Elementary School Journal
Jurnal Kajian Pendidikan Dasar

https://jurnal.unimed.ac.id/2012/index.php/elementary/article/view/40722
https://doi.org/10.24114/esjpgsd.v12i4.40722
e-issn (2355-1747) & p-issn (2407-4937)
Volume 12, No. 4 (2022)

DEVELOPMENT OF NUMERATION LITERACY MODULE BASED ON REALISTIC APPROACH FOR ELEMENTARY SCHOOL

Maya Alemina Ketaren[1], Dian Armanto,[2] Naeklan Simbolon[3]

[1,2,3]Pacasarjana Pendidikan Dasar, Universitas Negeri Medan
Corresponding Author: mayaketaren16@gmail.com

Abstract

This research aims to expand module study literacy numeration based on approach realistic. Supported from the PISA survey, TIMSS test, and based on the results assessment national student ability in literacy numeration under competence minimum. Type this research is research and development using the ADDIE model. subject in this research students classes IV SDN 104223 Bingkawan. Research results show module study literacy numeration based on realistic approach from the results validation of expert material, expert design and expert language show this module is "Very Eligible" for participants to use in learning education.

Article History

Received: 2022-11-22
Reviewed: 2022-12-10
Published: 2022-12-28

Keywords

Literacy Numeration, Realistic Approach, Elementary School

INTRODUCTION

The rapid development of technology has a big impact on education. Education is expected capable be a receptacle shaper man character, think critical, creative, communicative, and capable compete globally(Ashri & Pujiastuti, 2021). In fact, education in Indonesia is still not yet able to compete with other countries(Kadek et al., 2022). The 2018 PISA (Program for International Student Assessment) survey was attended by 79 countries. In terms of mathematics, Indonesia is ranked 73 out of 79 other countries. This matter shows that in the field of mathematics, Indonesia's position is in the 7th lowest position with presentation student more many is at below level 1, while the average for all countries that follow PISA survey on the field of mathematics ie 76% are at level 2 or more, and 78% are above level 2 in the field science . As well as in the fields of Indonesian mathematics experienced decline score points, in 2015 Indonesia got a score of 386 while in 2020 Indonesia gets a score 379 As well as results of the 2015 PISA and 2016 (Kemdikbud, 2021). TIMSS test two organization under the OECD (Organization for Economic Cooperation and Development) shows that Indonesia occupied ranking under , even under Vietnam, a small country in the new Southeast Asia just independent . Test results mathematics held by PISA between Vietnam and Indonesia are very far apart . Vietnamese get value 495 (with average score of 490), while Indonesia gets score 387. Meanwhile that from TIMSS results, Indonesia gets value 395 of the average value set by TIMSS is 500. The highest value got Singapore with value 618 (50% more tall than Indonesia) while Indonesia is classified as low (Kementrian Pendidikan dan Kebudayaan, 2017).

Based on the TIMSS (Trend in International Mathematics and Science Study) Survey conducted by IAE (The International Association for the Evaluation and Educational Achievement) Indonesia's

position in the field of mathematics is in 44th and 49th countries (Zukhrufurrohmah & Putri, 2021). Based on the PISA test and a survey conducted by TIMSS found that the ability of students in Indonesia in mathematics is relatively low and is still below the average score. TIMSS results can be considered low due to several factors. One of them is the lack of skills in problem solving. As stated by Ramadhani (2018: 127), " Research by TIMSS and PISA, found that Indonesian students have low ability to answer mathematic questions of international standards, especially on mathematical problem solving(Mailani, 2020).

In addition, the low acquisition of PISA and TIMSS Indonesia test results was also influenced by the low numeracy literacy skills of students. Numerical literacy skills and problem solving are interrelated (Afandi et al., 2021).

According to Wahyuningsih, "The low numeracy literacy skills of students in Indonesia can be influenced by many things, one of which is the ability to solve mathematical problems." So mastery six literacy the basis agreed upon by the World Economic Forum in 2015 is very important no only for participant students , but also for parents and all inhabitant society . Six literacy base the covers literacy read write , literacy numeracy , literacy science , digital literacy , literacy finance , and literacy culture and citizenship (Sri Wahyuningsih, 2021).

