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THE VALIDITY OF SCIENSE LEARNING MEDIA TO JUNIOR HIGH SCHOOL STUDENTS

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Abstract

This study aims to develop science teaching media. This is a development research that develops science teaching that consists of Learning Implementation Plan, Student Activity Sheet, and guide the students. The procedure consists of several phases: preliminary studies, model development, model validation, operational models, validation tools, and empirical validation. This section reports the results of the validation of learning science developed oriented learning model scaffolding aided analogy. The results of the expert validation indicate that the device developed learning science oriented learning model scaffolding aided analogy is valid and can be implemented in learning to practice thinking skills and to complete mastery of concepts of junior high school students.

Keywords: *Science Learning Media, Validity*

I. Introduction

One task of the teacher is very important is making learning preparations, which requires a number of capabilities such as: (1) master the subject matter (teaching materials) and its characteristics; (2) master the various methods and learning media; (3) selecting and combining the subject matter, methods, media, with learning experiences appropriate to the objectives and evaluation; (4) supporting the success of other learning processes (Directorate of Educational Personnel, 2008). In the process of education is certainly a school institution doing drafts of both the system and the order of the institution. The education process will be successfully influenced by teachers, students, and institutions. Teachers are in demand for more professional in their duties, among others, should be able to make the learning device and able to develop and able to apply it. Learning device is a series of media or means prepared by the teacher used as a guide or give direction to facilitate a teacher to help the learning process in the classroom. The professionalism of a teacher can be improved by learning devices. In other words, that the learning device not only as administrative requirements. but also as a medium enhancement of professionalism. A teacher should use and develop

learning tools as much as possible, fix everything related to the learning process through the device.

The purpose of learning science emphasizes on providing direct experience (natural and experience) to develop student competencies and directed to "seek out" and "do" that can help students to learn independently. In addition to make learners independent students should be familiarizes to build their own understanding, need to observe a model that can generate similar behavior in others and convey the behavior patterns of new (Bandura, quoted by Woolfolk, 2009), and requires guidance targeted and structured (Vygotsky, cited by Nur, 2008).

Constructivist recommends that students are active learners who seek to build meaning and understanding to new situations based on their knowledge and experience, both formal and informal (Maharaj, 2011, and Slavin, 2009). obtaining strategy takes precedence over how much students gain knowledge and recall (Sagala, 2007). Learning in school is not just focused on provisioning capabilities theoretical knowledge, but how the learning experience of students owned can be applied in everyday life (Rusman, 2011). For example, in science learning how to find out about a systematic nature, so that the IPA is not only a mastery of knowledge in the form of a collection of facts, concepts, or principles, but also a process of discovery. Based on the above opinion can be concluded that students do not just accept what is given by the teacher, but actively acquiring knowledge and skills that can be applied in everyday life. This implies that the active learning students need guidance and assistance to find or implement their own ideas that need to be designed forms and procedures suitable assistance.

To make meaningful knowledge, students must apply their own ideas in order to improve the understanding of learning and teaching. It required the guidance / coaching scaffolding that is headed from a student's actual ability to achieve its potential capability with the guidance given gradually (Lipscomb, Swanson and West, 2004). Scaffolding including the provision of assistance to students who are more intensive and structured at the beginning of the lesson, then gradually transfer responsibility for student learning to work under the direction of themselves (Palincsar, 1986; Rosenshine & Meister, 1992, 1994 in (Slavin, 2009). Excess scaffolding is to involve students actively through the encouragement of

teachers to construct new knowledge based on prior knowledge. Additionally, scaffolding can motivate students to learn continuously and lower frustration level students. this is similar to the one proposed (Stuyf 2002) a form of scaffolding can reduce (reduce) frustration and risk.

According Saye and Brush (2002) quoted Simons and Klein 2006) scaffolding classified into soft and hard scaffolding. Soft scaffolding means is dynamic and refers to the domain of action of students in support of the student when the student has special needs (Berk & Winsler, 1995; Roehler & Cantlon, 1997; Saye & Brush, 2002 in Simons and Klein 2006). Hard scaffolding is static support that can be developed based on the students' learning difficulties as anticipation or typical associations associated with the task (Saye & Brush cited by Simons and Klein, 2006). Modelscaffolding used in this study were 1) Modelling for students to learn from the model shown, 2) Grouping complex task to be mastered students into sections of specific and clear, 3) the provision of assistance by experts on the students to the maximum on those aspects that cannot be controlled by students, 4) Teachers provide feedback response to the task at hand students. the teacher's role is to collaborate, 5) to consolidate the ownership of the knowledge of the students in order to really excel at (Orey, 2010).

