

STUDENTS' RESPONSE TOWARD THE DEVELOPMENT OF STUDENT WORKSHEET WITH PROBLEM BASED LEARNING IN COMPARISON MATERIAL AT CLASS VII-1 OF SMP NEGERI 1 KUANTAN MUDIK

Syarifah Nur Siregar^{}, Syofni, Metti Sukri, Titi Solfitri*

FKIP Universitas Riau

Kampus Bina Widya Km.12,5 Simpang Baru, Pekanbaru, Indonesia

**e-mail: syarifahnur.siregar@lecturer.unri.ac.id.*

Abstract— *This study aimed to determine students' responses toward the development of student worksheet with problem based learning model in the comparison material. This study used 4-D model of development that consisted of four stages, namely the definition, design, development, and disseminate. Data collection instruments were sheets of validation and questionnaire of students' responses. The questionnaire of students' responses used Guttman scale consisting of 20 items of positive and negative statements. Grain statement was based on the aspects of accuracy, conformity with learning models, as well as the fulfillment of the terms of didactic, construction, and technical. Before tested to students, the student worksheet has been validated by three experts on mathematics education with very valid results (3.73). The student worksheet trial conducted to 32 students of class VII-1 SMPN 1 Kuantan Mudik, Kuantan Singingi, Riau Province during the second semester of the academic year 2016/2017. After carrying out learning by using worksheets, students were given the response questionnaire. Overall, students gave a positive response to the student worksheet which amounted to 94.37% categorized as very practical. Although the student worksheet already using Indonesian referring to Spelling Enhanced, there are some students who think that they find the unknown word or term on student worksheet. However, this is not a significant obstacle in learning because the student worksheet was developed for group learning so students can discuss things they did not understand with their group members.*

Keywords: *problem based learning, students' response, students' worksheet*

Abstrak. *Penelitian ini bertujuan untuk mengetahui respon siswa terhadap Lembar Kerja Siswa berbasis Problem Based Learning yang dikembangkan. Pengembangan menggunakan model 4-D yang terdiri dari 4 tahap yaitu Definition, Design, Development, dan Disseminate. Pengumpulan data menggunakan lembar validasi dan angket respon siswa. Angket respon siswa menggunakan skala Guttman yang terdiri atas 20 item berisi pernyataan positif dan negative. Item pernyataan didasarkan pada aspek akurasi, kesesuaian dengan model pembelajaran, serta pemenuhan syarat didaktik, konstruksi, dan teknis. Sebelum diuji kepada siswa, lembar kerja siswa divalidasi oleh tiga ahli pendidikan matematika dengan hasil yang sangat valid (3,73). Uji coba lembar kerja siswa dilakukan kepada 32 siswa kelas VII-1 SMPN 1 Kuantan Mudik, Kuantan Singingi, Provinsi Riau pada semester II tahun akademik 2016/2017. Setelah melakukan pembelajaran dengan menggunakan lembar kerja, siswa diberi angket respon. Secara keseluruhan, siswa memberikan respon positif terhadap lembar kerja siswa yang berjumlah 94,37% tergolong sangat praktis. Meskipun lembar kerja siswa sudah menggunakan bahasa Indonesia yang mengacu pada Ejaan yang Disempurnakan, ada beberapa siswa yang menemukan kata atau istilah yang tidak diketahui pada lembar kerja siswa. Namun, ini bukan masalah karena lembar kerja siswa dikembangkan untuk pembelajaran kelompok sehingga siswa dapat mendiskusikan hal-hal yang tidak mereka mengerti dengan anggota kelompok mereka.*

Keywords: *problem based learning, students' response, students' worksheet*

INTRODUCTION

Mathematics learning objectives mandated by the curriculum can be achieved by optimal if constituted with a good lesson planning. One of the important planning done by teachers are developing teaching materials or learning resources that match the curriculum mathematics. One source of learning for students is the student worksheet. Student worksheet is a guide used by students to conduct an inquiry or problem-solving (Trianto, 2007). Good student worksheet to be able to encourage the active participation of students and to develop a culture of reading and writing. In addition, the development of student worksheet should consider linkages and integration between basic competence, materials and learning activities. Student worksheet usage is expected to increase students' independence in learning, confident, disciplined, responsible, and able to take decisions.

