

Development of Realistic Mathematics Learning Materials in Terms of Mathematical Literacy Skills

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ABSTRACT

Mathematical literacy is very important. This is because mathematical literacy emphasizes the ability of students to analyze, argue about ideas effectively in solving mathematical problems they encounter (OECD, 2009, p.19). Judging from various things, the ministry of education and culture has actually anticipated it by making several curriculum changes. However, in the period 2000 until now there have been three types of curriculum that have been implemented, namely the 2004 curriculum, 2006 curriculum and 2013 curriculum. And by mastering students' mathematical literacy, individuals will be able to reflect on mathematical logic to play a role in their lives, communities, and society. Mathematical literacy makes individuals able to make decisions based on a constructive mathematical mindset. Realistic mathematics learning presents a contextual problem that can be related to local excellence-based educational games. The main goal is that students have high mathematical communication skills towards mathematics. Selin, the introduction of local excellence in educational games to students through learning that can be used as a way to grow the character of students to the local culture of the nation of Indonesia. Advances in technology and information that are not balanced with strong filters will affect the lifestyle of a foreign country. In this development using procedural development model. The development model in this study led to the development model of Sugiyono (2015). However, in this study not all steps are applied, this is because the research conducted is still on a limited scale with no cover into the wider research. Therefore it stages of development begins by doing 1. Planning with identification of potential problems, 2. Create a new design, 3. Validate the design, 4. Design revision, 5. Validate the design and the last 6. Product trials.

Keywords: *Literacy, Realistic_Mathematics_Learning.*

INTRODUCTION

lesson at the level of education. Law no. 21 of 2003 concerning SIKDIKNAS article 37, explains that mathematics is one of the compulsory lessons for students at the primary and secondary education level (Najwa, 2018). Even mathematics has been introduced since kindergarten and is still studied until college. The mathematics program itself for the UK is studied by every student at the elementary and secondary level according to the regulation of the Minister of National Education of the Republic of Indonesia number 22 of 2006 as follows (Ramadani, 2014): (1) Understanding mathematical concepts, explaining the interrelationships between concepts applies concepts, flexibly, accurately, efficiently and precisely in problem solving; (2) Using reasoning on patterns of nature, performing mathematical manipulations in making generalizations, compiling evidence or explaining ideas and mathematical statements; (3) Solving problems that include the ability to understand problems, design mathematical models, classify models and interpret the solutions obtained (Satiti & Khotimah, 2021).

It is also continuous with mathematical literacy. Mathematical literacy is the application, interpretation and formulation of students in any context (Gunardi, 2017). In terms of mathematical ability, survey results of *trends in international mathematics and science study (TIMSS)* (Masjaya., 2018). Conducted every 4 tahun starting from 1999, in 2001 determined that Indonesia is ranked 36th out of 40 countries. And in 2015 the results showed that the ability of learners still did not show satisfactory

achievement results. Kemampuan mathematics learners Indonesia, only able to keep the ranking of 45 out of 50 countries, with the achievement of a score of 397 and still below the international average score, which is 500 (Pulungan, 2014).

Education can also be seen in the programmer for international student *assessment* (PISA) study report in 2005. Based on the Pisa report released in 2019, Indonesia's reading score against 72 out of 77 countries, then the Indonesian math score was ranked 72nd out of 78 countries, and Indonesia's science score was ranked 70th out of 78 countries (Pulungan, 2014). The ability of mathematical literacy needs to be improved in modern times like this to be used in solving a problem in everyday life. One alternative to solving the problem of low quality education, especially in mathematics subjects is to apply a learning approach that is beneficial to students, namely the algorithmic mathematical learning approach. Realistic math learning is one of the approaches used by teachers in math learning that can help students in providing concrete concepts of mathematics that are abstract (Khotimah, 2018).