Students are not considered as scientists are trying to solve his own problems, but active learning guided by people who are experts, facilitated by connecting what will be learned with what is already known to overcome learning difficulties, and to train students' thinking skills. The task of the teacher is to facilitate this process through meaningful experiences, provide opportunities for students to find and implement their own ideas, and applying their own strategies in learning. The strategy should also be developed to equip students with the ability to think. To measure the success of their mastery of concepts needs assessment. Rate refers to the goals to be achieved using levels of levels of cognitive according to Bloom in Anderson and Krathwol (2010) consists of C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (evaluate) and C6 (creating). Mastery of the concept in question in this research is the students' ability to understand, implement, analyze and create the concept of classification of living things and the cell both in theory and in practice in our daily lives.

So far it has not provided information that explains how to form scaffolding corresponding to the content of science (biology), and how the implementation steps, this research will develop the science teaching biology to train the ability to think and complete the mastery of concepts for junior high school students with learning steps adjusted the curriculum in 2013.

II. Method

This study included research and development (Educational Research and Development), which produced products such model of learning through the process of testing the validity, practicality and effectiveness of the model. The procedure consisted of several stages of preliminary studies, model development, model validation, operational models, validation tools, and empirical validation. This validation used to assess the feasibility of science teaching device that has been developed consisting of sheet validation lesson plans, Student Activity Sheet validation, and validation of student books. This validation sheet given to faculty experts who are competent in their field. Validation device aimed to produce learning tools that have been revised based on input from experts. This stage included the validation by experts (Lecturer) and teacher (Practitioner).

The validity of the learning device was determined based on the average total score with reference to the validity criteria in Table 1

Table 1. Criteria for assessment validation learning device

Interval score assessment	Category ratings
3,25 < Score ≤ 4,00	Very Valid
2,50 < Score ≤ 3,25	Valid
1,75 < Score ≤ 2,50	less valid
1,00 < Score ≤ 1,75	Invalid

modified from: Ratumanan dan Laurens 2011

III. Result and Discussion

Learning media are developed that material and cell classification of living things. RPP device developed four validator validated by experts and four teachers of (practitioners). The results of the validation Learning Implementation Plan (RPP) for each validator presented in Table 2 and Table 3. The average score for the validator RPP consisted of goals (90.6%), the materials studied (89.06%), language and time allocation (90.6%), and the method of presentation (97.2%), while teacher

assessment consisted of goals (81.25%), the materials studied (97%), language and time allocation (93.75%), and the method of presentation (97.2%). The tests showed that the RPP has been developed valid and feasible to use by the teachers in the school to support the implementation of the model.

RPP developed following the guidelines of making RPP in regulation of the Minister of Education and Culture No. 58 of 2014 concerning the curriculum in 2013 SMP / MTs. Learning steps in the RPP has been adapted to the steps in the syntax of the SMART model. Scenarios on RPP was based on three phases of activity, namely preliminary activities, core activities, and closing activity. Preliminary activities included providing motivation and apersepsi. Motivation in learning activities contained in the desire of individuals to stimulate a person to perform actions (George R. Terry in Riduwan, 2007). Core activities included the phases of the "SMART": 1) Serve phenomenon phase made to attract the attention of students by giving examples / modeling through analogy dish concept to be covered for beginning students to gain knowledge through observation (observational). In accordance with the opinion expressed by Bandura that observational learning is learning that includes the acquisition of skills, strategies, and beliefs by observing others (Santrock. 2011). 2) Propose and formulate questions phase made to steer students toward problems by asking questions that would raise ideas that students could build knowledge within himself through discussion so that students find meaningful information for himself. As noted by the Personal (2011, p. 159) that "learning theory constructivist do with facilitating students to acquire learning experience that can be used to establish the meaning of the knowledge that is being studied". At the time of formulating the question, the students began to identify new things that did not exist in the cognitive structure. Some of the activities that were essential in building knowledge among others to ask questions, gain knowledge, and test the knowledge they have learned (Dewey, Piaget, Vigotsky). 3) Exploration activities phase designed to collect as much data as possible, students worked in groups to observe the grain analogy with the help of teachers at the beginning of learning and gradually transferred responsibility for the students' own work, as proposed by Slavin. 4) Report phase (drawing conclusions and preparing the report) aimed to provide opportunities for students

to formulate conclusions based on the data that has been analyzed to identify the various information and find their own new concepts. Final activity ie, 5) Apply the findings in a new context phase aimed to provide opportunities for students to apply the concepts they have acquired in various situations for example, evaluation and administration tasks.

