

S-04

INTEGRATED SCIENCE SMP/MTs BASED ON THE LOCAL POTENTIAL IN YOGYAKARTA SPECIAL DISTRICT

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Abstract

This research aims to develop integrated science for SMP/MTs grade based on local potential in Special District of Yogyakarta. This research has background of paradigm that the learning of science in SMP/MTs has been being recommended integrated and combined with some studies in Science. The characteristic of integrated science that has close relationship with the contextual theme and environment point of view also needs to be developed. The real implementation of the development of integrated science is the mapping analysis of integrated science curriculum competency based on the local potential; module and student's worksheet which have relationship with assessment and local superiority. The research method is Research and Development. The research steps are Define, Design, Develop and Disseminate step. The instruments of this research are product validation and tryouts (test, observation sheets, and questionnaires). The result of the research can produce integrated science based on local potential for "Aphyterapy Clinic", "Dragon fruit farms" and "PDAM". Those four integrated science packets have been categorized in to good quality to improve the creative thinking and student independence

Key words: Integrated Science, local potential, creative thinking, science understanding concept

INTRODUCTION

The development of science and technology needs to be balanced with the development of the education system in Indonesia. In connection with this, the Natural Sciences (IPA) has an important role. The importance of the role of science in supporting the advancement of technology is a challenge for science teachers in organizing learning. Science teacher is expected to improve the quality of science education, in order to obtain a high quality education, and cannot be separated from student factors, teaching materials, teachers and the methods used.

Integrated science teaching is emphasized in the science curriculum for SMP/MTs, instead of the separate science subjects as physics, biology, and chemistry. The learning model enables the integrated science learning more efficient and effective. Create an integrated science learning materials will not overlap with each other, as if it is taught separately.

Learning science is often found in the field is still centered on the teacher. This also occurs at the time of observation one half (July-December 2013) at 1 Mayodan SMP, SMP N 1 Wonosari, and SMP N 1 Wates show that learning science still be taught separately, are still visible science learning activities centered on teachers (teacher-centered). Learners rely on material provided by the teacher without seeking their own, so do not train the creative thinking

skills of learners in learning.

Learning science can be packaged with the theme or topic of a discourse is discussed from various perspectives or disciplines that are easily understood by learners. Concept or theme in science teaching is discussed from various fields of study to be more effective in the use of time to achieve learning objectives. According to Fogarty (1991:54), " Webbed curricula represent the thematic approach to integrating subject matter. Typically, this thematic approach to curriculum development begins with a theme". Learning webbed models is a thematic approach to integrate subject matter. This thematic approach begins by determining the theme.

Through learning science, students can gain hands-on experience that can add strength store , and apply the concepts they have learned. Thus, students are trained to be able to find yourself a variety of concepts studied thoroughly (holistic), meaningful, authentic, and active. Packaging designed learning experiences teachers are very influential on the meaningfulness of the experience for learners. Not to the implementation of an integrated science learning in the field, due to the background of teacher competence are still fragmentary between physics, biology, and chemistry. In addition, the limited science book is featuring an integrated science.

Science and technology have strong links with everyday life (Bachtiar, 1986: 13). It is very influential on the development of science and technological progress and vice versa. Science and Technology are the parts that can be distinguished, but both cannot be separated from a system that interacts with other systems within the framework of national and international. The point in science learning should be connected between the concepts associated with technology.

Environment in Yogyakarta Special Region, particularly in the area Moyudan, Sleman; area Temon, Kulon Progo, and Wonosari area, Gunung Kidul potential for learning science. In this area there Moyudan one place for Apiterapi treatment is treatment using honey bee stings, area Temon, Kulon Progo are dragon fruit cultivation centers, and regional Wonosari, Gunung Kidul are Regional Water Company (PDAM). From honey bee sting treatment dragon fruit cultivation, and taps, students can learn science concepts and get to know the local potential that exists around them. Learning to use the outdoor learning activity, where the students can learn science in the honey bee sting treatment, dragon fruit cultivation, and taps. Outdoor learning system is a learning system that creates learning activities outside the room, which is very hard to define in particular, because it is not a technical terminology but rather a general concept that uses outdoor area as a learning tool. As explained in the Ministry Of Education Malaysia (2002: 14)

"The learning of science is not limited to activities carried out in the school compound. Learning of science can be enhanced through the use of external resources such as zoos, museums, science centres, research institutes, mangrove swamps, and factories"