METHOD

Research and development methods or in English called Research and Development is a research method used to produce products and test the effectiveness of products (Sugiyono, 2015). In this development using the procedural development model, in accordance with the discussions described above. That, in addition to producing procedural development products also produce product components to be developed and related to these components. The purpose of research development is to produce products where the resulting products already exist and the products are made to be perfected, so as to support mathematical learning activities in school. The product is in the form of power points and games on the development of realistic-based mathematics learning that is reviewed from students' mathematical literacy (Ramadani, 2014). Give design development research:

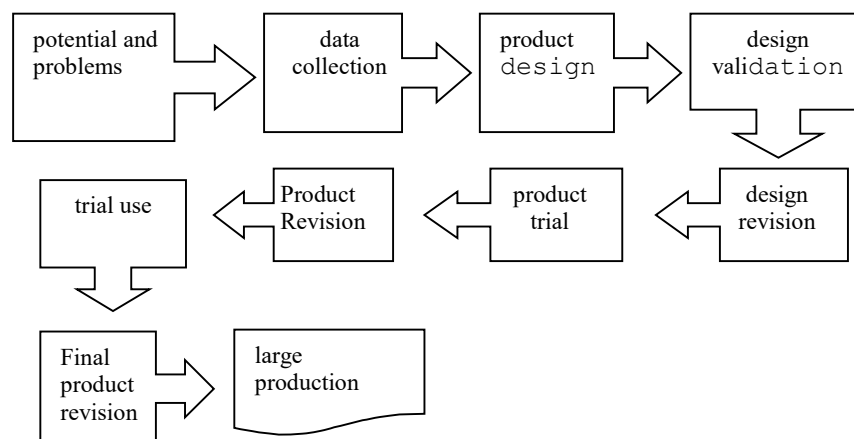


Figure 1. Design Development Research

The development model in this research leads to a development model (Sugiyono, 2015). However, in this study not all measures are applied, this is because the research conducted is still on a limited scale with no covering into the broader research. Therefore, the stages of development begin by doing 1. Planning with the identification of potential problems, 2. Create a new design, 3. Design validation, 4. Design revision, 5. Validate the design and the last 6. Product trials.

RESULT AND DISCUSSION

Result

Here are the results and discussions of the development of realistic-based matematika learning materials reviewed from students' literacy skills in accordance with the R&D method.

- Planning by Identifying Potential Problems

- Determining needs and goals

In this research it is expected that the development of media power points and games can meet and increase the power of students' interest in math learning and increasing literacy power in students in math learning.

- Formulate basic competencies and indicators

In this research, of course, must have basic competencies and indicators that must be met. In basic competence and this Indicator is in accordance with the material studied by class VIII A Junior High School Nur El-Arafah regarding Building a Flat Side Room.

- Source Material and Materials

In this research, the material was obtained through the book LKS and Google about the material Build a Flat Side Room in accordance with the Syllabus or Basic Competencies and Indicators.

- Create a New Design

At this stage is the stage of design making in the creation of PPT and design in Games with the aim to increase literacy and attractiveness in students. There are several stages in this design:

- RPP creation

In this research, the creation of learning flow is the same as making a Learning Implementation Plan or what we more often call RPP. RPP is a plan or plan of what we will do and carry out in class.

- Learning Media Creation

In this learning design using 2 learning media, namely: power point learning media and game learning media.

- Power Point design creation

Creating this Power Point is a stage in creating a mathematical learning medium in students that contains materials and summaries in math learning.

- Game Design Creation

In the making of this game is a medium to hone the power of inget in students in learning that has been presented in the material delivery media, namely power points.

- Design Validation

Before this learning media is applied in class, it needs a validation from the media and problems in learning. This validation is done by experts and questionnaires are taken from students. From the validation obtained an assessment of the media and the problems that have been developed. In validation assessments are used a reference to mathematical problems developed worthy of application in the class if the assessment is obtained at least "sufficiently valid" and has been revised in accordance with the validator.

