



The development of guided inquiry-based mathematics student's worksheet on algebra material in eighth grade students in SMP / MTs in Landak Regency

Muhammad Firman Annur^a, Pradipta Annurwanda^{a,*}, Siti Suprihatiningsih^a

^a STKIP Pamane Talino, Jln. Affandi Rani, Ngabang 79357, Indonesia

* E-mail address: pradiptamaospati@gmail.com

ARTICLE INFO

Abstract

Article history:

Received 13 November 2018

Received in revised form 26

October 2018

Accepted 2 August 2018

Keywords:

guided inquiry-based,
algebra, student's worksheet

The background of this study was the lack of the effective use of student worksheets in schools. This study was a development research. Meanwhile, the developed and tested product was in the form of guided inquiry-based worksheets on Algebra material for eighth grade of Junior High School (MTs) students. The development model was ADDIE (Analysis, Design, Development, Implementation, and Evaluation). The purpose of this study was to develop guided inquiry-based worksheets for validity, practicality, and effectiveness to help VIII grade MTs students to be more understanding on algebra material. The subject of this study was the eighth grade students of MTs 1 Landak. While the instruments used were validation and observation sheets, and learning outcome tests. Firstly, the results of instrument validation were categorized as valid with the level of material validation of 76.25% and media validation of 78.7%. Secondly, the observation result of student's worksheets implementation of practical level was 78.3%. Thirdly, the average of learning test results was 77.7 with a percentage of classical completeness of students by 80%. In brief, the test results indicated that students' worksheet is included in sufficient category.

© 2018 Published by Mathematics Department, Universitas Negeri Semarang

1. Introduction

Landak regency is one of the regencies in West Kalimantan province which is a division of Pontianak regency. Based on the Presidential Regulation Number 131 of 2015 concerning the Determination of Underdeveloped Regions in 2015 – 2019. Landak regency is one of 122 regions which is designated as underdeveloped regions. It goes without saying that the teaching demands of these areas are heavier than in developed areas. This matter seeks more attention in the field of education, especially in underdeveloped areas, namely the quality of teachers. In that case, many teachers feel uncomfortable so they prefer to teach in urban areas. Therefore, the figure of a teacher who has a willingness to teach in an underdeveloped area becomes very worth in transforming his knowledge in society.

Mathematics is one of the compulsory subjects that students must learn. It becomes very necessary

to be taught to students to equip students in order to have a logical, analytical, systematic, critical and creative thinking ability as well as the ability to collaborate (Risnawati, 2008). Students can understand concepts in mathematics if all of learning success supporting factors are well fulfilled. Indeed, the success of mathematics learning is supported by the teacher's ability to apply mathematics learning devices.

One of the learning tools that can be used to support mathematics learning is the Student Worksheet (LKS). According to Prastowo (2013), Student Worksheets are prepared and used in learning as teaching materials that can minimize the role of educators, but make students become more active. As Trianto (2011: 6) argues that if the implementation stage of direct learning begins with lecturing, providing examples of problems and exercising, then the classroom atmosphere tends to be teacher-centered and students become passive. Therefore, LKS should be able to

To cite this article:

Annur, M. F., Annurwanda, P., & Suprihatiningsih, S., (2018). The development of guided inquiry-based mathematics student's worksheet on algebra material in eighth grade students in SMP / MTs in Landak Regency. *Unnes Journal of Mathematics Education*, 7(2), 95-99. doi: 10.15294/ujme.v7i 2.25365

facilitate students to understand the material and enable student involvement in the learning process.

Furthermore, based on the results of interview with the eighth grade mathematics teacher at MTs Negeri Ngabang, it is known that students are more interested in using LKS. However, the current LKS has not been able to facilitate students' needs optimally. Otherwise, the role of the teacher is still dominant to guide students to work on LKS. Therefore, it is necessary to develop LKS that can facilitate students' needs.

Regarding to above description, guided inquiry-based mathematics worksheet becomes one of the alternative solutions to these problems. Guided inquiry-based mathematics worksheets are worksheets which contain tasks that students must work on based on the instructions of the inquiry approach. Essentially, inquiry is a discovery or investigation process. The main purpose of inquiry is to encourage students to develop thinking skills by giving questions and getting answers from them. The teacher simply acts as a facilitator and students can be actively involved to find their own knowledge. The result of Rokhmah's research (2015: 88) highlights that learning by using guided inquiry-based worksheets is able to train experimental skills with an average value of 3.53 (A- predicate). Hence, it is necessary to develop guided inquiry-based mathematics student worksheets on algebra material for eighth grade junior high school students in Landak district which are valid, practical and effective.

2. Methods

This study was a development research. The developed and tested product of this study was a valid, practical, and effective guided inquiry worksheets on algebra material for second semester of VIII Junior High School (MTs/SMP) students. The development design used was ADDIE (Analysis, Design, Development, Implementation, and Evaluation). In conduction this study, there were several steps which were done, as follows (1) the analysis was done to collect various information as a product planning material which would be developed. The analysis stages included curriculum, student and student needs analysis, (2) the design was conducted to compile guided inquiry-based worksheets framework, guided inquiry-based worksheets need maps and assessment sheets, (3) the development was conducted to write guided inquiry-based worksheets and validate before being tested, (4)

the implementation was performed to test guided supervisory worksheets, conduct tests, and distribute response questionnaires, and (5) the evaluation was performed to conduct analysis and improvement of problems which occurred during learning.