Learning science with a theme has not been done in SMP / MTs, so it needs to develop a theme related to the local potential is "bee sting therapy "; "Science in Dragon Fruit", and "Science in the crystal clear water taps". The theme of this integrated science teaching is a theme that connects science with potential local environment in the community. For this reason, it is a suitable approach for this integration in teaching Science, Technology and Society (STM) in which learners are able to participate actively in the exploration of the theme/events science and technology developed in the community. Definition STM according to Yager (1996: 5), "Science Technology Society is a kind of curriculum approach designed to the make traditional concepts and processes found in typical science and social studies programs more appropriate and relevant to the lives of students". Science and technology have a very close relationship. This led to the systematic application of engineering and science in the development and application of technology has evolved from an advancement to become an independent science.

Based on the description that has been presented, it is essential to research the development of Integrated Science SMP / MTs. Local Potential based in Yogyakarta Special Region. The resulting form of learning modules and Students Activity Sheet (LKPD) is intended to be a new breakthrough in science learning SMP / MTs in an integrated manner based on local potential, because it is expected to improve independent learning and creative thinking skills among learners. Self-learning is an active learning process that is driven by intent or motive to competencies to address the problem and constructed with sufficient knowledge or competencies possessed before. The independence of learners can be identified by several characteristics, namely the motivation to learn, how to learn, tempo and rhythm of learning, the use of teaching resources, learning outcomes assessment capabilities, and the ability of reflection (Haris Mudjiman, 2007: 7). Creative thinking skills students will establish a high level of imaginative ability, the ability to reduce and modify the product of innovative ideas, described as "A person who thinks creatively has a high level of imagination, is able to generate original and innovative ideas, and modify ideas and products" (Ministry Of Education Malaysia , 2002: 5)

RESEARCH METHOD

This study uses the Research and Development (R & D). The research aims to develop a product. Products of this research is the science lesson on " bee sting therapy"; "Science in Dragon Fruit", and "Science in The clear water taps" approach through Science Technology Society (STM). This study uses a model of 4-D of Thiagarajan & Semmel (1974: 5) comprising the step of define, stage design, stage of development, and the disseminate. Figure 1 is a Model of Teaching Material with 4D. Deployment phase (disseminate) implemented on a limited basis.

Subjects were 6 men and 6 expert science teachers, that is, as a reviewer. Assessment is done by filling assessment instruments that have been provided. In addition to the reviewer, who is the subject of this study were 26 students of SMP Negeri 1 Moyudan, 24 students of SMP N 1 Wonosari, and 30 students of SMP N 1 Wates. The objects of research on the products produced are the educational teachings of science with 3 themes.

Research using multiple instruments, namely 1) Likert scale questionnaire, used for assessment by experts LKPD modules and materials science and science learning technology experts as well as independent learning of students, 2) tests to measure thinking skills , and 3) the observation sheet to measure the achievement of skills creative thinking and independence of learners.

To test the validity of the opinion of the expert construction used (expert judgment). In this case after the instrument is constructed on the aspects to be measured by a particular theory based, then subsequently consulted with experts; validity of the content can be helped by using a grating instrument, or instrument development matrix. In the lattice are studied variables, indicators as benchmarks and item number questions or statements that have been described from the indicators. With the grating was then testing the validity of the instrument can be done easily and systematically.