However, reality shows that the use of student worksheet in mathematics learning is still limited. The findings are based on observations carried out at several secondary schools in Kuantan Singingi of the year 2016. The teacher does not use student worksheet because teachers have not been able to design student worksheet ability to accommodate the needs of students to learn more actively, so that teachers could use the book Student Worksheet outstanding on the market. The book of Student Worksheet contains only a summary of the material and collection matters. Student worksheet like this do not provide learning experiences for students and does not promote the development of the ability to think for student worksheet does not contain learning activities that involve students directly in finding and applying mathematical concepts.

According Prastowo (2011), student worksheet consists of six main elements,

namely: title, learning instructions, basic competence or subject matter, supporting information, task or work steps and assessment. Meanwhile, if viewed from the format, student worksheet least contains eight elements, namely, title, basic competencies to be achieved, the time of completion, equipment/materials required to complete the task, brief information, action steps, a task that must be done, and the report should be done.

By using the student worksheet is expected to be more focused and mathematics learning can help students implement the knowledge gained in everyday life. There are many ways that can be done to develop student worksheet be such. One of them is to apply the characteristics of Problem Based Learning (PBL) in the presentation of the material student worksheet. PBL is a learning activity that starts from the problems found in the work environment. Savoie and Hughes (in Wena, 2011) states that PBL has several characteristics, namely: (1) Learning begins with a problem; (2) The problem that is given should relate to the real world students; (3) Organizing learning around problems, not around disciplines; (4) Provide a great responsibility to the students in the form and operate directly the learning process; (5) To encourage cooperation by creating study groups; and (6) Wish all students demonstrate their learning through a product or performance.

Through PBL students play an active role because they were given the freedom to study and resolve the problems posed. Arends (in Warsono and Hariyanto, 2012) argues that the model PBL is a learning model which is based on constructivism and accommodate student engagement in learning and engage in problem solving context. Ibrahim and Nur (in Rusman, 2013) also suggested that PBL is a learning model that is used to stimulate students' higher-order thinking in a situation-

oriented real-world problems, including how to learn.

PBL started with the solution presents a real problem requiring the cooperation of students, teachers guide the students to describe troubleshooting plan into phases of activity, the teacher provides examples of the use of the skills and strategies necessary so that the task can be completed. Teachers create a classroom atmosphere that is flexible and oriented towards the investigation by the student. Through PBL, the subject matter associated with the real context of the students, to be more easily understood, making learning more meaningful. Application of PBL done systematically group work, so students can empower, honing, testing, and develop the ability of thinking sustainably.

In mathematics, one of the subjects taught in class VII is a comparison. Material comparison is one of the foundations for studying mathematics and science which can be used in various situations in everyday life (Utari, Princess, and Hartono, 2015). Results of Rahmawati reseach (2015) showed that students had difficulty in determining which is worth ratio (worth) and which are turned comparison value (turn the price). Comparison of the mathematics associated with problem solving and domain activities involving counting in fractions, percents, speed, geometry, algebra, odds, statistics and congruency (Dole, Wright, Clarke, and Campus, 2009). According to Van de Walle (2008), the material should be explored informally comparison because students can construct their own and use his reason to solve the problem. Problems comparisons can be explored include situations involving measurements, pricing, geometry, speed, and so forth.

It is therefore necessary to develop student worksheet to enhance the activity and independence of students so that students feel challenged to make a solution to the problem.

This study aims to investigate the response of student at class VII.1 SMP Negeri 1 Kuantan Mudik toward development of student worksheet with the adoption of PBL in comparison material. Students' response to development the student worksheet is seen as a response to the application students worksheet that emphasize students' independence in learning.