Results validator expert assessment of the lesson plan using the analogy aided Scaffolding Learning Model "SMART" to the material classification of living things as much as four RPP and RPP as much as a cell material. Results of votes on the four RPP validators are presented in Table 2.

Table 2. Results of validator expert assessment of the RPP concept of classification of living things and the cell

Num	Aspects observed	Assessment of Validator				Average	%	Inform
		I	II	III	IV			
I	**Tujuan**					**3,6**	**90,6**	**Very Valid**
	1. Ability contained in the basic competencies	4	4	3	4	3,7	93,7	
	2. The accuracy of the translation of basic competencies to indicators	4	3	3	4	3,5	87,5	
II	The material studied					**3,56**	**89,06**	**Very Valid**
	1. Suitability of the concept with the purpose	3	4	4	3	3,5	87,5	
	2. sequence concept	4	3	3	4	3,5	87,5	
	3. Exercises that support materials in accordance with the purpose	4	3	3	4	3,5	87,5	
	4. The task given to support materials	4	3	4	4	3,7	93,75	
III	Language and time allocation					**3,62**	**90,6**	**Very Valid**
	1. The precision of language use	4	3	3	4	3,5	8,75	
	2. The timeliness for each stage	4	4	3	4	3,75	93,75	
IV	**Method of Presentation**					**3,88**	**97,2**	**Very Valid**

1.	Suitability order presentation	3	3	3	3	3	
2.	Giving guidance / assistance to work LKS	4	4	4	4	4	100
3.	Provides an opportunity to think, to work independently or work with groups	4	4	4	4	4	100
4.	Provide opportunities for students to ask and answer questions	4	4	4	4	4	100
5.	Provide an opportunity for teachers to guide / help students understand concepts through analogies	4	4	4	4	4	100
6.	Providing opportunities for students to analyze the observed data	4	4	4	4	4	100
7.	Providing opportunities for students to present their group work	3	4	4	3	3,5	87,5
8.	Providing opportunities for students to respond to his presentation	3	4	4	3	3,5	87,5
9.	Teachers check students' understanding through a given task	4	4	4	4	4	100

Ratings teacher (practitioner) against the lesson plan based on the description of the assessment scale (1 = not implemented, 2 = Less implemented, 3 = implemented, 4 = very well done) are presented in Table 3. The mean achievement for a goal (3.25), the material being studied (3.88), language and time allocation (3.5), and the method of presentation (3.94). Based on the assessment criteria that aspect contained in the RPP done well. This shows the lesson plans outlined in the RPP can be used to support the implementation of learning model "SMART" in junior high school.

Table 3. Results of the assessment of teachers' (practitioner) against RPP concept of classification of living things and cells.

Num	**Aspects observed**	**Teacher Ratings**				**Average**	**%**	**Inform**
		I	**II**	**III**	**IV**			

I	**Purpose**					**3,25**	**81,25**	**Reached**
	1. Ability contained in the basic competencies	3	3	3	3	3	75	
	2. The accuracy of the translation of basic competencies to indicators	3	4	4	3	3,5	87,5	
II	**The material studied**					**3,88**	**97**	**Reached**
	1. Suitability of the concept with the aim	4	4	4	3	3,75	93,75	
	2. sequence concept	3	4	4	4	3,75	93,75	
	3. Exercises that support materials in accordance with the purpose	4	4	4	4	4	100	
	4. The task given to support materials	4	4	4	4	4	100	
III	**Language and time allocation**					**3,5**	**87,5**	**Reached**
	1. The precision of language use	3	3	4	4	3,5	87,5	
	2. The timeliness for each stage	3	4	3	4	3,5	87,5	
IV	**Method of Presentation**					**3,94**	**98,5**	**Reached**
	1. Suitability order presentation	3	4	3	4	3,5	87,5	
	2. Giving guidance / assistance to work LKS	4	4	4	4	4	100	
	3. Provides an opportunity to think, to work independently or work with groups	4	4	4	4	4	100	
	4. Provide opportunities for students to ask and answer questions	4	4	4	4	4	100	
	5. Provide an opportunity for teachers to guide / help students understand concepts through analogies	4	4	4	4	4	100	
	6. Providing opportunities for	4	4	4	4	4	100	