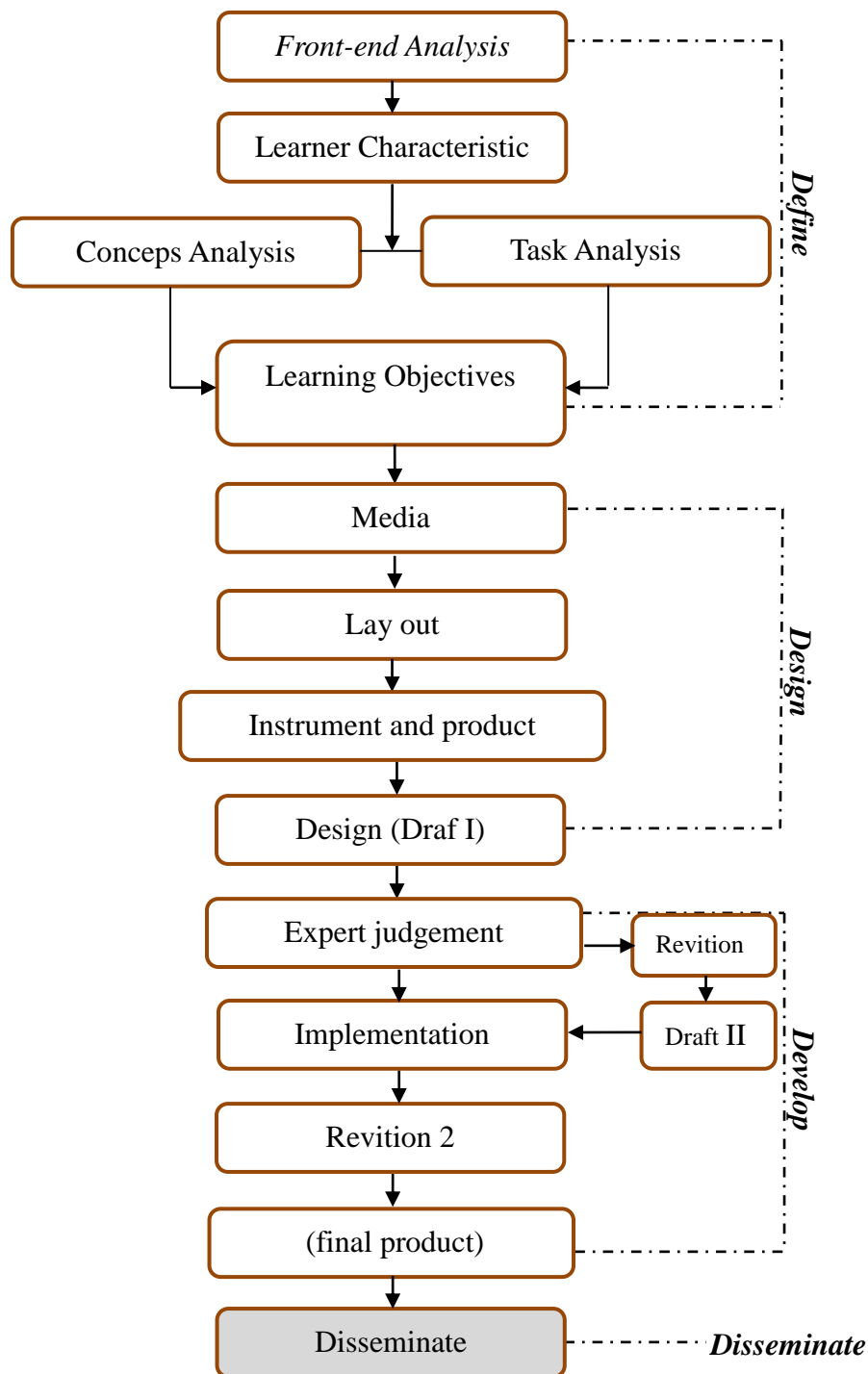


Figure 1
Model of Teaching Material with 4D

RESULT AND DISCUSSION

The result of the learning development with the chosen theme is “bee sting therapy “. Basic Competency (KD) was selected as principal KD KD according to the theme linked to the other,

so the IPA organized into competency analysis. The IPA competency analysis of each theme can be seen in Table 1, Table 2, and Table 3.

Table. 1. Competence Analysis IPA in the theme “bee sting therapy”

Content of Science	Life science	Physical science
Competency Standards (CS)	1. Understanding the various systems in the human life	5. Understanding the role of business, style , and energy in daily life
CS Integrated	Understanding the life of honey bees and its application in daily life by applying science -based learning is integrated in the local potential in Moyudan , Sleman.	
Basic Competence (BC)	1.1. Analyze the importance of growth and development in living organisms . 1.3 Describe the coordination system and sensory organs in humans and its relationship to health	5.5. Investigate the pressure on solids, liquids, and gases as well as its application in everyday life
BC Integrated	1 . Explaining metamorphosis on honeybee 2. Describes the methods used in bee sting therapy 3. Explaining the principle of pressure on bee sting therapy. 4. Describes the human nervous system on bee sting therapy	
Subject	1. Metamorphosis honeybees	2. The human nervous system 3. Pressure og solid
Theme	Bee sting therapy	

Table 2. Competence Analysis IPA in the theme of “Science in Dragon Fruit”