According to Khotimah (2020) "Numeration skills are explicitly taught in mathematics. In addition, the mathematics teaching provided should use a realistic mathematics approach, because this will make it easier for students to understand the numeracy literacy material taught through mathematics lessons." One of the learning approaches in mathematics is a realistic mathematics approach (Khotimah & As'ad, 2020).

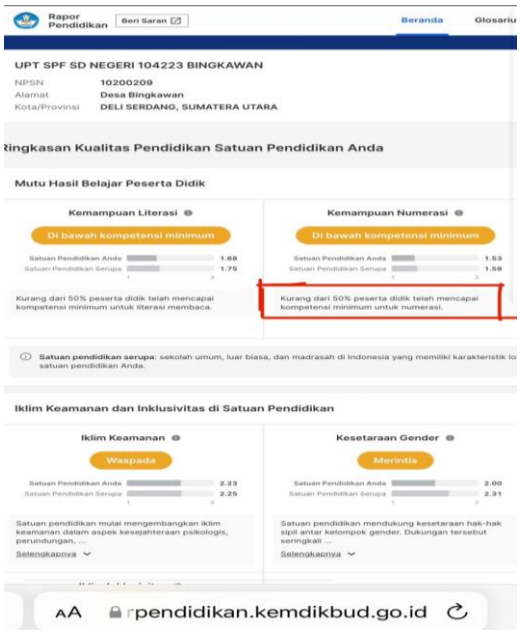
The realistic mathematics approach is an approach that uses the concept of questions related to real life in everyday life in learning mathematics. One learning approach that is able to help students improve their problem solving abilities is through a realistic approach(Patriana et al., 2021). Through a realistic mathematical approach students are not only given problems found in everyday life, but students also have to solve these problems. In other words, a realistic mathematical approach will provide opportunities for students to discover and reconstruct mathematical concepts so that students have a strong conceptual understanding. So that through the use of a realistic approach in learning tools it is hoped that it can improve students' mathematical solving abilities, especially with problems related to everyday life.

In accordance with a survey conducted by the Program for International Student Assessment (PISA) in 2018, the numeracy literacy skills of students in Indonesia need to be improved, especially in mathematics.

Since 2016 the Ministry of Education and Culture has been activating the National Literacy Movement (GLN) as part of the implementation of the Minister of Education and Culture Regulation Number 23 of 2015 concerning the Development of Good Character(Handayani et al., 2019). Reporting from the website of the ministry of education and culture which was accessed on 20 February 2022, currently the ministry of education is conducting AKM (Minimum Competency Assessment). The Minimum Competency Assessment (AKM) in the National Assessment is designed to measure student achievement from cognitive learning outcomes, namely literacy and numeracy. To

support the Ministry of Education and Culture's movement in increasing students' numeracy literacy skills, it is necessary to develop learning tools, one of the learning tools that can be developed is modules. Module is one type of teaching material that can be used to support the numeracy literacy movement and improve students' ability to learn.

Based on the results of the computer-based national assessment (ANBK) that was carried out in 2021, SDN 104223 Bangkawan obtained the result that the numeracy literacy skills of students at SDN 104223 Bangkawan were 50% below the minimum competency, this can be seen directly through the education report cards.



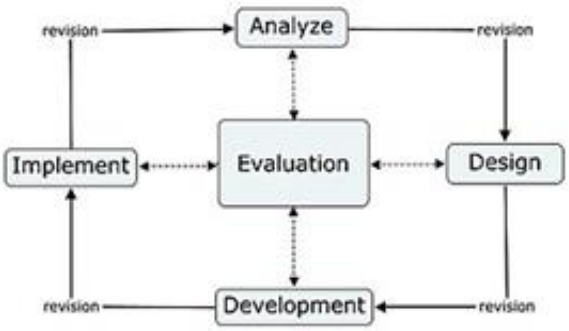
Picture 1 Numerical Literacy Ability in Education Report Cards

Through the results of the national assessment listed on the education report cards previously presented, the numeracy literacy skills of elementary school students still really need to be improved. In accordance with the demands of technological developments and teacher education are required to be able to create students who have good numeracy literacy skills, students' numeracy literacy skills can be obtained through literacy and numeracy-based learning tools. The module is one of the learning tools, the module contains material, methods, limitations and ways of evaluating which are designed systematically and attractively to achieve the expected competencies, the development of numeracy-based modules is one of the things that is useful besides being able to create modules that are also numeracy-based will improve student learning outcomes, especially in the ability to solve mathematical problems.