Table 1. Validation from the media and problems in learning

No.	Percentage	Validity Criteria
1.	80%-100%	Valid
2.	60%-79%	Valid Enough
3.	40%-59%	Less Valid
4.	0%-39%	Not Valid

Based on the power point media validation stage by the Mathematics Teacher, a 98% validated percentage is obtained so that it meets the "valid" criteria. Thus it can be concluded that the media power point is valid and worthy to be implemented. In the indicator of assessment of validity there is also a component of mathematical literacy, namely the problem developed contains the following competencies. In this case, it shows that the media power points and games in knowing the development of student math literacy is appropriate to develop student mathematical literacy. In the making of desai it is known that the less interesting games are seeded, then researchers change the template of games into labyrinth games.

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

$\sum x$ = total number of answer scores

$\sum xi$ = highest total number of answer scores

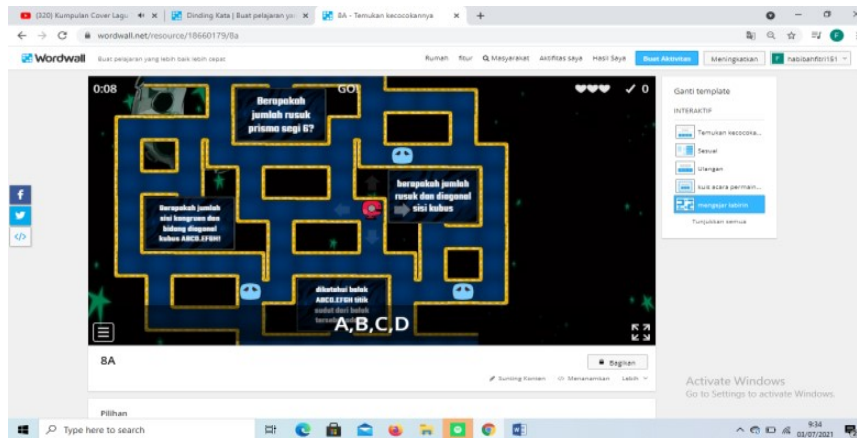


Figure 2. Learning game

After revising the learning games to make it more exciting, fun and tense. Once the learning media is ready, validation will be carried out that will be tested by students. After studying the material Build a Flat Side Room using Power Point and Games media following the results of the student response. Who uses the reference as follows:

Table 2. The results of the student responses

No.	Percentage	Student response criteria
1.	80%-100%	Good
2.	60%-79%	Pretty Good
3.	40%-59%	Less Good
4.	0%-39%	Bad

In the calculation is known the result of the questionnaire amounting to 30.3 is the total number of scrotum every aspect. While the result of 40 in the calculation above is obtained from the maximum number of scores. From the results of the calculation of the assessment from the table above obtained a total presentation of 75.75%. Based on the criteria of media eligibility, the media power points and games on the material Build Flat Side Room VIII Junior High School in the qualification strongly agree means this media is worth using for learning on math subjects.

Discussion

The trial was conducted at SMP Islam Nur El Arafah class VIII A in Villa Makmur I, Tambun Selatan, Bekasi. The student trial was conducted on student VIII A which amounted to 32 students. In this trial, researchers to manage classes in accordance with the learning implementation plan that will be implemented during 4 meetings using realistic approaches and with google class room and google meet media. At the end of the meeting students were asked to complete 10 questions in the form of self-description questions submitted online via google class room. Students are given 2 x 40 minutes to complete the problem and the student's answer results are sent via google class room. And the results of the development of R&D using the PMRI method stated that the level of literacy in Nur El Arafah Islamic Junior High School students was very good.

CONCLUSION

Based on the results of research and discussions that have been outlined, it can be concluded several things as give met:

- The development of teaching materials with Realistic attachment or PMRI for students of class VIII A is done using the RnD method consisting of stage 1. Planning with the identification of potential and problems, 2. Create a new design, 3. Design validation, 4. Design revision, 5. Design validation and 6. Product trials.
- The quality of teaching materials developed as at-give:
 - The validity of teaching materials shows the criteria "very good" with a score of 98 determined based on the results of the evaluation of teaching materials oelh math teachers

- The effectiveness of teaching materials determined based on the results of mathematical ppoteslitearsi showed the percentage completion of student learning outcomes reached 72.13%. This shows that the teaching materials developed are effectively used to facilitate the achievement of students' mathematical literacy.

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