According Sujanto (2004) response/feedback observation picture is living in self-awareness after observing. Kartono (1996) states that the response is the impressions experienced if the stimulus is gone. So the observation process has stopped and only live impressions only. According Soemanto (2006), the response is the shadow of the impression produced from observation, the impression of the contents of consciousness can be developed in conjunction with the context of the experience of the present and anticipated situation for the future. The response is an impression that appears in consciousness that espoused or may also be obstacles. Support for the response will be the cause of pleasure (positive) while the barrier will cause annoyance (negative). On a positive response, then the behavior tendency is to accept, approve, and implement. While the negative response there will be a tendency of behavior in the form of rejection, do not like, and avoid objects in front of him. In this study, the students' responses to development of student worksheet impression is positive or negative impressions that arise when students learn using the student worksheet.

RESEARCH METHODS

This research is the development of the use of the 4D model design Thiagarajan (in Arifin, 2011), which consists of four stages: Define, Design, Development, and Disseminate. However, this study is limited to only develop phase, while phase disseminate not done for several reasons.

In the define phase, the researchers analyzed the problem, analyze the characteristics of the students, analyze the task, analyze concepts, and specify the purpose of development. Furthermore, at the design stage, researchers collected reference, designing student worksheet, designing sheet validation, and design a student questionnaire responses. At the stage of development, researchers developed the student worksheet according to the preliminary draft, validate and revise of student worksheet, and conduct trials.

The instrument used in this study is a validation instrument and the instrument practical. Instrument validation form validation and instrument practical sheet form student questionnaire responses and interview guidelines. Experts and practitioners selected as the validator is a lecturer at Mathematics Education Department FKIP University of Riau and mathematics teacher of SMP Negeri 1 Kuantan Mudik. Respons' questionnaire given to the students at class VII-1 SMP Negeri 1 Kuantan Mudik. While the interview guidelines used researchers to obtain more information about the development of the student worksheet.

Data analysis technique is done by the analysis of the validity of the student worksheet and student worksheet practicality analysis. The validity of the analysis done by calculating the results of the assessment validators using a Likert scale with four scale, ie 1, 2, 3, and 4. While the practicality of the analysis done by calculating the results of the assessment questionnaire responses of students using Guttman scale consisting of two alternative answers, ie Yes or Not.

Results and Discussion

In the define phase, after analyzing the problem, the researchers conducted analysis of the characteristics of students who indicate that the class VII student's own ability to think abstractly, reason logically, and to draw

conclusions. Then the researchers analyzed the tasks that determine KD and indicators of achievement of competencies. KD knowledge used is KD 3.8 that difference comparison worth and turn the value of using tables, graphs, and equations. While the skill is being used KD 4.8 that resolve issues related to the comparison of worth and value turns ratio. Further analysis and prepare a concept to develop the concepts of comparison of what should be owned by the students. Based on the task analysis and the analysis of the concept described learning objective comparison that students may find the concept of comparison, comparative worth, the comparison turns the value and scale, and can solve daily problems associated with the concept of comparison, comparative worth, the comparison turns value, and scale.

At the design stage, the activities carried out by researchers is collecting references and designing the student worksheet. In addition, the researchers also designed a validation sheet and student questionnaire responses. Once the design is complete, then proceed to development stage. In accordance with the initial draft, the researchers developed the student worksheet. The student worksheet subsequently validated by three validator. The results of the assessment are presented in Table 1.

Table 1. Results of student worksheet validation

Rated aspect	Assesment			Mea n
	1	2	3	
Worksheet material quality	3.4	4	3.88	3.78
Worksheet conformity with problem based learning	6			
Language	3.9	3	4	3.63
Worksheet presentation	3.2	3.6	4	3.62
Graphic	5			
	3.8	3.7	3.87	3.83
	7	5		
	4	3.4	4	3.81

The student worksheet validity of the data obtained from the validation sheet categorized as very valid. This is shown by the values obtained for each aspect ranged from 3.62 to 3.83. The average value of the validator is 3.73. It can be concluded that the presentation of the material on the student worksheet is accurate and in accordance with the purpose of learning, presentation materials referred to the characteristics of PBL, the language used in accordance with the enhanced spelling (EYD), as well as display student worksheet already meet aspect of graphic.

