Development Of Work Sheet Students In Guided Inquiry Based On The Game Education Using Macromedia Flash

by s Ida Kholida 14

Development Of Work Sheet Students In Guided Inquiry Based On The Game Education Using Macromedia Flash

Development Of Work Sheet Students In Guided Inquiry Based On The Game Education Using Macromedia Flash

***S. Ida Kholida(1), Suprianto(2), I Ketut Mahardika(3)**

Physics Education, Faculty of Teacher Training and Education, Madura Islamic University (1,2)

Departmen of Physics Education, Universitas Jember(3)

Jl. Kompleks PP. Miftahul Ulum Bettet Pamekasan

Email : * sidakholida@uim.ac.id

Abstract. The use of conventional student worksheets makes students feel bored so that students' mastery of physics concepts is low. Then it takes the development of student worksheets that are oriented towards guided inquiry based on educational games. The purpose of this study was to develop an educational game-based guided inquiry student worksheet using macromedia flash, and to identify teacher and student responses to the educational game-based guided inquiry worksheet. This study uses research and development adapted from Borg and Gall. Borg and Gall developed detailed steps (1) research and information collecting, (2) planning, (3) developing preliminary forms of product, (4) preliminary field testing, (5) playing product revision, (6) playing field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, (10) dissemination and implementation. But in this study only reached stage 7 because of limited time. The average percentage score of the validator team on the worksheet of guided inquiry-based educational games gained 85.39%. The average percentage score of the validator team against the educational inquiry-based student worksheet obtained 85.39% with valid criteria. while the percentage of teacher responses to student worksheets obtained 66.67% considered very practical and 33.33% considered practical. The percentage of student responses of 45% considers very practical, 50% considers practical and 5% considers quite practical. it can be concluded that the development LKS guided inquiry-based educational game is already valid and very practical to use learning.

Key words: guided inquiry, game education, macromedia flash

1. Introduction

The effectiveness of learning activities is influenced by several factors including the source of teaching. One source of teaching that is often used by teachers in learning activities is the Student Worksheet. The use of worksheets in learning is expected to make a positive contribution and time becomes more effective, towards the achievement of student learning outcomes. In addition, worksheets can be adapted

to the needs of students in the class, making it easier for them to understand physical material and help students develop their potential. The use of worksheets can also have an impact on changes in the learning process, namely from teacher-centered learning (TCL) to student-centered learning (SCL).

But in reality, based on the results of observations in the school and interviews with several teachers, the worksheet provided from the school is not the result of the development of the teacher, but the worksheet obtained from the publisher has been provided. The using of student worksheets causes the learning methods used by teachers to be monotonous so that teacher-centered learning is not student-centered. In addition, for a long time, the explanation of student worksheets with traditional learning models such as "definition-formula-example-exercise-practice" was very easy for the teacher but for students it was boring and difficult, thus affecting student learning outcomes. This makes students unable to acquire new knowledge by itself and the learning process is ineffective and inefficient, so that a good learning environment is needed to arouse students' experiences, so they can acquire new knowledge by themselves.

The implications of the above description need to be developed student worksheets that can improve students' practicum skills and be able to make students happy not saturated in learning physics, so that the learning process can be effective and efficient. One solution to this problem is to develop guided inquiry worksheets based on educational games using macromedia flash. The selection of the development of guided inquiry worksheets based on game education, given the advantages of guided inquiry that can shape students' Self Concepts, develop individual talents or abilities, give students freedom to learn on their own, and can improve mastery of physical concepts. While the educational game is a game that has been specifically designed to teach students about a particular learning, development of concepts and understanding, guiding them in practicing their abilities, and motivating them to play them [1].

This is in accordance with the results of previous studies which explained that the basic physics practicum guide based on guided inquiry can improve the hard skills and soft skills of physics education students at Madura Islamic University [2]. The use of basic physics practicum guides based on guided inquiry has a very big impact in improving students' hard skills and soft skills [3]. The results of another study also explained that the use of flash media, combined with the inquiry method is very effective in improving student learning outcomes in the cognitive, affective and psikomotrik [4].