Thus literacy and numeracy-based development as a tool that can improve students' critical thinking skills, as well as support the national literacy movement program created by the ministry of education and culture, especially in mathematics is increasingly needed.

METHOD

The research method in development of numeracy literacy learning modules based on mathematics realistic approach used *Research and Development* (R&D). The research model is ADDIE research and development model (Rusdi, 2019). The stages of the ADDIE development model include: 1) *Analysis*, 2) *Design*, 3) *Development*, 4) *Implementation* and 5) *E*



Picture 2. Research Procedure Based on the ADDIE Model

As for the subject study development, this numeracy literacy-based mathematics module namely student grade IV elementary school 104223 Bingkawan Subdistrict Sibolangit. With amount students 27 people, total students 18 men, and total students women 9 people. Where as object in this research is a numeracy literacy module in mathematics lessons based on a realistic approach to improve the mathematical problem solving skills of fourth gradeelementary school students.

The instruments used in this research is questionnaire for validation expert mathematics material, expert design and media expert. As well as using sheet interviews and observations. To count module assessment with questionnaire, can analysis with determine criteria answer from instrument validation with using a Likert Scale (Arifin, 2017).

RESULTS AND DISCUSSION

Developed module has validated by several expert ie expert design, material, and expert language. As for the results obtained validation namely :

1. Material Expert Validation Results

Validation Theory done to test is presented material in module already worth testing try it to kids. As for the material presented related about get up flat ie triangle, square and rectangular.

Validation Theory carried out by Dr. Edy Surya, M.Si is lecturer Medan State University postgraduate program focusing on mathematics. Validation expert Theory see of 17 indicators evaluation with range score 4.5 out of 5 or same with 90%. In accordance with criteria eligibility in the table below :

Table 1. Criteria Module Eligibility

Level of success	Information
0 %– 20%	Very unworthy
21%–40%	Not feasible
41 %– 60%	Pretty decent
61% – 80%	Worthy
81% – 100%	Very worth it

Source : (Suryana & Indrawati , 2018:221 with modification)

More details presented material will explain to area and circumference triangle, square and rectangular in stundents life. So categorized as "Very Eligible" so based on validation expert material, then presented material in this module is very worthy to be tested try and use at school basic .

2. Linguist Validation Results

Validation language done to test isdisplayed language in module already worth testing try it to students in elementary school. As for design customized with characteristics participant educate as subject research, that is student class IV school basic. In facet language in a manner whole rated start from ordinances writing, use of words and sentences, choice of words, usage conjunctions and signs read, as well suitability language with characteristics participant educate. Validation language carried out by Dr. Wisman Hadi, M.Hum. He is a lecturer in Medan State University postgraduate as well as served as chairman study program Indonesian Postgraduate degree at Medan State University .

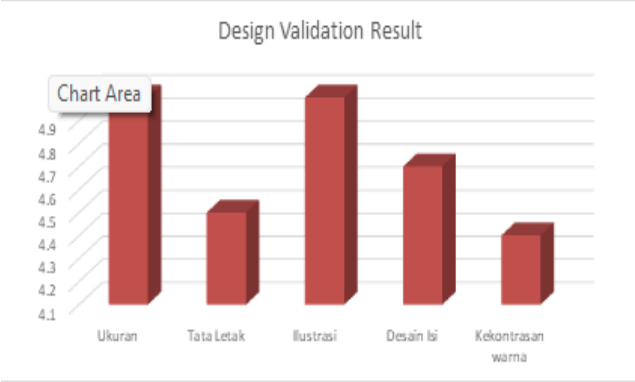
Validation expert linguist see of 14 indicators evaluation with range score 4.4 out of 5 or same with 88%. In accordance with criteria eligibility in the table before , then from aspect language module This is categorized as "Very Eligible" so based on validation expert language, then language

presented in this module is very worthy to be tested try and use at school basic.