Furthermore, researchers tested the student worksheet to class VII-1 SMP Negeri 1 Mudik Kuantan, Kuantan Singingi District, Riau Province amounted to 32 people. After the student worksheet tested, researchers gave questionnaires to students. In the questionnaire there are two types of statements are positive and negative statements. For positive statements, answer yes and the answer is worth 1 Not worth 0. As for negative statements, applies vice versa. Student response assessment results are presented in Table 2.

Table 1. Results of student questionnaire responses.

Rated Aspect	Percentage (%)	Criteria
Language	84.38	Practical
Worksheet presentation	93.75	Very Practical
Worksheet content	93.75	Very Practical
Image	100	Very Practical
Cognitive Competencies	96.88	Very Practical
Affective Competencies	100	Very Practical
Psychomotor Competencies	96.88	Very Practical

From Table 2, it can be concluded that the student worksheet with model PBL in

comparison material have a very good level with the practicalities of the average response of the students reached 94.37%. Practicality level of student worksheet to every aspect range from 84.38% to 100%. In addition to providing a questionnaire, the researchers also conducted interviews in the form of a discussion with the student to obtain more accurate data.

Based on the assessment questionnaires and interviews with students illustrate the students' response to the development of student worksheet with PBL in the comparison material, as follows:

a. Aspects of Language

Aspects of language were represented by the statement number 2, 4, 10, and 16. According to the students, they find the unknown word or term on student worksheet, so they have trouble understanding the sentence to perform the activities contained in the student worksheet.

b. Aspects of Student Worksheet Presentation

The student worksheets presentations aspect was represented by the statements numbers 1 and 8. In general, the students said that the display cover and contents of student worksheet was interesting. The student worksheet presentation of full color makes the display student worksheet becomes more varied so that students are eager and able to eliminate boredom when reading the student worksheet. However, due to the design of all of student worksheet were same, so there are four students who said the view LAS tend to be monotonous.

c. Aspects of The Student Worksheet Content

The student worksheet contents associated with exposure to the concepts of comparison that can be constructed by the students through problem-solving activities. The student worksheet contents aspect were represented by the statement

of the number 7 and 12. According to the students, the activities contained in the student worksheet help students to discover the concept of comparison. However, there are still 12.5% of students who are confused in finding the concept.

d. Aspect of Image

Aspects of image represented by the statements number 9 and 14. According to the students, the images on the student worksheet according to the problem, so the images can help the visualization and imagination of the students to solve problems. In addition, the images presented on the student worksheet were very clear and can be found in real context.

e. Aspects of Cognitive Competence

Statement number 13, 17, 18, and 20 on the questionnaire aimed to look at students' cognitive competence in the use of the student worksheet. According to the students, using the student worksheet, students more easily understand the material comparisons. It is helped students solve the problems contained in the student worksheet. Only four students say that the problems in the student worksheet difficult to done.

f. Aspects of Affective Competence

Affective competencies aspect was represented by the statement number 3 and 15. According to the students, learning by using student worksheet growing motivation and curiosity and trained students to work together. it is because the activities contained in the student worksheet requires students to discuss the group so that students can exchange ideas and cooperate in doing each activity.

g. Aspects of Competence Psychomotor

Statement number 5, 6, 11, and 19 on the questionnaire aimed to look at the competencies of students psychomotor skills in solving problems. According to students, the problems contained in the

student worksheet can be solved because steps to resolve the problem systematically arranged. Problems found in student worksheet is a problem that is often encountered in daily life so that students feel they became aware of the benefits of comparative study material

Although the student worksheet has been developed using Indonesian referring to Spelling Enhanced, there are still some students who do not understand some of the words/terms and sentences in student worksheet. This has led to confused students to perform troubleshooting steps and measures the concept of the invention. But this can be resolved by the draft student worksheet should be done in groups so that students can exchange ideas and discuss to resolve the problem.