Based on the background of the problems above, this study aims: 1) to develop a worksheet of guided inquiry students based on educational games using macromedia flash; 2) to identify teacher and student responses after using the guided inquiry student worksheet based on educational games.

This paper consists 5 sections, namely introduction, literature review, research methods, results and discussion and conclusions. Introduction describes the overview of the research. Literature review describe the concept of student worksheet, guided inquiry model, game educations and macromedia flash. The section Research Methods describes the steps of research. The results are discussed in section Results and Discussion. Finally, it is concluded in section Conclusion.

2. Literature Review

2.1. Student Worksheet

Student Worksheet is a blank sheet, form or card form to be filled by the students at work, either independently or in groups in the form of narrative and images in accordance with the instructions specified on the activity sheets [5]. students worksheet is an important component that must be done by all students in the learning process and makes students more active [6]. students worksheet is an activity sheet in which contains a step sheet of activities to complete a task that must be done by students [7]. based on the definitions of the experts it can be concluded that the student worksheet is a sheet of activities that must be done by all students either independently or in groups, which contain instructions in the form of narration or pictures so as to make students more active.

The purpose of the preparation of students worksheets, among others (1) as teaching material makes it easy for students to interact with the material presented, (2) mastery of students' concepts of the material

provided is increasing with the assignments, (3) students are trained to learn independently, (4) The assignment of tasks to students is easier for teachers to do [7].
The development of good student worksheets must meet three aspects, namely: 1) didactic aspects which include: (a) Can be used by all students by paying attention to individual differences, (b) can find concepts through emphasis on the process, (c) having a variety of stimuli through various media and student activities, (d) can develop moral, aesthetic and social communication to students; 2) aspects of construction relating to the use of language, vocabulary, sentence structure, level of difficulty, and clarity that must match the level of maturity of students; 3) technical aspects relating to writing design [8]

2.2. Guided Inquiry Learning Model

Guided inquiry can train students to build answers and think intelligently in finding various alternative solutions to problems raised by educators, develop concept understanding skills, build a sense of responsibility and train the process of conveying found concepts [9]. The guided inquiry is a learning model that trains students to identify problems, formulate problems, formulate hypotheses, collect data, verify results, and generalize conclusions gradually [10].
The characteristics of guided inquiry, that is, students learn actively and are reflected in experience, learning based on what they know, develop a series of thinking in the learning process through guidance, student development occurs in a manner gradually, have different ways of learning, and learn through social interaction with others [11]. The inquiry process consists of identifying and resolving contradictions, generalizing, concluding, and solving problems [12]. The advantage of guided inquiry is that students actively participate in learning through inquiry [13]. The positive effect resulting from active students in learning is the increase in process skills.

2.3. Games Educations

the educational game is a game that has been specifically designed to teach students about a particular learning, development of concepts and understanding, guiding them in practicing their abilities, and motivating them to play them [1]. educational game is one form of game that is used to support the learning process or develop mastery of the concept of its users through an interesting, more fun, and more creative media.

2.4. Macromedia Flash

Macromedia Flash is the latest version of Flash since it was acquired by Adobe. Macromedia Flash is an animation creation software that is often used to create interactive CDs and other media to appear more interactive. features in Macromedia Flash have very powerful and complete capabilities so they can be used in designing various applications, such as web animation, cartoons, interactive multimedia, to applications for mobile phones.
The advantage of macromedia flash is that it can produce files of small size with a type (extension) that is flexible, the use of macromedia flash programs is relatively easy to create animations. Weakness of Macromedia Flash program is that in terms of graphics that are incomplete, the menu is not user friendly, making 3D animation is quite difficult.

3. Research Methods

This research is a type of Research and Development (R&D) research with reference to the modified Borg & Gall model. R&D research is a basic research activity to obtain information on need assessment, then continued development activities to produce products [14]. Borg and Gall developed detailed steps (1) research and information collecting, (2) planning, (3) developing preliminary forms of product, (4) preliminary field testing, (5) playing product revision, (6) playing field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, (10) dissemination and implementation [15].

