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The Feasibility Study of Moodle-Based E-Module to Increase the Numeration Literacy of Elementary School Students

Rio Samudra Pramono[1,✉]
[1]Department of Primary Education, Universitas Negeri Semarang, Indonesia

Abstract

Numeration literacy is an ability to formulate and interpret mathematics in contexts variety, including the ability to reason mathematically using concepts, facts, procedures as a tool to describe, predict, and explain an event or phenomenon. This research aims to determine the feasibility of moodle-based e-module to increase numeration literacy for elementary school students. This study uses the Research & Development (R&D) model from Borg & Gall with ten development stages. Data collection technique using purposive sampling. The developed product was then validated by media expert, content expert, and learning expert by using instrument validation sheets that are tailored to each expert. The data on the feasibility of moodle-based e-module in the form of the percentage of e-module validity and notes from experts. The results of the feasibility of moodle-based e-module were analyzed descriptively. The result of this development research is a moodle-based e-module for 3rd grader elementary school students by a media expert obtain a very feasible level of validity with a percentage of 100%, material expert obtains a proper validity level with a percentage of 71% and learning expert with a very feasible level of validity with a percentage of 97%. These results show that the e-module developed is in the feasible criteria and can be implemented with a few revisions for the material.

Keywords: *feasibility, e-module, moodle, numeration literacy*

Uji Kelayakan E-Modul Berbasis Moodle untuk Meningkatkan Literasi Numerasi Siswa Sekolah Dasar

Abstrak

Literasi numerasi adalah kemampuan untuk merumuskan, menafsirkan, dan menggunakan matematika dalam bermacam konteks, termasuk dalam kemampuan untuk menalar secara matematis dengan menggunakan konsep, fakta, prosedur, sebagai alat untuk mendeskripsikan, memprediksi, dan menerangkan suatu kejadian atau fenomena. Penelitian ini bertujuan untuk menguji kelayakan e-modul berbasis moodle untuk meningkatkan literasi numerasi siswa. Penelitian ini menggunakan model pengembangan dari Borg & Gall dengan sepuluh tahap pengembangan. Metode pengumpulan data menggunakan *purposive sampling*. Produk pengembangan divalidasi oleh ahli media, ahli materi, dan ahli pembelajaran dengan menggunakan lembar validasi instrumen yang disesuaikan dengan masing-masing ahli. Data hasil uji kelayakan e-modul berbasis moodle berupa persentase kevalidan e-modul dan catatan dari ahli. Hasil kelayakan pengembangan e-modul dianalisis secara deskriptif. Hasil dari penelitian pengembangan ini adalah e-modul berbasis moodle untuk siswa kelas III sekolah dasar oleh ahli media memperoleh tingkat validitas sangat layak sebesar 100%, ahli materi memperoleh tingkat validitas layak sebesar 71%, dan ahli pembelajaran dengan tingkat validitas sangat layak sebesar 97%. Hasil tersebut menyatakan bahwa e-modul yang dikembangkan dalam kriteria layak dan dapat digunakan dengan sedikit revisi untuk materi.

Kata kunci: kelayakan, e-modul, moodle, literasi numerasi

✉*Corresponding Author: Rio Samudra Pramono*
Affiliation Address: Jl, Kelud Utara III, Kelurahan Petompon, Kecamatan Gajahmungkur, Kota Semarang, Jawa Tengah
E-mail: riosamudrap@gmail.com

INTRODUCTION

The Ministry of Indonesia Education and Culture has attempted to create a literacy culture by launching the literacy program namely Gerakan Literasi Nasional (GLN), a literacy program. The GLN is an implementation of ministry regulation number 23 year of 2015 about Character Education. In advance, GLN launched by the government that is implemented through elementary schools called Gerakan Literasi Nasional (GLS), a school-based literacy program. The program was interpreted as an effort made to create a literate student community and foster character for school members through various activities including reading non-learning books for 15 minutes (Prihartini, 2017).

The ability to read can be the first step in understanding other basic literacy, such as scientific literacy, numeration literacy, digital literacy, cultural literacy and citizenship and financial literacy (Ibrahim *et al.*, 2017). The basic literacy that can be applied in elementary school education is numeration literacy.

Numeration literacy is the ability to formulate, interpret and use mathematics in various contexts, including the ability to reason mathematically using concepts, facts, procedures, as a tool to describe, predict and explain an event or phenomenon (OECD, 2018). Numeration literacy is defined as an ability to use reasoning. Reasoning means analyzing and understanding a statement, through activities in manipulating symbols or mathematical language found in everyday life, and expressing these statements through written or oral (Abidin *et al.*, 2021). Numeration literacy is a part of mathematics. Thus, the components in the implementation of numeration literacy cannot be separated from the topic coverage that exists in mathematics. Mathematics is a science that deals with exact knowledge that has been organized systematically including rules, ideas, logical reasoning and logical structures (Rahayu, 2021). Numeration is a competency that includes the knowledge, skills, behaviors, and dispositions needed by students to use mathematics in a wider scope and situation (Pusmenjar, 2020).