Overall, the students' response to the development of the student worksheet with PBL in comparison material is a very good (positive). Students claimed that the material on the student worksheet easily understood. This indicates that the student worksheet already qualified didactic. Terms didactic regulates the use of student worksheet is universal in which students are intelligent or less intelligent can use the student worksheet as very well. Students also said that the explanation of the material on the student worksheet is easy to learn because the language used is understandable. These responses indicate that student worksheet meet construction standards that the conditions relating to the use of language, sentence structure, vocabulary, level of difficulty, and clarity, essentially student worksheet should be understood by students. Students also added that the student worksheet look very attractive so that learning becomes fun using the student worksheet. It shows that technically qualified the student worksheet which emphasizes presentation of student worksheet, namely in the form of text, images, and display.

Based on the results of student responses can be concluded that the student worksheet with PBL in comparison material to students of class VII SMP/MTs have qualified didactic, construction standards, and technical requirements. This is in accordance with the opinion of Darmojo and Kaligis (in Das Salirawati, 2012) which states that in the development of the LAS must qualify didactic, construction standards and technical requirements.

CONCLUSION

This research has produced teaching materials in the form of the student worksheet refers to the curriculum 2013 with model problem based learning in comparison material for students of class VII SMP/MTs. The student worksheet considered to be valid after the validation process by experts and highly practical after tested to student of class VII-1 SMP Negeri 1 Kuantan Mudik. Students' response toward the development of student worksheet is very good (positive). The total average students' response to the student worksheet was 94.37%.

REFERENCES

- Arifin, Z. (2011). *Penelitian Pendidikan (Metode dan Paradigma Baru)*. Bandung: Rosda.
- Das Salirawati. (2017, January 16). *Penyusunan dan Kegunaan LKS dalam Proses Pembelajaran*. Retrieved from <http://staff.uny.ac.id/sites/default/files/pengabdian/das-salirawati-msi-dr/19penyusunan-dan-kegunaan-lks.pdf>.
- Dole, S., Wright, T., Clarke, D., dan Campus, P. (2009). *Proportional Reasoning. Making Connection in Science and Mathematics* (MC SAM), 1-18.
- Kartono, K. (1996). *Psikologi Umum*. Bandung: Mandar Madju.
- Prastowo, A. (2011). *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Yogyakarta: Diva Press.
- Rahmawati. (2015). *Desain Pembelajaran Perbandingan dengan Menggunakan Kertas Berpetak di Kelas VII*. Tesis. Palembang: PPs Universitas Sriwijaya.
- Rusman. (2013). *Model-model Pembelajaran Mengembangkan Profesionalisme Guru*. Jakarta: Rajawali Pers.
- Soemanto, W. (2006). *Psikologi Pendidikan (Landasan Kerja Pemimpin Pendidikan)*. Jakarta: Rineka Cipta.
- Sujanto, A. (2004). *Psikologi Kepribadian*. Jakarta: PT. Bumi Aksara.
- Trianto. (2007). *Model-model Pembelajaran Inovatif Berorientasi Konstruktivistik*. Jakarta: Prestasi Pustaka Publisher.
- Utari, R.S., Putri, R.I., dan Hartono, Y. (2015). Konteks Kebudayaan Palembang untuk Mendukung Kemampuan Bernalar Siswa SMP pada Materi Perbandingan. *Jurnal Didaktik Matematika*, 2(2):27-37.
- Van de Walle, J. (2008). *Matematika Sekolah Dasar dan Menengah: Pengembangan Pengajaran*. Jakarta: Erlangga.
- Warsono dan Hariyanto. (2012). *Pembelajaran Aktif*. Bandung: Rosda.
- Wena, M. (2011). *Strategi Pembelajaran Inovatif Kontemporer*. Jakarta: Bumi Aksara.