	students to analyze the observed data						
7.	Providing opportunities for students to present their group work	4	4	4	4	4	100
8.	Providing opportunities for students to respond to his presentation	4	4	4	4	4	100
9.	Teachers check students' understanding through a given task	4	4	4	4	4	100

Student activity sheet used in this study consisted of 6 student activity sheets they are: student activity sheet 01 (Fundamentals of classification of living things), student activity sheet 02 (Key of determination), student activity sheet 03 (Grouping plants), student activity sheet 04 (Grouping of animals), student activity sheet 05 (Structure and function of cells), student activity sheet 06 (Differences in animal cells and plant cells). Student activity sheet which was developed following stages SMART learning model that includes what students should do includes observe, perform and analyze. Feature of student activity sheet that was developed wass for student activity sheet 1 assistance / guidance given in the form of a question, make a table, make conclusions and others were all still listed in the student activity sheet with the help of the teacher, for the rest of student activity sheet aid has been reduced until eventually the students could do it themselves without the help of teachers like to formulate questions, create tables, drawing conclusions and others.

The results of the expert assessment of the student activity sheet (LKS) on the material classification of living things and the cells are shown in Table 4. Based on the average ratings validator for the organization LKS (3.60), and the question (3.42) thus categorized as very valid. Multiple input / suggestions validator includes: 1) LKS concept of classification of living things from three LKS should be broken down into four LKS, the concept of a cell of a worksheet split into two, 2) in giving the name of the image should be consistent, 3) practice in making key dichotomy was too complex , should be simplified, 4) preferably in the LKS 03 and

04 were equipped with pictures of animals and plants that were in the neighborhood of students, 5) need to be included numbering on each LKS, 6) before the colons did not need spaces.

Table 4. Results of votes against LKS expert validator concept of classification of living things and the cell

Num	Aspects observed	Assessment of Validator				Average	%	Inform
		I	II	III	IV			
I	**Organization and Content LKS**					**3,60**	**90**	**Very Valid**
	Sequence material	3,33	4,00	4,00	4,00	3,83	95,75	
	Working order	3,33	4,00	4,00	4,00	3,83	95,75	
	Truth concept	3,00	3,00	3,00	4,00	3,25	81,25	
	Clarity image	3,00	4,00	3,00	4,00	3,5	87,5	
II	**Question**					**3,42**	**85,5**	**Very Valid**
	Conformity with objectives (indicators of learning)	3,33	4,00	3,00	4,00	3,5	87,5	
	Stimulate students to think	3,33	4,00	3,00	3,00	3,25	8125	
III	**Readability/ clarity of language**	3,33	4,00	3,00	4,00	**3,5**	**87,5**	**Very Valid**

Help and guidance on each LKS made different. Teachers' Assistance / guidance were more in LKS 01 and LKS 02 compared with LKS LKS 03 and 04, while for LKS 05 there was more help / guidance compared to LKS 06. This was in accordance with the opinion of Bruner (in Oakley, 2004) that for spur increased confidence begins with providing initial tasks that can be done with a little help to students. Prepare assistance that enables students to complete the task quickly, so the motivation of students looked up to the next task. LKS used in this learning activity was useful to provoke students to actively engage with the material covered. LKS should guide students to perform certain activities, so that at the end of the activity, students could master one or more basic competence. Prastowo (2011: 206) argues that through the worksheets, teachers got a chance to lure students to actively engage with the material covered. Based on these opinions can be concluded that

the LKS is very important for learning activities, among others, to enable students to learn and facilitate students to understand the material given.

Ratings teacher (practitioner) to Student Worksheet presented in Table 5 mean achievement for the organization and content of LKS (4.00), and the question (3.5) by category implemented. Multiple input / suggestions practitioners include: 1) the material classification of living things use an image known by the students, should be contained in the environment around the student, 2) on LKS 05 analogy cell material using a known image of students.

