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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/13082
DOI URL: <http://dx.doi.org/10.21474/IJAR01/13082>



RESEARCH ARTICLE

ANALYSIS OF THE NEED FOR THE DEVELOPMENT MULTI-REPRESENTATION MODULES TO FOSTER CREATIVE THINKING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS DURING THE COVID-19 PANDEMIC

Dwi Setyowati, I. Ketut Mahardika and Slamet Hariyadi

Department of Science Education Magister, University of Jember, Jember, Indonesia 68121.

Manuscript Info

Manuscript History

Received: 25 April 2021

Final Accepted: 28 May 2021

Published: June 2021

Key words:-

Module, Multirepresentation, Plant Structure And Function, Creative Thinking Skills

Abstract

The purpose of the study was to determine the need for multirepresentation modules to foster creative thinking skills in plant structure and function on science learning at junior high school. This research is a qualitative descriptive study. The method used in the online form of questionnaires for teacher and students. Data were analyzed using descriptive analysis and the percentage of the results of the number of answers given was divided by the total number of respondents multiplied by 100%. The results of this study indicate that: (1) 95.56% of teacher need a module as teaching material during COVID-19 Pandemic; (2) 97.13% of students like teaching materials that contain multirepresentation (3) The reason of teacher need a multirepresentation module are guide for students in doing learning, facilitating distance learning, overcoming time constraints, making learning systematic and directed, representing the presence of teachers. The conclusion of this research is that it is necessary to develop teaching materials in the form of multirepresentation modules to foster creative thinking skills in plant structure and function on science learning at junior high school.

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Introduction:-

Science is a system of knowledge about the physical world and related phenomena that require unbiased observation and systematic experimentation (Gregersen, 2020). Science develops along with the times. What was known as a scientific truth in the past may experience a shift in the present or in the future. In teaching science, there are two pedagogical approaches: deductive and inductive approaches (Constantinou et.al, 2018). The teacher's role, in a deductive approach, is to present a concept with related logic and provide examples of its application. Students are positioned as passive learners, that is, they only receive material. In contrast, the inquiry process approach (which is an inductive approach), students are given broad opportunities to make observations, conduct experiments and be guided by teachers to build concepts based on their knowledge (Rocard, et.al., 2007).

There are two main elements in science education, namely understanding science and process skills (inquiry) to apply science in everyday life. Each element applies to four scopes of content, namely living things, matter and their properties, energy and changes, and earth and space. Students have scientific thinking competence if they have a complete understanding of science. The ability to think will have a progressive impact on the development of science if someone has an understanding of a particular scientific field. Critical reasoning in understanding the scope

Corresponding Author:- Slamet Hariyadi

Address:- Department of Science Education Magister, University of Jember, Jember, Indonesia 68121.

of content is expected from students. Understanding of science can always be associated with higher order thinking skills (HOTS).

Therefore, in achieving these competencies, students are expected to have an understanding of scientific concepts that are in accordance with the scope of each content and the development of learning levels. An understanding of the scope of content that is built in students must show the interrelationships between biology, physics and chemistry. As a result, students understand science thoroughly for a certain scope of content. This understanding includes the ability to think systematically, understand concepts, the relationship between concepts, causality (cause and effect) and the hierarchical level of a concept.

The main purpose of 21st-Century learning is how to improve students' creative thinking skill to a higher level than before, particularly ones related to an ability to think critically in absorbing various information, think creatively in solving problems by using their background knowledge as well as make decisions in complex situations (Anggrainy, 2016). 21st-Century learning has characteristics including teaching students to have the ability to creative thinking, critical thinking, collaborative, and communicative. One of the important abilities that must be trained in 21st-century learning is creative thinking (Syaibani, et al. 2017). Creative thinking is defined as thinking that allows students to use their imagination to produce ideas, questions, hypotheses, experiment with various alternatives, evaluate ideas, and make solutions to a problem independently (Kampylis, et al., 2014).

A multi-representation approach is needed to develop this module because in science learning students are required to master the material described by different representations depending on the character of the material. Mahardika (2013), said that students are required to master different representations (experiments, graphs, tables, conceptual, formulas, images, diagrams). Whereas according to Izsak and Saherin (Rosyid 2013) teaching by involving multiple representations provides a rich context for students to understand the concept. The multi-presentation textbook display makes it more interesting and rich in context so that it will make it easier for students to understand a concept. The results of Widianingtyas's research (2015), that in learning using a multi-representation approach can improve students' cognitive abilities. Cognitive ability is the ability of students to read, understand, communicate, and apply science knowledge (Tohirun, 2011).

Many factors may influence, one of them is the lack of content that trains students' creative thinking ability in the textbooks used. Therefore, we need a multirepresentation module that is easy to understand and able to train students' creative thinking abilities. Based on this view, the purpose of the study was to determine the need for multirepresentation modules to foster creative thinking skills in plant structure and function on science learning at junior high school.