Thene	<i>Science in Dragon fruit</i>		
Field of Science	BIOLOGY	PHYSICS	CHEMICAL
	Understanding the diversity of living things	Understanding states of matter and change elements , compounds and mixtures	Competency Standards
	diversity in the organization of the system of life, ranging from the cellular level to the organism .	Describe the role of heat in changing states of matter and the temperature of an object as well as its application in everyday life and describe the nature of the compound mixture	Basic Competencies

Theme	<i>Science in Dragon fruit</i>		
Field of Science	BIOLOGY	PHYSICS	CHEMICAL
Subject matter	diversity in Agro Kusuma	Change Dragon Fruit jelly substance on Natural	Indicators of acids and bases from Dragon Fruit Leather

Table 3 . Competence Analysis IPA in the theme of "Science in The clear water taps"

Field	Chemical	Biology and Health Studies
Competency Standards	4. Understanding the nature of the physical and chemical changes 2. Understand the classification of substances 3. Explain the concept of matter particles	1. Understanding the various systems in the human life
Basic Competence .	3.1. Separating mixtures in various ways based on physical and chemical properties 2.3. Explaining the element name and the chemical formula is simple 3.2. Linking the concept of atoms , ions , and molecules with chemical products daily	1.1. Describe the excretory system in humans and its relationship to health

Product assessment results for each theme presented in Table 4 , Table 5 and Table 6

Table 4 . The data module assessment by expert lecturers theme " bee sting therapy "

No	aspect	Mean Score	Values	category
1	<i>Self Instructional</i>	3,95	B	good
2	<i>Self Contained</i>	4,10	B	good
3	<i>Stand Alone</i>	3,50	B	good
4	<i>Adaptive</i>	4,75	A	Very good
5	<i>User Friendly</i>	3,83	B	good
6	Readability (Order Speak)	4,17	B	good
7	Illustration	4,14	B	good
8	changable / Appearances	4,17	B	good
9	Integration Concepts IPA	3,50	B	good
10	STM (Science Technology Society)	4,25	A	very goodk

Table 5. Eligibility Data Products LKPD by Assessor theme " Science in Dragon Fruit "

No	aspect	Assessors			Average	Value	Category
		Expert lecturer s	Peer Viewer	science teacher			
1	Suitability Contents / Material						
	a. Components feasibility LKPD	33	35,5	33	33,7	A	Very good
	b. Presentation component LKPD	28	28,5	28	28,1	A	Very good
2	Compliance with Conditions	21	22,5	22,5	22	A	Very good
3	Compliance with Technical Terms	17,5	19	17,5	18	A	Very good
Total		99,5	105,5	101	101,8	A	Very good

Table 6 . Quality Outcomes Assessment Module on Every Aspect by reviewers test the theme "Science in The clear water taps "

No.	Aspects	Mean Score	value	Category
1.	Feasibility of Contents	3,18	A	Very good
2.	Language and Figure	3,35	A	very good
3.	Good Presentation	3,31	A	Very good
4.	Kegrafisan	3,35	A	Very good

Results The effectiveness of the product theme " bee sting therapy " of the questionnaire is presented Figure 2 and Figure 3 independent learning from the results of observation .

