

Development of high School Biological Module based on Pictorial Riddle inquiry in Human Motion System

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Abstract— Global changes in the development of knowledge and technology, especially those related to the education system in schools, require a change in teacher attitudes in implementing classroom learning. Therefore, teachers are required to continue to innovate in developing learning models that can improve students' attitudes, skills and knowledge. This learning model is expected not only to prepare students as a generation who only follows the times, but also to prepare them as a generation that is critical, creative, and innovative in developing their potential in the future. However, in general, the level of creativity and critical thinking of students is still low. Some of the causes for dull student creativity and critical thinking are the low mastery of basic concepts. Thus, in this study, learning improvements will be carried out through the use of biology modules based on the pictorial riddle inquiry method to increase student retention as a support for the learning process. Therefore, it is necessary to improve learning biology, especially on the subject of human motion systems in the form of using biology modules based on the pictorial riddle inquiry method as a medium and / or a student learning resource. From this explanation, it is hoped that metacognition skills can be useful in increasing critical thinking, conceptual understanding, and student creativity.

Keywords— the pictorial riddle inquiry method, biology modules.

I. INTRODUCTION

Module development is needed to be able to meet student needs, namely modules that are in accordance with the characteristics or social environment of students. Therefore, teachers are required to continue to innovate to develop learning models that can improve students' attitudes, skills and knowledge. This learning model is expected not only to prepare students as a generation who only follows the times, but also to prepare them as a generation that is critical, creative, and innovative in developing their potential in the future. However, in general, the level of creativity and critical thinking of students is still low. Some of the causes for dull student creativity and critical thinking are the low mastery of basic concepts. Another cause of bluntness in students' creativity, critical thinking, and conceptual understanding is low metacognition skills.

This statement is also supported by the results of an interview with a Biology teacher at a high school in Jember, related to the material module of human motion systems used in schools that have not fully carried out the inquiry steps, even in some high school schools the textbooks provided by the government have not met the quota of students. so that the system used alternately when learning activities in Biology subjects, in the process of learning activities are also not supported by other modules or modules that support inquiry learning activities so that students are less stimulated to create inquiry learning.

Inquiry pictorial riddles is a learning method that uses pictures, demonstrations or real situations so that it can stimulate students to think more critically about the problems presented in the form of pictorial puzzles. Pictorial riddles motivate students to issue ideas, think critically and intuitively, and form and develop self-

concepts in students, besides that the material will last longer in memory because the material is presented using images and events that actually occur in everyday life. For these reasons, the pictorial riddle inquiry is in accordance with the demands of the 2013 curriculum described above. Based on the aforementioned background, a study was compiled with the title "Development of a Biology Module Based on Pictorial Riddle Inquiry on Metacognition Skills and Student Retention in SMA / MA Material for Motion Systems in Humans.

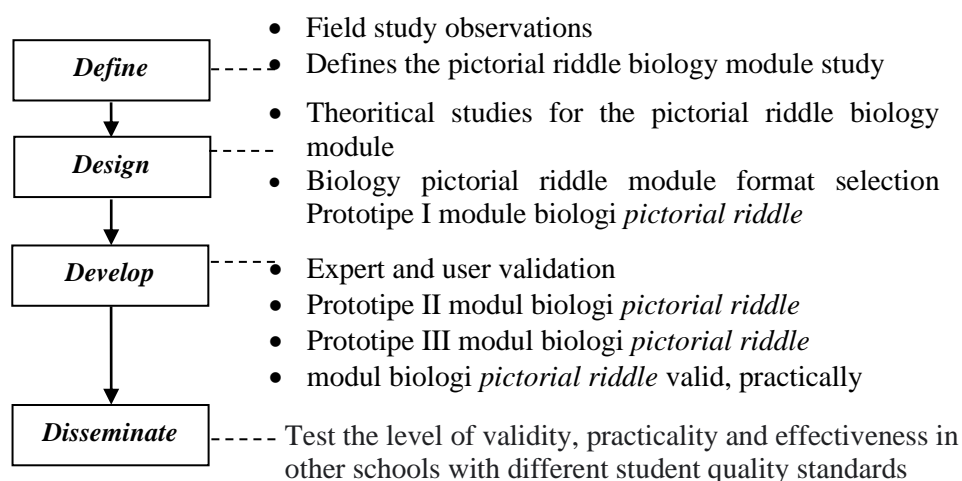
Based on the background above, the following problems can be formulated:

- How is the validity of the Pictorial Riddle Inquiry-Based Biology Module on Metacognition Skills and Student Retention in SMA / MA Material for Motion Systems in Humans?
- What is the practicality of the Pictorial Riddle Inquiry-Based Biology Module on Metacognition Skills and Student Retention in SMA / MA Material for Motion Systems in Humans?

- How effective is the Pictorial Riddle Inquiry-Based Biology Module on Metacognition Skills and Student Retention in SMA / MA Material for Motion Systems in Humans?