2.1. Instruments

Validation sheets were used to obtain the data of experts' validation on guided inquiry-based LKS. This instrument aimed to determine the validity value of worksheets that were developed based on competence, content, and suitability aspect with guided inquiry-based.

Observation sheets were used to see the implementation of guided inquiry-based worksheets obtained from students' input, ongoing learning activities, and input from the teacher after the learning process. The implementation of guided inquiry-based worksheets was seen from the ease of use, readability, content, and time.

Learning outcomes test was used to determine the average percentage of student learning outcomes test scores. From the test results, the percentage of students' classical completeness was obtained to determine the effectiveness of LKS.

2.2. Data Analysis

2.2.1. Validation Sheet

The validity data were obtained from the guided inquiry-based LKS validation sheet. Then the data were calculated by using the following formula:

$$tkt. val. (x) = \frac{\text{the obtained score}}{\text{the number of the highest score}} \times 100\% \quad (1)$$

The validity criteria of guided inquiry-based worksheets level which were considered sufficient to continue in the next stage if they reached more than 41.

Table 1. The Criteria of Validity Level

Criteria	Category
$0 \leq x < 21$	Invalid
$21 \leq x < 41$	Less valid
$41 \leq x < 61$	Quite valid
$61 \leq x < 81$	Valid
$81x < 100$	Very valid

2.2.2. Observation sheet

Practicality data was obtained from observation sheets of guided inquiry-based worksheets. Then

the data were calculated by using the following formula:

$$tkt\ practice = \frac{\text{the average score}}{\text{the maximum score}} \times 100\% \quad (2)$$

Table 2. The Criteria of Practicality Level

Criteria	Category
$0 \leq x < 55$	Unpractical
$55 \leq x < 65$	Less practical
$65 \leq x < 80$	Quite practical
$80 \leq x < 90$	Practical
$90 \leq x < 100$	Very practical

The criteria for the practicality level of guided inquiry-based worksheets which were considered sufficient in order to continue in the next stage if it reached more than equal to 65.

2.2.3. Learning Outcomes Test

The data of guided inquiry-based worksheets effectiveness were obtained from the test score of student learning outcomes which was carried out at the end of learning. The quality of effectiveness was determined by the percentage of completeness of student learning outcomes. The data were calculated by using the following formula:

$$Score = \frac{\text{the number of completed students}}{\text{the number of students}} \times 100\% \quad (3)$$

Table 3. The Criteria for Effectiveness Level

Criteria	Category
$0\% < x \leq 55\%$	Very less
$55\% < x \leq 65\%$	Less
$65\% < x \leq 80\%$	Sufficient
$80\% < x \leq 90\%$	Good
$90\% < x \leq 100\%$	Very good

The criteria of the practicality level of guided inquiry-based worksheets were categorized to be effective if the percentage of student completeness was at least 65.

3. Results & Discussions

3.1. Instrument Validation

Validation sheet instrument was used to determine the validity value of the developed LKS. The validators who helped in this study were 2 people, namely Agustinus Antin Urep, M.Pd. as a validator of material expert and Budi Primaono, S.Pd. as a media expert validator. The level of validity obtained from the validation sheet by material experts was 76.25%. Based on the acquisition of validity level as well as in accordance with its criteria, the validity level of the validation sheet was valid. While the level of validity obtained from the validation sheet by media experts was 78.70%. Based on that finding as well in accordance with its criteria, the validity level of the validation sheet was valid.

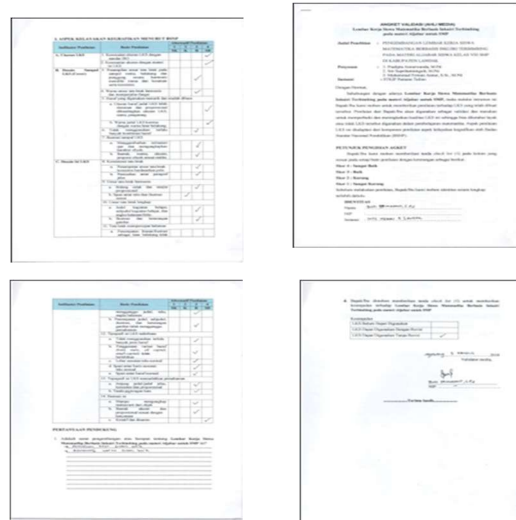


Figure 1. The Validation Results of Media Expert Validator

3.2. Guided Inquiry-based Students Worksheet (LKS)

The basic competencies that students must master in guided inquiry-based mathematics students worksheets were they are able to understand algebraic form count operations. The learning activities that students must master are first, they are able to work on addition, subtraction, multiplication, and division operations in algebra, and both students are able to express daily problems related to algebraic operations.