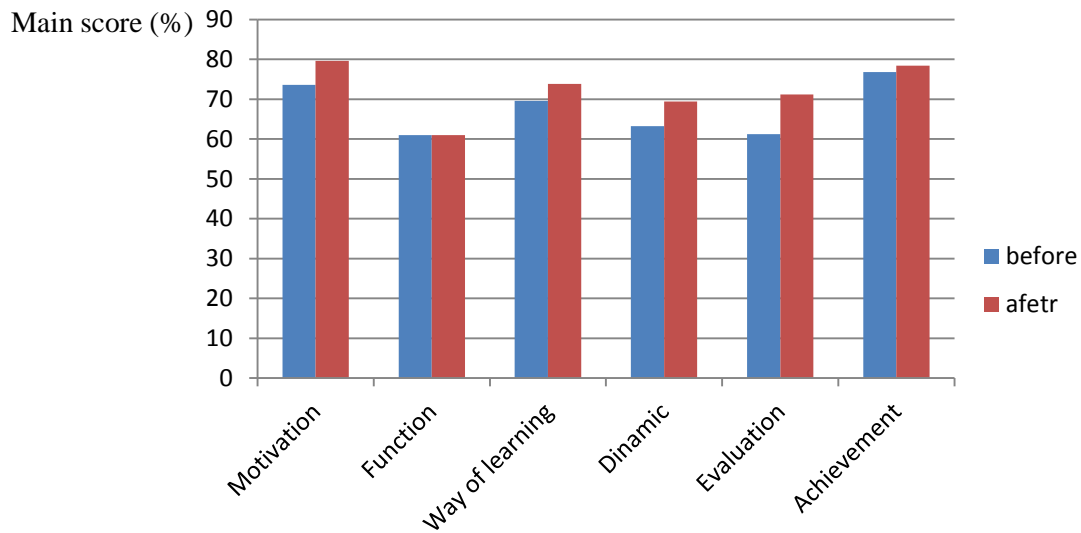


Figure 2

The results of learner's independence questionnaire before and after using science learning modules

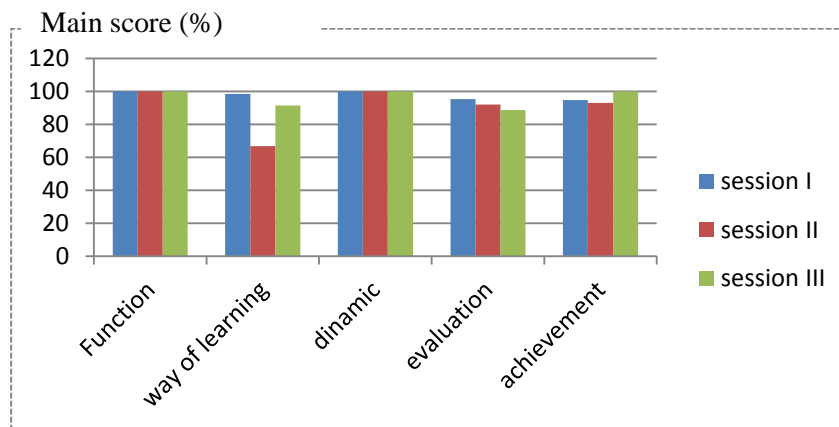


Figure 3

The results of observations at each meeting learner's independence using learning science module

Results The effectiveness of the product theme " Science in Dragon Fruit " is presented Table 7 and Figure 3 include increased creative thinking skills scores before and while using LKPD development results.

Table 7. Creative Thinking Skills Values Before and When to Use Product LKPD

Value		Before	Metting 1	Metting 2	Metting 3	Average
The lowest value		12,5	50	50	75	58,33
The highest value		87,5	100	100	100	100
The average value		62,92	79.17	82.97	90.47	84,20
Percentage		62,92%	79.17%	82.97%	90.47%	84,20%
Standard deviation		0,63	0,51	0,48	0,40	0,46

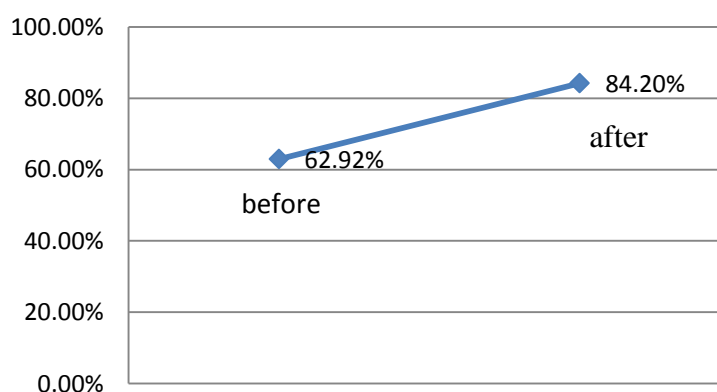


Figure 4

Increasing students' creative thinking skills scores before and while using LKPD

Results The effectiveness of the product theme " Science in the crystal clear water taps " on the questionnaire is presented Figure 5 and Figure 6 independent learning from the results of observation .