II. METHODOLOGY

This type of research is development research, namely a type of research that develops a new product or enhances an existing product. The product in question is a Biology module based on the Pictorial Riddle inquiry method on the material of motion systems in humans in high school is a type of development research (Research and Development), this product is then tested for practicality and effectiveness on students. The process leads to the development of the module through the 4-D model proposed by Thiagarajan et al., (1974), namely (define, design, develop and disseminate) as shown in Figure 3.1 below:



III. RESULT

Research on the Development of Biology Module in High School Based on Pictorial Riddle Inquiry in Human Motion Systems is a type of research and development, and produces products that are valid, practical, and effective. This research was conducted at MA Al-Qodiri Gumukmas based on a 4-D development design (Thiagarajan et al., 1974: 9). The results of this development include 1) the results of the define stage,

namely a questionnaire on teacher needs, a questionnaire on student needs and materials; 2) the results of the design stage, namely the initial prototype of the developed module; 3) the results of the development stage, namely expert validation, small group trial results and large scale trial results (class scale); and 4) the results of the disseminate stage, namely the results of class scale trials at MA Al-Qodiri Gumukmas and MA Ibnu Kholidun Puger.

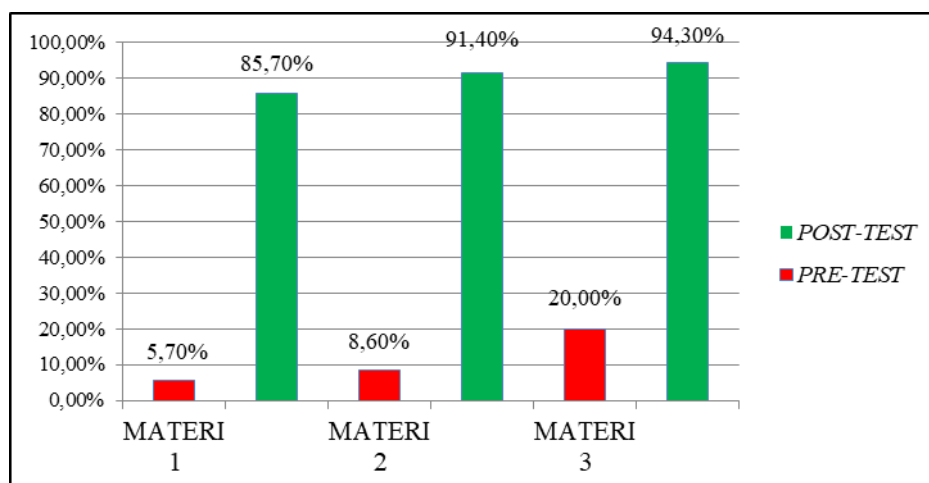


Fig 4.4 Histogram Skore N-Gain Uji Coba II di MA Al-Qodiri Gumukmas

The Disseminate stage (dissemination) is carried out in other schools with the aim of testing the effectiveness and practicality of using the developed Pictorial Riddle Inquiry Module, the assessment process is by giving student response questionnaires, pre-test and post-test questions. This dissemination also aims to get criticism, suggestions, and ratings, as a basis for improving the final product development, so that it is ready for adoption by users. This distribution stage is only carried out on a limited scale, namely carried out at two schools that have the same Biology material character but have different student characters, the first school is at MA Al Qodiri Gumukmas, the second school at MA Ibnu Kholdun Puger. The results of the dissemination trial were in the form of student response questionnaires, pretest and posttest results.

IV. DISCUSSION

Module Based On Inquiry Pictorial Riddle Material Motion Systems in humans consists of three different subject matter. Material 1 contains "The frame as an active motion system", Material 2 "Muscles as an active motion system", Material 3 "Disorders of the movement system", The three module materials are arranged with the 5M approach step which is presented in full starting from (observing, asking try, reason and communicate) Activities that aim to analyze, try, reason and conclude are important parts of teaching and learning activities because students carry out the process of finding facts or concepts that are being studied (Gok, 2010). Module Based on Inquiry Pictorial Riddle Material for Motion Systems in humans has gone through the validation and testing stages of small and large groups (class scale), the preparation of modules is arranged on the basis of field needs and is designed

based on appropriate supporting references and directions from the supervisor, this module adopts the 4-D development (Thiagarajan et. al., 1974) in its development process.

V. CONCLUSION

Based on the results of research, data processing analysis, and research discussion, it can be concluded that the use of pictorial riddle inquiry-based biology modules on human motion systems material can improve student outcomes. This is evidenced by the percentage of students' conceptual understanding after using a pictorial inquiry-based module on the material of motion systems in humans of N-Gain 0.74 with a high category.

Suggestions that can be given for further research are 1) Development of a High School Biology Module Based on Pictorial Riddle Inquiry in Human Motion Systems. it will be more effective if the spirit of each student in the class has high learning motivation. 2) Before the Pictorial Riddle Inquiry Based Module Material for Human Motion Systems is distributed to students, the teacher first reads the instructions for using the module so that students understand if the module is an independent teaching material that trains students' independence in understanding the subject matter. 3) In the testing step, there are tools and materials that must be prepared by students, tools and materials for the practicum so that they are notified at the previous meeting. 4) For further researchers, it is hoped that they can make a Pictorial Riddled Inquiry Based Module with broader material and

pay attention to the content of the material applied in the steps of the approach.

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