The guided inquiry-based mathematics worksheets of this study have 10 pages as well complete with initial illustrations, explanations of algebraic form operations, group discussions,

hypotheses, work steps, conclusions, reflections and practice questions.

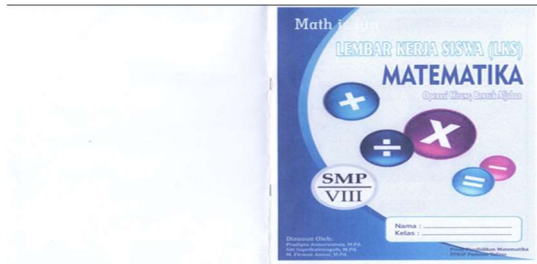


Figure 2. The Guided Inquiry Mathematical Worksheet Cover

3.3. Observation sheet

The observation sheet in this study was used to find out the implementation of guided inquiry-based worksheets which were obtained from student input, ongoing learning activities, and input from the teacher after the learning process. In this study, there were 3 indicators observed as follows: 1) interest; 2) material; and 3) language. The practicality level which had been obtained from the use of guided inquiry-based LKS was 78.3%. Regarding to that finding as well in line with the practicality level criteria, the practicality level of guided inquiry-based worksheets of this study was quite practical.

Figure 3. The Implementation Observation Results

3.4. Learning Outcomes Test

Learning outcomes test was used to determine the average test of student learning outcomes. Based on the learning that has been carried out by using guided inquiry-based worksheets, the average test of students' learning outcomes is 77.70. While the percentage of students' classical completeness after learning is 80%. Owing to that finding as well in accordance with the criteria of effectiveness, the percentage of students' classical completeness is in the sufficient category.

4. Conclusion

Guided inquiry-based LKS on Algebraic Operations material which has been produced has been through LKS quality assessment by 2 (two) validators namely validator material and media expert. In material validation, the validity level is 76.25%. Thus, the level of validity is included in the valid category. Meanwhile, the media validation level is 78.7%. This level of validity is also categorized as valid.

Based on the observation result of guided inquiry-based LKS implementation, the practicality level is 78.3%. It notes that the practicality level of guided inquiry-based worksheets used is quite practical. Even more, the observation was carried out by focusing on 3 indicators, namely interest, material, and language used.

Further, in the test of student learning outcomes, the average of learning outcomes test obtained by students is 77.7, while the percentage of classical completeness of students obtained after learning is 80%. Hence, it is included in sufficient category. Above all, these results indicate that this worksheet has been properly used in the learning process in order to facilitate the improvement of student learning outcomes.

Acknowledgment

We would like to thank Directorate of Research and Community Service, Ministry of Research, Technology, and Higher Education for funding this research and we appreciate LPPM STKIP Pamane Talio for supporting this research.

References

- Agus, N. A. (2007). *Mudah Belajar Matematika 2*. Jakarta: Pusat Perbukuan Depdiknas.
- Darmodjo. (1993). *Pendidikan IPA II*. Jakarta: Rineka Cipta.
- Departemen Pendidikan Nasional. (2004). *Pedoman Umum Pengembangan Bahan Ajar Sekolah Menengah Atas*. Jakarta: Departemen Pendidikan Nasional Direktorat Pendidikan Menengah Umum.
- Dimiyati & Mudjiono. (2009). *Belajar dan Pembelajaran*. Jakarta: Rineka Cipta.
- Hamalik, O. (2008). *Proses Belajar Mengajar*. Jakarta: Bumi Aksara.

- Pariska, I. S., dkk. (2012). Pengembangan Lembar Kerja Siswa Matematika Berbasis Masalah. *Jurnal Pendidikan Matematika*, 1(1), 75-80.
- Prastowo, A. (2013). *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Jogjakarta: Diva Press.
- Riduwan (2006). *Belajar Mudah Penelitian*. Penerbit: Alfabeta.
- Rizal, A. & Hermawati, K. (2017). Pengembangan Game Edukasi Matematika dengan Pendekatan Guided Discovery untuk Siswa Kelas VIII. *Jurnal Pendidikan Matematika*, 6(3), 1-8.
- Rokhmah, A. & Madlazim. (2015). Pengembangan Lembar Kerja Siswa (LKS) berbasis Inkuiri terbimbing untuk melatih keterampilan siswa dalam melakukan eksperimen pada materi ajar sumber energy terbarukan. *Jurnal Inovasi Pendidikan Fisika (JIPF)*. ISSN: 2302-4496. 4(2), 88-91.
- Rustaman, A. (2005). *Pengembangan Kompetensi (Pengetahuan, keterampilan, Sikap, dan Nilai) Melalui Kegiatan Praktikum Biologi*. Penelitian Jurusan Pendidikan Biologi FPMIPA UPI Bandung.
- Salama, F. S. (2016). Pengembangan Lembar Kerja Siswa Berbantuan Aplikasi Geogebra Dengan Pendekatan Penemuan Terbimbing Pada Materi Grafik Persamaan Kuadrat Di SMA. *Skripsi*. FKIP Universitas Jember. Jember, Indonesia
- Sanjaya, W. (2008). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Jakarta: Kencana Prenada Media Grup.