The study consists of two data, that 1) the qualitative data obtained from interviews and observations were analyzed qualitatively, 2) Qualitative data were converted into quantitative obtained from the assessment team of experts as well as teacher and student assessment questionnaire. Data from the validation results of the expert team's assessment of the educational game-based guided inquiry student worksheet using macromedia flash were then analyzed using quantitative descriptive analysis by averaging the scores of each component. The experts' assessment is done by giving a checklist (√) to the column that has been provided with criteria consisting of 4 categories, namely: not good (value 1), good enough (value 2), good (value 3), very good (value 4). The assessment results from these experts are then calculated using the following formula:

$$\bar{X} = \frac{\Sigma X}{N} 100\% \quad \text{..... (1)}$$

Note: $\bar{X} = a \quad s$
Σ X = total score
N = maximum value

To determine the feasibility or validity of student worksheets guided inquiry-based educational games used criteria that can be seen in the table below:

Table 1. Eligibility Criteria For Student Worksheets Guided Inquiry-Based Educational Game

Prosentase	Criteria	Annotation
80% - 100%	Valid	Well, no revision needed
60% - 79%	quite valid	good but needs a partial revision
50 % - 59%	Less Valid	poorly, needs some revision, the content is reviewed again
< 50%	Invalid	not good, totally revised or replaced

Based on the results of consultations and suggestions from the validator will be used to improve student worksheets, then the decision of the validator is used to continue the research to the testing phase with revisions or not with revisions to produce draft II. Furthermore, the draft II that has been produced will be limited to testing to see the practicality of the practicum guides developed. This trial was conducted on 2 teachers and several students. Next the teacher and students are asked to comment and fill out the questionnaire on the student worksheet that was developed. The results of the questionnaire will be analyzed later based on student direct comments and the findings in the field of educational inquiry-guided student worksheets will be revised.

4. Results and Discussion

4.1. Product Validation Analysis

This research has developed a student inquiry-based worksheet based on educational games using macromedia flash. The student worksheet developed was then validated by a team of experts consisting of 2 people for media experts and 2 people for matter experts. Based on the results of the validation by media and matter experts, the educational inquiry-based student worksheet was revised. Comments from media and matter experts are shown in Table 2.

Table 2. Comments on the validator to draft educational games and student worksheet

Validators	Comments
Media Expert 1	The educational game should not only be in the form of a quiz, but make an adventure game to make it more interesting to students but must be in accordance with the worksheets of the students.

Media Expert 2	The cover of the student worksheet is made even more interesting not only in the writing content but also in giving pictures that are appropriate to what will be practiced.
Matter Expert 1	Game instructions in the educational game don't be too formal so students feel relaxed when playing it.
Matter Expert 2	A summary of the material should not be placed on the student worksheet but will be placed in the educational game so students are more interested in reading it.

Based on the comments from the validator team in the above table, it can be concluded that the prototype of the educational game is still less interesting and should be replaced with an adventure game with clear and not too rigid game instructions. In accordance with the comments from the validator team, the educational game which was originally in the form of a quiz game was replaced with a simple adventure game. The educational game prototype and the revised guided inquiry student worksheet draft will then be assessed again by the validator team. The validator team's evaluation of the revision results is shown in Figure 1.