3. Design Expert Validation Results

Validation design done to test is the design shown in module already worth testing try it to kids. As for design customized with characteristics participant educate as subject research , that is student class IV school basic. In facet design overall, coloring , cover, up to use letters and spaces used in the module will assessed by an expert validator design.

Validation design carried out by Dr. Samsidar Tanjung, M.Pd, she is lecturer Medan State University postgraduate as well as secretary study program technology education in State university postgraduate. Validation expert design see of 20 indicators with 5 sub components evaluation obtain range score 4.7 out of 5 or same with 94%. In accordance with criteria feasibility in table 1 before, then from aspect design module This is categorized as "Very Eligible". So based on validation expert design presented design in this module is very worthy to be tested try and use at school basic. As for the results validation expert design could seen with clear through the following diagram :



Picture 3. Design Validation Results

The following are form design developed modules :

1. Cover

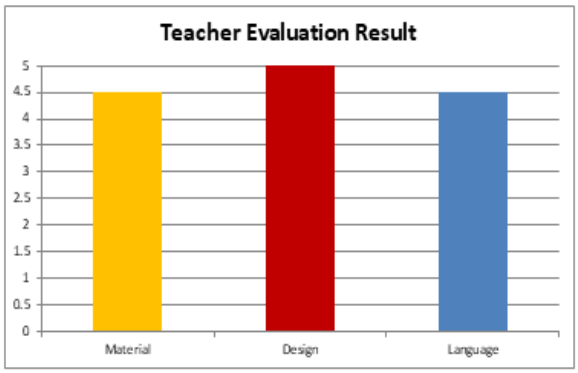
2. Content Overview

3. Evaluation

4. Content

4. Teacher Assessment Results

While the results of the teacher's assessment of the numeracy literacy learning module based on this realistic approach are in the "Very Eligible" category with a score of 4.6 or 92%. The teachers who assessed were 2 grade 4 and 5 teachers at SDN 104223 Bangkawan. Their name is Maya Febrina and Ceria Pepayosa. The categories of teacher assessment are language, design and material presented. Based on the results of the teacher's assessment, it can be described as in the chart below:



Picture 4. Teacher Evaluation Result

Based on results validation could is known that module literacy numeration based developed realistic has could categorized as "Very Eligible" to be implemented in schools base specifically for student class IV school base, with destination student capable increase understanding about literacy numeration especially in material get up flat.

This module is developed in accordance with competence base mathematics class IV and also adjusted with presented material in literacy numeration ie Geometry. The results of this study are in accordance with previous research Marbun (2022), which conducted research and obtained results, namely modules that are suitable for use in early childhood. Supported by the research results of Tarigan (2018) revealed realistic mathematical models can improve student learning outcomes. so that the numeracy literacy module based on a realistic mathematical

approach is expected to improve student learning outcomes

CONCLUSION

Development module study literacy numeration based approach realistic has developed and structured in accordance with characteristics participant educate based on results Step analysis, then planning making module, from collection theory designing view, collect illustration. Next step is development module validated to 3 experts language, design and mathematics material.

Based on results validation language module categorized as very feasible with results 90% validation. Next based on results validation expert design so module categorized as very eligible with results :

1. Design Expert
   The module of literacy numeracy based on realistic approach look from design expert get score 4,7 or 97%.
2. Languange Expert
   The module of literacy numeracy based on realistic approach look from language expert get score 4.4 or 88%.
3. Mathematic Material Expert
   The module of literacy numeracy based on realistic approach look from mathematic material expert get score 4,5 or 90%.

So that in a manner whole this module can categorized very eligible for use on students elementary schools.

ACKNOWLEDGEMENT

The author would like to thank all those who played a role in this study including the linguist validators, design and mathematics materials. Thanks for Dr. Samsidar Tanjung, M.Pd, Dr. Edy Surya, M.Si, and Dr. Wisman Hadi, M,Hum as validators in this module.