Table 5. Results of the assessment of teachers' (practitioner) against LKS concept of classification of living things and the cell

Num	Aspects observed	Teacher Ratings				Average	%	Inform
		I	II	III	IV			
I	**Organization and Content LKS**					**4,00**	**100**	**Reached**
	Sequence material	4,00	4,00	4,00	4,00	4,00	100	
	Working order	4,00	4,00	4,00	4,00	4,00	100	
	Truth concept	4,00	4,00	4,00	4,00	4,00	100	
	Clarity image	4,00	4,00	4,00	4,00	4,00	100	
II	**Question**					**3,5**	**87,5**	**Reached**
	Conformity with objectives (indicators of learning)	3,00	3,00	3,00	3,00	3,00	75	
	Stimulate students to think	4,00	3,00	4,00	4,00	3,75	93,75	
III	**Readability/ clarity of language**	3,00	4,00	4,00	4,00	**3,75**	**93,75**	**Reached**

Validator assessment results to guide students in learning model SMART to see three components, namely the feasibility of the content, language feasibility, and feasibility of the presentation. Results validator judging the students' books are listed in Table 6. note that the average score of students by the book validation validator for the content components (3.56), linguistic (3.56) and the shape / appearance overall (3.75). Based on the validation of the assessment criteria it was considered as valid student book. The results of the assessment of the students' books recommended validator eligible to use in research.

Student book is a very important element in learning. Student book in question is a set of materials arranged in a systematic in writing so as to create the environment / atmosphere that allows students to learn. Without the presence of the student book, impossible learning objectives will be achieved and the basic competencies mastered by students. As stated by Mahmood (2011) states that the students' books as part of a curriculum that is a major component in the learning process in class to achieve the learning objectives. Student books created in an innovative and attractive will be very useful for students that learning becomes more interesting activities, students have opportunities to learn independently and find it easy to learn each competency to be mastered. It is as proposed by Prastowo (2011: 211) that every teacher should be able to prepare and make the students themselves innovative book for learning to be interesting.

Table 6. Results of the assessment of the validator Student Book

Num	Aspects observed	Assessment of Validator				Average	%	Inform
		I	II	III	IV			
I	**Component Content**					**3,56**	**79,7**	**Valid**
1	The suitability of the material to the basic competencies and learning indicators	4	3	3	4	3,5	87,5	
2	Breadth of material	3	4	3	4	3,5	87,5	
3	Organizing the material	4	4	4	4	4,00	100	
4	Compliance with the development of science	3	4	3	4	3,5	87,5	
5	Scope of material	4	4	4	4	4,00	100	
6	Coherent concept	4	4	4	4	4,00	100	
7	Presents examples that are relevant to everyday life	3	3	3	3	3,00	75	
8	freshness reference	3	3	3	3	3,00	75	
II	**Linguistic**					**3,56**	**79,7**	**Valid**
1	Compliance with the level of student thinking	3	4	3	4	3,5	87,5	
2	Information is easy to understand	3	4	3	4	3,5	87,5	
3	The accuracy of sentence structure	3	4	3	4	3,5	87,5	
4	Standard terminology	3	3	3	3	3,00	75	

5	Links between sub subject	4	4	4	4	4,00	100	
6	Grammatical correctness	4	4	4	4	4,00	100	
7	Clarity image	4	4	4	4	4,00	100	
8	Consistency use of the term	3	3	3	3	3,00	75	
III	**Shape / overall appearance**	**4**	**3**	**4**	**4**	**3,75**	**92,5**	**Valid**

Based on Table 6 ratings teacher to guide students on average for the contents of the component aspects (3.68), linguistic (3.59), and the shape of the overall appearance (3.75). Some suggestions from the teacher (practitioner) include: 1) the terms used in the book should be easily understood by students, 2) add material on morphological features of plants such as roots, stems and leaves. Results of the assessment of teachers to guide students recommended could be used in research.

IV. Conclusion

This results of this product development research was learning device. Learning device developed, namely the concept of classification of living things and the cell consisting of lesson plans, worksheets, and student books. This validation was used to assess the feasibility of learning science that has been developed which aimed to produce a device that learning science could be implemented in schools, especially secondary school.

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