.28	Currently	92.72	Very high	95.52	Very high
4.	Determine the solution to the problem in the question	69.42	Currently	90.5	Very high	94.42	Very high
5.	Writing the answer to the problem solution in the question	69.38	Currently	93	Very high	95.52	Very high

6.	Determine the conclusion from the problem solution that has been obtained	73.28	Currently	92.02	Very high	93.86	Very high
7.	Determine alternatives/ other ways to solve the problem	0	Very low	49.38	Very low	72.2	Currently
	Average	**61.94**	**Low**	**85.52**	**Tall**	**91.4**	**Very high**
Percentage (%)				**82.28 (High)**			

Based on table 4.9, it can be seen that the 7 indicators of students' critical thinking skills in learning using the studied module, aspects of analyzing questions, focusing questions, identifying assumptions, determining solutions to problems in questions, writing answers to solutions to problems in questions, determining conclusions from solutions to problems that have been obtained and determining alternatives / other ways to solve problems, so it can be interpreted that the critical thinking skills of students studied in learning activity 1 obtained an average of 61.94 in the low category, in learning activity 2 obtained an average value of 85.52 in the high category, and finally in learning activity 3 obtained an average value of 91.4 and entered the very high category.

CONCLUSION

Based on results study development and discussion about development module learning mathematics loaded culture wicker bamboo on material geometry dimensions two, can withdrawn conclusion as following :

1. The research on the development of a mathematics learning module containing bamboo weaving culture on two-dimensional geometry material was carried out in several steps using the ADDIE model, namely (1) the analysis stage (*Analysis*) which includes needs analysis, student characteristics analysis, material analysis, educational technology analysis and objective analysis, (2) the design stage (*Design*) which includes the development schedule, development team, media specifications, material structure, in this developed module it is necessary to pay attention to the ideas that emerge according to the analysis carried out, so that the mathematics learning module on this two-dimensional

geometry material is expected to be able to help in learning, (3) the Development stage *(Development)* which produces an initial product which is then validated by a team of experts, at the development stage input is obtained in the form of criticism and suggestions by learning design validation experts, media validation experts and material validation experts using qualitative instruments, after undergoing several stages of improvement until the module is said to be suitable for use (4) the Implementation stage *(Implementation)* which is carried out in class XI MIPA 1 MAN 1 Kerinci through small group tests, using response instruments and interviews with students and teacher response instruments, (5) the Evaluation stage (*Evaluation*) which is a formative evaluation. Based on these steps, in the opinion of the team of experts, the learning media that has been created is declared worthy of development.

2. In developing this designed mathematics learning module, the requirements that must be met are in accordance with certain procedures that are in accordance with the targets to be achieved, a clear learning content structure. The requirements that must be considered are: 1) *Self Instruction* , 2) *Self Contained*, 3) *Stand Alone* , 4) Adaptive and 5) *User Friendly*.
3. The procedure for using this designed mathematics learning module consists of two procedures or instructions for use, namely instructions for use for teachers and instructions for use for students. The procedure for using the module refers to the condition of the learning module that is created and tested to help teachers and students, so that the learning carried out is meaningful, interesting, fun and useful for students' lives.
4. The developed mathematics learning module has effectiveness with a very critical category reviewed from the aspects of providing simple explanations, building basic skills, concluding, providing further explanations, and arranging strategies and tactics. In the ability to think after being given learning using the module, a score of 82.28% was obtained with a very critical category. It can be concluded that students' critical thinking ability after using the mathematics module containing bamboo weaving culture for six meetings is very critical.
5. After validation and the product has been declared fit for testing, the product is tested in small groups. Based on interviews with respondents, responses from 9 students of class XI MIPA 1 MAN 1 Kerinci and MAN 1 Kerinci teachers, it was found that this mathematics learning module is categorized as very positive and helps students understand the material, while student comments on this learning module state that this learning module is easy to use, interesting and increases student attention, in addition, student comments on this learning module can help students in learning, and according to students the quality of this module is good and good to be developed. Students feel happy when using the module and they feel more understanding after using this module. This is supported by the assessment of MAN 1 Kerinci teachers who gave a positive response to the learning module that was developed.

REFERENCE

Bekerman, Z., Burbules, N. C., & Silberman-Keller, D. (Eds.). (2006). *Learning in places: The informal education reader* (Vol. 249). Peter Lang.

Brines, M., Patel, N. S., Villa, P., Brines, C., Mennini, T., De Paola, M., ... & Cerami, A. (2008). Nonerythropoietic, tissue-protective peptides derived from the tertiary structure of erythropoietin. *Proceedings of the National Academy of Sciences*, *105*(31), 10925-10930.

Bryant, R. L. (2013). Branding natural resources: science, violence and marketing in the making of teak. *Transactions of the Institute of British Geographers*, *38*(4), 517-530.

Chebii, R. (2011). Effects of science process skills mastery learning approach on secondary school students' achievement and acquisition of selected chemistry practical skills in Koibatek District schools, Kenya. *Unpublished Master's thesis, Egerton University*.

Dahar, M. A., & Faize, F. A. (2011). Effect of the availability and the use of instructional material on academic performance of students in Punjab (Pakistan). *Middle Eastern Finance and Economics*, *11*, 15-26.

Damon, W. (Ed.). (2013). *Bringing in a new era in character education* (No. 508). Hoover Press.

Djamarah, S. B., & Zain, A. (2006). Strategi pembelajaran. *Jakarta: Rineka Cipta*.

Dewi, E. R., & Alam, A. A. (2020). Transformation model for character education of students. *Cypriot Journal of Educational Sciences*, *15*(5), 1228-1237.

Mokyr, J. (1992). *The lever of riches: Technological creativity and economic progress*. Oxford University Press.

Mulyasa, E. (2007). Menjadi kepala sekolah profesional. *Bandung: Remaja Rosdakarya*.

Richey, R. C., & Klein, J. D. (2014). Design and development research. *Handbook of research on educational communications and technology*, 141-150.

Sleeter, C., & Carmona, J. F. (2017). *Un-standardizing curriculum: Multicultural teaching in the standards-based classroom*. Teachers College Press.

Sumiati, E., & Gunawan, O. S. (2007). Aplikasi pupuk hayati mikoriza untuk meningkatkan efisiensi serapan unsur hara NPK serta pengaruhnya terhadap hasil dan kualitas umbi bawang merah. *Jurnal Hortikultura*, *17*(1), 80778.

Zhao, Z., Emzir, M., & Särkkä, S. (2021). Deep state-space Gaussian processes. *Statistics and Computing*, *31*(6), 75.