The results of the interview, observation, and needs analysis of the Gerakan Litearsi Nasional (GLN) at SD Muhammadiyah 8 KH Mas Mansur Malang City showed that: 1) there is no numeration literacy companion module in schools, 2) in the process of implementing learning in class, only relying on textbooks and existing modules, 3) the implementation of numeration literacy has begun to appear, but is not yet optimal. Teachers are still unable to distinguish between the Numeration Literacy program and mathematics learning. According to the classroom teacher, numeration literacy is not separated from learning mathematics, but still adapts to the learning theme that will be taught on that day. The class teacher also explained that until now there was still no special module for literacy activities, especially in numeration literacy, classroom teachers only used general learning modules where numeration literacy activities were still not visible, it could even be said that they were still tied to mathematics learning. Teachers find it difficult in the learning process, so a companion module that supports learning is needed, especially to improve student numeration literacy.

The learning environment is related to the modules provided by the teacher, where the module can be arranged systematically to help teachers in learning (Hamdani, 2017). Modules can be designed to be more practical, easy to carry everywhere, do not cost a lot of money and can be used for independent study through the use of the internet and android (Zulkarnain *et al.*, 2015). Module is one of the teaching materials that helps students learn independently (Asyhar, 2012). The role of ICT in the form of e-modules is the ability to achieve learning objectives. The e-module is interactive which can display images, audio, video, animation, and equipped with formative test/quiz for which feedback can be immediately implemented (Suarsana, 2013). One application program that is good for use as a form of web-based learning and allows teaching materials to be delivered to students is by using the Moodle application.

Moodle is a Learning Management System (LMS) which plays a role in the development of a technology-based learning process in the

form of a website (Herayanti *et al.*, 2017). Through the Moodle application, teaching materials can be transformed into a web with an object-oriented model so that students can learn dynamically. Moodle has complete facilities so that it can support efficient and effective learning activities. Moodle is an open source based web application that allows educators to create teaching materials and conduct computer based tests that are freely available and accessible anywhere and by anyone (Batubara, 2018). However, for certain things this application can only be accessed by certain people according to the access rights given. Moodle provides complete features for a learning process. The features contained in the Moodle application include features for communication, creation and administration of learning materials, features to track and follow the development of the learning process. Teachers can develop learning resources with the Moodle application, because this application provides the freedom to copy, use and modify them. In Moodle, the teacher can see the activities of students online, when discussing, seeing the results of exercises and student quizzes.

With the development of moodle-based e-module, it is hoped that teachers can improve students' numeration skills. Therefore, this study aims to determine the feasibility of moodle-based e-module to get suggestions from experts so that the product can be revised and used for 3th grader at elementary school.

METHOD

Method used in this research is R & D. By using the Borg and Gall development model (Sugiyono, 2015) which includes the first steps; preliminary research (preparation, in-depth survey, needs analysis), second; product development planning (data collection, identification of products developed), third; product validation and revision (expert review, small group trial, large group trial), fourth; product implementation (planning, preparation, implementation, observation, evaluation).

In the product validation and revision stages, there is a feasibility test that is carried out by validating the e-module to experts. Media expert, namely educational technology lecturers, content expert are primary education lecturers, and learning expert, namely 3rd grade teacher. The instrument used in the research and development data collection used a questionnaire in the form of a check-list. The questionnaire has an answer in the form of a Likert scale number. The form of a questionnaire for each expert is different to collect evaluation data in the form of input, comments, criticism and suggestions from experts. The data analysis technique used is descriptive qualitative and quantitative descriptive. Qualitative data will be used as suggestions for product improvement. Meanwhile, quantitative data will be calculated using the percentage formula. The percentage scale table for the feasibility of the product being developed is shown in Table 1:

Table 1. Conversion Rate Product Achievement

Criteria	Validity Level
81-100%	Very Decent
61-80%	Decent
41-60%	Pretty Decent
21-40%	Less Worth
<21%	Unsuitable

RESULTS AND DISCUSSION

After the product has been developed, it is carried out by a media expert, content expert, and learning expert by filling in the instruments. The product then revised according to the validator's suggestion. Before the e-module was tried out in small groups, it was revised according to notes and expert suggestions so that the e-module met the criteria (Sitepu, 2015).

The Results of Media Expert Validation

The development product made in this study was a moodle-based e-module for the 3rd grader students. Based on the validation that has been done by media expert, the percentage is 100% which means the product is very feasible. Table 2 shows the detail value submitted by the expert, it can be seen that the level of validity obtained from media expert is 100%.