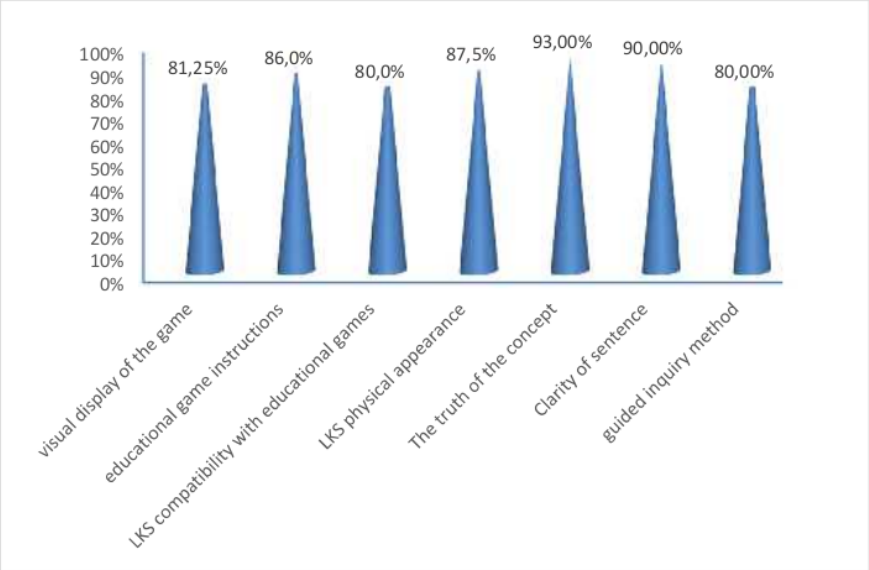

Figure 1. Average percentage of team validator ratings

In Figure 1, it appears that the draft of the student inquiry guided worksheet based on educational games using macromedia flash is feasible to use. This can be seen in the acquisition of scores for each aspect of the assessment exceeding the value of 80%, while the average percentage assessment of all aspects of 85.39%. Based on the picture above that has the lowest percentage is the suitability of LKS with an educational game that is equal to 80%, but still in the feasible category. This is in accordance with the results of the study which explains that the development of a basic physics practicum 1 guide module based on guided inquiry is appropriate for use in practicum [16]. The development of guided inquiry-based worksheets is valid, effective and practical in the study of plant movement matter [17].

4.2. Practicality Analysis Worksheet

After being declared feasible to be used by the validator team, the draft student worksheets guided inquiry-based on educational games using macromedia flash was tested on science teachers and An-Nidhomiyah Middle School students to find out the practicality of the worksheet. As for the percentage of teacher and student responses to the LKS inquiry based educational game using macromedia flash can be seen in Figure 2. Based on Figure 2, it appears that the use of educational inquiry-based supervised learning LKS based on responses by the teacher of 66.67% stated very practical, and 33.33% said practical. Whereas students' responses to educational game-based guided inquiry worksheets showed 45% assumed very practical, 50% said it was practical and 5% said it was not practical. Other studies have also explained that the student worksheets based guided inquiry practical use in the learning process [17] [16]. Student worksheets based guided inquiry also effectively used in the learning process [18].

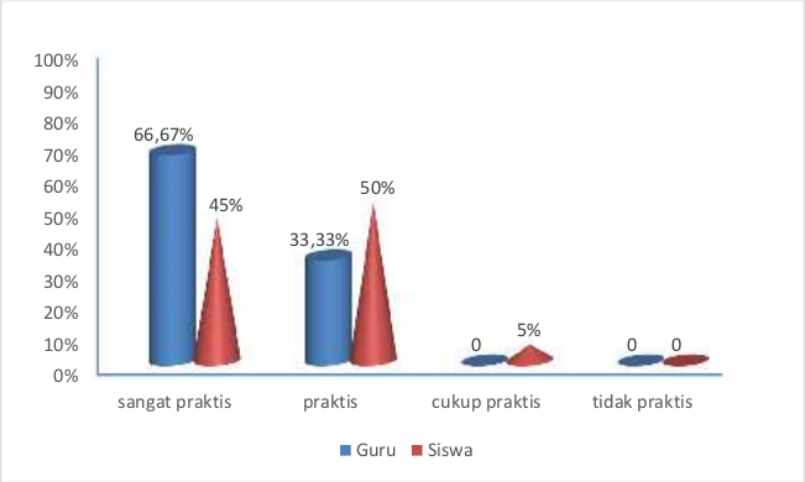

Figure 2. The response of teachers and students on worksheet guided inquiry based on educational game

In figure 2, it appears that there are some students who respond less practical use student worksheets guided inquiry-based educational games. This is because the use of guided inquiry worksheets is initially very difficult to understand, because students are familiar with using conventional worksheets. This is in accordance with the findings, [19], [20], [12], [21], that students at the beginning of learning did not enjoy guided inquiry-based learning because many of the activities they had to do themselves although at the same time, students' abilities grow and are able to build their own knowledge.