Research Method:-

The type of this research is descriptive qualitative research which was conducted November 2020 during pandemic of COVID 19. The sample was taken randomly as many as 209 junior high school students who have taken plant structure and function at the SMPN 1 Pasirian on 2020/2021 academic year and 45 teacher in science subject. Data collection techniques used in the online form of a questionnaire (questionnaire) needs analysis for students and for teacher also online form questionnaire answers to be used as research data. The data were analyzed using qualitative descriptive analysis of the lecturers' answers and the percentage of the total answers given by the respondents divided by the total number of respondents multiplied by 100%.

The needs analysis questionnaire was developed based on the first stage of the 4-D of Thiagarajan development model, namely analysis where the main objective is to find out which products are suitable to be developed according to the problems found and materials that need to be developed according to student needs.

Findings and Discussion:-

Needs analysis for students is carried out using a questionnaire containing, genders of the student, the difficulty of science learning to understand, preferred learning resources by students and preferred in challenging question to improve thinking skills. Respondents are allowed to submit only one submission on the questionnaire.

The genders of the student who answer the questionnaire is 41.63% are male and 58.37% are female. The results obtained are as many as students choose 50.72% that science learning is difficult to understand and 49.28 %

students chose that science learning is not difficult to understand. Learning resources that are preferred by students are learning resources that various representation such as images, literature with a percentage of 97.13 % and the other student says not interested with various representation are 2.87 %. The results of the needs analysis for students in detail can be seen in Table 1 below.

Table 1:- Results of research-based multirepresentation module needs analysis for students.

No.	Question	answer		Information
		Yes	No	
1	Science learning is difficult?	50.72%	49.28 %	
2.	Your preference on learning material with images and literature?	97.13%	2.87%	
3.	Your preference on challenging question to train thinking skills?	42.58%	57.42%	

Analysis of the needs of teaching materials by the teacher contains about genders, ages, certified educators, have made teaching materials, types of teaching materials made, during the pandemic whether you need a module in learning, the reason for needing a module, whether you need a multi-representation module and whether a module is needed to train creative thinking skills.

The genders of the teacher who answer the questionnaire is 80% are female and 20% are male. The results obtained are as many as 45 teacher are on the range 25 to 58 years old. And about 75.56% has certified educator and 24.44% has not have certified educator. The reasons teachers need during the covid 19 pandemic are: as a guide for students in doing learning, facilitating distance learning, making students more independent learning, overcoming time constraints, modules adjusting to pandemic conditions, making learning systematic and directed, representing the presence of teachers. The results of the needs analysis for students in detail can be seen in Table 2 below.

Table 2:- Results of research-based multirepresentation module needs analysis for teacher.

No.	Question	answer		Information
		Yes	No	
1	have an educator certificate	75.56%	24.44 %	
2.	Have you ever made teaching materials?	97.78%	2.22%	
3.	Type of teaching materials?	-	-	a. student worksheet 35.44% b. Module 24.05% c. Dictate 12.66% d. Handout 25.32% e. never made 2.53%
4.	During the COVID-19 pandemic, do you need a module in learning?	95.56%	4.44%	
No.	Question	answer		Information
		Yes	No	
5.	do you need a multirepresentation module in learning (contain graph, images, verbal)?	100%	-	
6.	do you need a module in learning that train creative thinking skills?	100%	-	

Discussion:-

Teaching materials are everything that can be used as a guide or reference (Depdiknas, 2008). to make it easier for students to understand the material being studied. Teaching materials consist of various kinds, including textbooks, modules, worksheets (Kemendikbud, 2016), handouts, and brochures. So far, the teaching materials used in microbiology learning are textbooks, ebooks, articles from various journals and practical manuals for carrying out practicals. Teaching materials in the form of module are more in demand by students because they are more accessible than ebooks. This is contrary to the 21st century which demands that everything uses technology. In addition, the teaching materials used according to the supporting lecturers are incomplete and focused due to the absence of theory and how to do practicums that are packaged in one teaching material, so it is hoped that it will make it easier for students to understand the material with direct laboratory practice.

Module that developed with representations make students more capable and develop the power of analysis, synthesis, and evaluation so that the score of high-level thinking skills becomes good (Mahardika, 2020). This is like Craig state (2007) which states that using different components of images, diagrams, writings, and colors can train the brain to analyze and think critically. Teachers can improve the quality of students if the teacher in the school can choose the right media. The images displayed in the lesson must be interesting, contextual, communicative and informative as a means of visualizing what they want to achieve in learning objectives where students will be easier to understand than just using verbal sentences.

Conclusion:-

As many as 97.13% of students are happy to use learning materials with contain multirepresentation, and 95.56% teacher need a module during pandemic COVID-19. And also all the respondent of the teacher need a multirepresentation module to train creative thinking skills of junior high school student. Students and teacher need to develop teaching materials in the form of multirepresentation module to trains creative thinking skills to be able to improve student learning outcomes on plant structure and function materials. The material in the field of science studies with various branches of science in it is very much with their respective characteristics, so it is necessary to develop appropriate teaching materials to improve applicable learning. The teaching materials developed should be in accordance with the needs of students and the applicable curriculum.

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