Table 2. Product Validation Data by Media Expert

No.	Assessed Aspects	Acquired Score	Maximum Score
1	Ease of use	24	24
2	Software	12	12
3	Consistent	12	12
4	Language	20	20
5	Graphics	16	16
6	Benefits	12	12
	Total Score	**96**	**96**
	Percentage	**100%**	

The Results of Content Expert Validation

Based on the results by the material expert analysis, the content of the e-module got a percentage of 71% with the feasible category. There needs to be improvements in language use. A good delivery of module content is to use communicative language. Communicative language is one of the characteristics of a module that can make students feel like they are studying with a teacher when reading it. The use of language is adjusted to the language skills of elementary school students. In the presentation of symbols, it is necessary to describe them with descriptions to make them easier for students to understand. The product is used for the 3rd grader so it is better to use a calibri typeface. Content expert validate moodle-based e-module. The results of product validation by content expert are described in Table 3.

Table 3. Product Validation Data by Material Expert

No.	Assessed Aspects	Obtained Score	Maximum Score
1	Coverage Content	11	16
2	Content Feasibility	20	28
3	Presentation	22	32
4	Benefits	10	12
	Total Assessment Score	**63**	**88**
	Percentage	**71%**	

The Results of Learning Expert Validation

The e-module was validated by 3rd grade teacher as a learning expert. Based on the validation that has been done by teacher as a learning expert, the average percentage was 97% which indicate that the product is very feasible with minor revisions. The detail validation value was then shown on Table 1, the developed e-module is declared very feasible and can be used with minor revisions. Product revision was carried out referring to the teacher's suggestion in the validation questionnaire, including (1) there was an operational problem because the buttons are too small, (2) there are words that have not been translated that makes it difficult for the students to understand the sentence. The product is then revised according to the validator's suggestion and can then be tested. Before the e-module was tried out in small groups, it was revised according to notes and suggestions from learning expert. The results of product validation by learning expert are described in Table 4.

Table 4. Product Validation Data by Learning Expert

No.	Assessment Indicators	Value
1	Suitability of the material presented with basic competencies	4
2	Presentation of e-Module material motivates and increases student interest in learning	4
3	E-Module is easy to operate	3
4	Ease of understanding the material in e-Module	4
5	Quality of animation, sound / audio, pictures and videos in the e-Module are good	4
6	Compatibility of the font and size of the letters used	4
7	Suitability of the background and layout	4
8	Instructions clarity for initial use of the e-Module	4
9	Navigation of the e-Module are functioning properly	4
10	The navigation location of the e-Module are consistent	4
11	The material are well structured	4
12	language used is in accordance with EYD (Indonesian writing rules)	4
13	The language used are clear and consistent	3
14	The e-Module can be a choice of learning media in the learning process	4
15	Conformity with teaching materials	4
16	Suitability of the material presented with basic competencies	4
17	Presentation of e-Module material	4

motivates and increases student interest in learning	
Total Score	**66**
Max Score	**68**
Percentage	**97%**

The Final Product of Moodle-based E-Module

The moodle-based e-modul can be accessed in https://belajarakm.com. Users (student and authorized teacher) can surf on the e-module after signing into the system. the first interface shown in Figure 1. Meanwhile, the developed e-module shown in Figure 2. In advance, the e-module will then be further developed and tested for the students.

Figure 1. Screen capture of welcoming interface on e-module

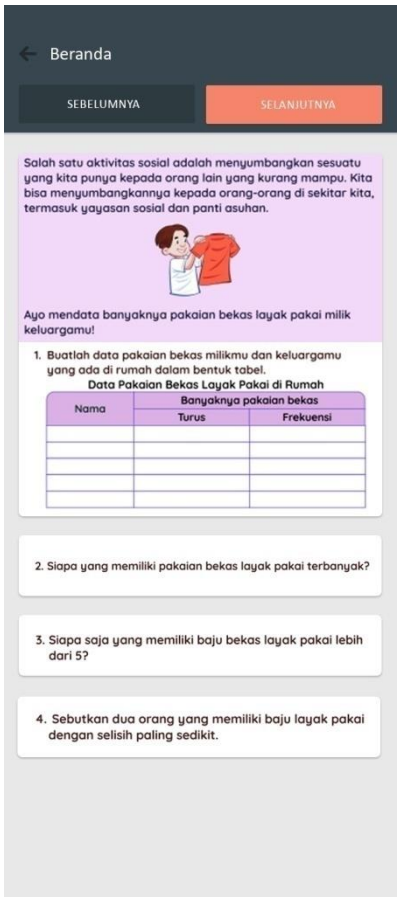

Figure 2. Example of e-module page

CONCLUSION

The research conclusions are as follows: the e-module are scored at 100% for media expert, 71% for content expert, and 97% for learning expert, so it can be stated that the final product of Moodle-Based E-Module that has been developed reaches the "feasible" criteria to be applied in classroom during the learning process.

Suggestions for the use of e-modules, it can be used as supporting teaching materials by teachers and students to learn numeration literacy. Suggestions for the dissemination of e-modules, the teacher must adjust the needs of the students. Suggestions for further development, namely e-module development can use more diverse themes.

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