5. Conclusion

Based on all the results and data obtained after conducting research and analysis, conclusions can be drawn regarding the research that:

- The worksheets guided inquiry-based educational game using Macromedia Flash has been developed with a valid.
- Teacher and student responses to the work sheet of guided inquiry based on educational games using macromedia flash, the majority assume it is practically used in the learning process.

From the results of this study, further development and research need to be carried out by observing the use of educational inquiry-based student worksheets on the mastery of student concepts.

References

[1] D. Irsa, R. Wiryasaputra, and S. Primaini, "PERANCANGAN APLIKASI GAME EDUKASI PEMBELAJARAN ANAK USIA DINI MENGGUNAKAN LINEAR CONGRUENT

METHOD (LCM) BERBASIS ANDROID," *J. Inform. Glob.*, vol. 6, no. 1, pp. 7–14, 2015.
[2] S. Suprianto, S. I. Kholida, and H. J. Andi, "Panduan Praktikum Fisika Dasar 1 Berbasis Guided Inquiry Terhadap Peningkatan Hard Skills dan Soft Skills Mahasiswa," *Momentum Phys. Educ. J.*, vol. 1, no. 2, pp. 122–139, 2017.
[3] Suprianto, S. . Kholida, H. . Andi, and I. . Mahardika, "THE EFFECTIVENESS OF BASIC PHYSICS EXPERIMENT MODULE BASED ON GUIDED INQUIRY MODEL IN IMPROVING HARD SKILLS AND SOFT SKILLS OF PROSPECTIVE PHYSICS TEACHERS," *J. Pendidik. Fis. Indones.*, vol. 14, no. July, pp. 52–59, 2018.
[4] I. T. Aprillia, M. Nuswowati, and E. Susilaningsih, "PENGEMBANGAN MEDIA FLASH BERBASIS PEMBELAJARAN INKUIRI UNTUK MENINGKATKAN HASIL BELAJAR SISWA," *J. Inov. Pendidik. Kim.*, vol. 9, no. 2, pp. 15607–1616, 2015.
[5] D. Çelikler, "The Effect of Worksheets Developed for the Subject of Chemical Compounds on Student Achievement and Permanent Learning: Educational Research Association," *Int. J. Res. Teach. Educ.*, vol. 1, no. 1, pp. 42–51, 2010.
[6] H. Özmen and N. Yildirim, "Effect of Work Sheets on Student's Succes: Acids and Bases Sample: Turk Fen Egitimi Dergisi," *J. Turkish Sci. Educ.*, vol. 2, no. 2, pp. 64–67, 2005.
[7] A. Prastowo, *Panduan Kreatif Membuat Bahan Ajar Inovatif*. Yogyakarta: DIVA Press, 2014.
[8] Darmojo and Kaligis, *Pendidikan IPA II*. Jakarta: Dirjen Dikti Depdikbud, 1992.
[9] I. Bilgin, "The Effects of Guided Inquiry Instruction Incorporating with Cooperative Learning Environment on University Students' Achievement of Acid and Bases Concepts and Attitude Toward Guided Inquiry Instruction," *Sci. Res. Essay*, vol. 4, no. 10, pp. 1038–1046, 2013.
[10] M. B. Matthew and I. O. Kenneth, "A Study On The Effects Of Guided Inquiry Teaching Method On Students Achievement In Logic," *Int. Res. Journal, Int. Res.*, vol. 2, no. 1, pp. 133–140, 2013.
[11] C. C. Kuhlthau, "Guided Inquiry : School Libraries in the 21 st Century," *Sch. Libr. Worldw.*, vol. 16, no. 1, pp. 17–27, 2010.
[12] R. Zawadzki, "Is Process-Oriented Guided-Inquiry Learning (POGIL) suitable as a teaching method in Thailand's higher education?," *Asian J. Educ. Learn.*, vol. 1, no. 2, pp. 60–74, 2010.
[13] J. . Opara and N. . Oguzor, "Inquiry Instructional Method and the School Science Currículum," *Curr. Res. J. Soc. Sci.*, vol. 3, no. 3, 2011.
[14] W. R. Borg and M. D. Gall, *Educational research: an introduction (7th ed.)*. New York: Longman, Inc, 2003.
[15] N. Nieveen, "Formative evaluation in educational design research," in *T. Plomp & N. Nieveen (Eds.), An introduction to educational design research (pp. 89-101)*, Enschede, the Netherlands: SLO, 2010.
[16] Suprianto, S. I. Kholida, and H. J. Andi, "PENGEMBANGAN PANDUAN PRAKTIKUM FISIKA DASAR 1 BERBASIS GUIDED INQUIRY UNTUK MENINGKATKAN KEMAMPUAN HARD SKILL DAN SOFT SKILL MAHASISWA (CALON GURU FISIKA)," in *Seminar Nasional Hasil Penelitian Universitas Kanjuruhan Malang*, 2017, pp. 487–494.
[17] A. Setiowati, S. Ngabekti, and E. S. Rahayu, "PENGEMBANGAN LEMBAR KERJA SISWA (LKS) BERBASIS GUIDED INQUIRY UNTUK MENINGKATKAN HASIL BELAJAR SISWA MATERI GERAK TUMBUHAN," *J. Biol. Educ.*, vol. 6, no. 1, pp. 88–94, 2017.
[18] N. Hamidah and S. Haryani, "Efektivitas lembar kerja peserta didik berbasis inkuiri terbimbing untuk meningkatkan hasil belajar siswa," *J. Inov. Pendidik. Kim.*, vol. 12, no. 2, pp. 2212–2223, 2018.
[19] K. C. Trundle, R. K. Atwood, J. E. Christopher, and M. Sackes, "The Effect of Guided Inquiry-Based Instruction on Middle School Students' Understanding of Lunar Concepts," *Res Sci Educ*, vol. 40, no. 1, pp. 451–478, 2010.
[20] P. Brickman, B. Hallar, C. Gormally, and N. Armstrong, "Effect of Inquiry-based learning on Students' science literacy skill and confidence.," *Int. J. Scholarsh. Teach. Learn.*, vol. 3, no. 2, 2009.
[21] Minderhout and Loertscher, "Lecture-free biochemistry a process oriented guided inquiry