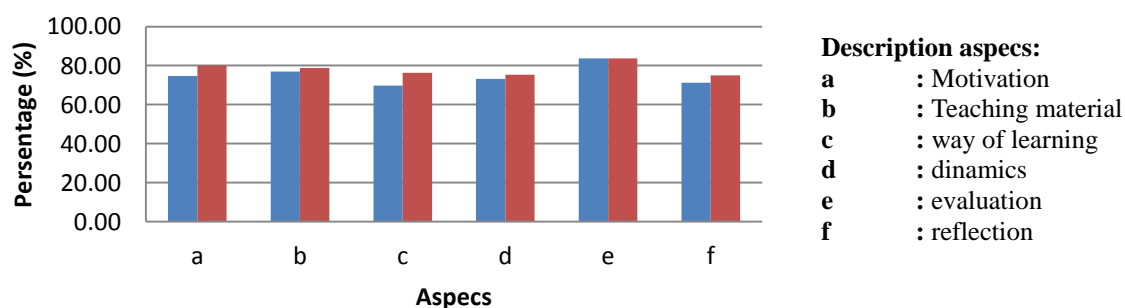


Figure 5

The results of student learning independence questionnaire after using the module

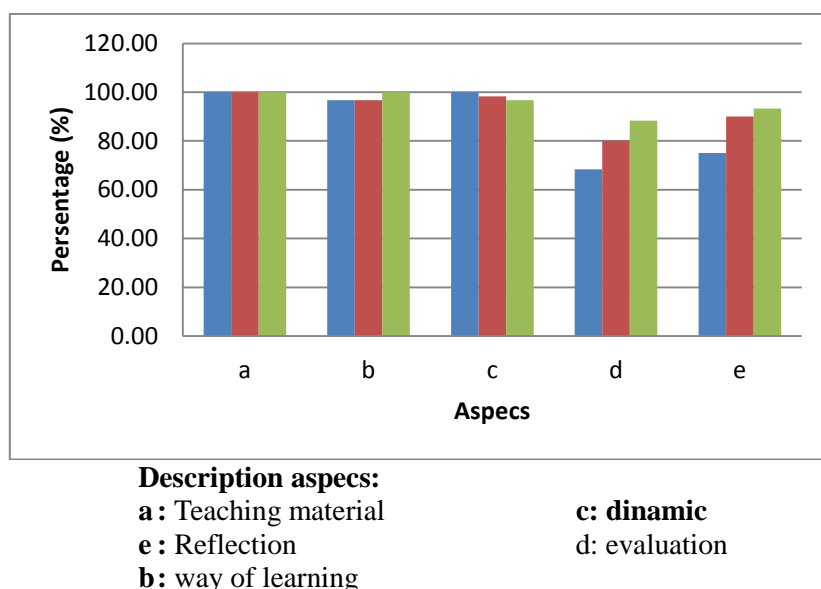


Figure 6

Graph the results of observations independent learning for students learning to use the module

CONCLUSION

Based on the results of research development , it can be concluded

1. IPA module theme "bee sting therapy" through the STM approach is feasible. Modules developed good overall assessed sting of aspects of self- instructional, self-contained, stand alone, adaptive, user friendly, legibility, illustrations, typographical arrangement/performance, integration of science concepts and aspects of the STM. The advantages of the developed module is a module presented by the STM approach, the theme of the potential existing in the area ocal Moyudan, there are self-assessment and reflection that gives learners the opportunity to do a self-assessment for learning.
2. IPA module theme "bee sting therapy" through the STM approach can improve the independence of learners that can be seen by looking at the normalized gain score of 0.15 with a low category . While the observation of learners independence of each meeting are 97.66 % , 90.33 % , and 96.00 % with each category very well .
3. LKPD theme "Science in Dragon Fruit" Science Technology Society berpendekatan based on local potential , the result of development meets the eligibility to obtain an A with a very good category.
4. LKPD theme "Science in Dragon Fruit" Science Technology Society berpendekatan based on local potential can improve creative thinking skills in science learning in SMP N 1 Wates . It can be seen from the average percentage of students creative thinking skills before using LKPD by 62.92 % and after using LKPD obtained a mean percentage score of 84.20 % with the calculation of the increase creative thinking skills of students using normalized gain score of 0.57 with medium category.
5. IPA module theme "science in the crystal clear water taps" decent digunakandengan developed very good overall value of the feasibility aspects of the content, language and image, presentation, and kegrafisan.
6. IPA module theme "Science in the crystal clear water taps" improve student learning independence views of the average percentage improvement of 3.29 % through questionnaires (low category) and the observation sheet of 5.00 % (medium category)

of Learning Activity I to II and 2 , 67 % (medium category) of Learning Activity II to III .

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