approach.," *Biochem. Mol. Biol. Educ.*, vol. 35, no. 2, pp. 172–180, 2007.

artikel 8

ORIGINALITY REPORT

18%	16%	12%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Negeri Surabaya The State University of Surabaya Student Paper	4%
2	eprints.uad.ac.id Internet Source	2%
3	mafiadoc.com Internet Source	2%
4	garuda.ristekbrin.go.id Internet Source	1%
5	Johar Maknun. "Implementation of Guided Inquiry Learning Model to Improve Understanding Physics Concepts and Critical Thinking Skill of Vocational High School Students", International Education Studies, 2020 Publication	1%
6	ejournal.umm.ac.id Internet Source	1%
7	iopscience.iop.org Internet Source	1%

8	eprints.uny.ac.id Internet Source	1%
9	eudl.eu Internet Source	1%
10	R.R. Sari, Abdurrahman, K. Herlina. "Development and Validation of students' Worksheet Based on Guided-Inquiry to Improve Students' Scientific Literacy Skills of Junior High School on Straight Motion Concept", Journal of Physics: Conference Series, 2020 Publication	1%
11	Submitted to Universitas Muhammadiyah Surakarta Student Paper	1%
12	staff.uny.ac.id Internet Source	1%
13	journal.unnes.ac.id Internet Source	1%
14	R P Sari, M P Hasibuan, A G Haji, Nahadi, Sofiyan. "A Development of project-based learning (PBL) chemistry worksheet to form students' habits of mind", Journal of Physics: Conference Series, 2020 Publication	1%
15	M Mujasam, A Y T Allo, M Ansaruddin. "The	1%

effectiveness of experiment-based student worksheets with map concept in understanding the physics concepts of static fluid materials", Journal of Physics: Conference Series, 2019
Publication

16	es.scribd.com Internet Source	<1%
17	ejournal.unsri.ac.id Internet Source	<1%

Exclude quotes	On	Exclude matches	< 15 words
Exclude bibliography	On		