REFERENCES

Afandi, F., Jafar, M. I., & Adnan.K. (2021). Hubungan Kemampuan Literasi Numerasi dengan Hasil Belajar Matematika Siswa Kelas V SD Gugus II. *JIKAP PGSD : Jurnal Ilmiah Ilmu Kependidikan*, *5*(3), 423–430.

Arifin, Z. (2017). *Evaluasi Pembelajaran*. Remaja Rosdakarya.

Ashri, D. N., & Pujiastuti, H. (2021). Literasi Numerasi Pada Pembelajaran Tematik Terpadu Di Kelas Rendah Sekolah Dasar. *Jurnal Karya Pendidikan Matematika*, *8*(2), 1–7.

Handayani, P. H., Marbun, S., & Srinahyanti, S. (2019). Validitas Bahan Ajar Sains Berorientasi Literasi Sains untuk Anak Usia Dini. *Elementary School Journal*, *9*(4), 327–334.

Kadek, N., Widiantari, K., & Suparta, I. N. (2022). Meningkatkan Literasi Numerasi dan Pendidikan Karakter dengan E-Modul Bermuatan Etnomatematika. *Jurnal Ilmiah Pendidikan Matematika*, *10*(2), 331–343.

Kemdikbud. (2021). *Modul Literasi Numerasi Di Sekolah Dasar*. http://ditpsd.kemdikbud.go.id/upload/filemanager/2021/06/2 Modul Literasi Numerasi.pdf

Kementrian Pendidikan dan Kebudayaan. (2017). *Materi Pendukung Literasi Numerasi*.

Khotimah, S. H., & As'ad, M. (2020). Pendekatan Pendidikan Matematika Realistik Terhadap Hasil Belajar Matematika Siswa Sekolah Dasar [Realistic Mathematics Education Approach to Mathematics Learning Outcomes for Elementary School Students]. *Jurnal Imiah Pendidikan*

Dan Pembelajaran, *4*(3), 491–498.

Mailani, E. (2020). Pengembangan Bahan Ajar Pendidikan Matematika Kelas Rendah Menggunakan Pendekatan Matematika Realistik. *Elementary School Journal*, *2*(1), 1–12. http://clik.dva.gov.au/rehabilitation-library/1-introduction-rehabilitation%0Ahttp://www.scirp.org/journal/doi.aspx?DOI=10.4236/as.2017.81005%0Ahttp://www.scirp.org/journal/PaperDownload.aspx?DOI=10.4236/as.2012.34066%0Ahttp://dx.doi.org/10.1016/j.pbi.2013.02.0

Marbun, S., Simatupang, D., & Simanjuntak, J. (2022). Penggunaan Modul Digital Interaktif Dalam Meningkatkan Aktivitas Belajar Mahasiswa PG PAUD. *Elementary School Journal*, *12*, 75–84.

Patriana, W. D., Sutama, S., & Wulandari, M. D. (2021). Pembudayaan Literasi Numerasi untuk Asesmen Kompetensi Minimum dalam Kegiatan Kurikuler pada Sekolah Dasar Muhammadiyah. *Jurnal Basicedu*, *5*(5), 3413–3430. https://doi.org/10.31004/basicedu.v5i5.1302

Rusdi. (2019). *Penelitian Desain dan Pengembangan Kependidikan*. Rajawali Pers.

Sri Wahyuningsih. (2021). *Modul Literasi dan Numerasi di Sekolah Dasar*. Kementrian Pendidikan dan Kebudayaan, Direktorat Sekolah Dasar.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, kualitatif dan R&D*. Alfabeta.

Tarigan, D. (2018). Meningkatkan Hasil Belajar Siswa Dengan Menggunakan Model RME Pada Mata Pelajaran Matematika Di Kelas V SDS Salsa Cinta Rakyat. *Elementary School Journal*, *8*(4), 622–633.

Zukhrufurrohmah, Z., & Putri, O. R. U. (2021). Pendampingan Pengembangan Instrumen Berciri Literasi Numerasi dalam Menyiapkan AKM pada Guru SD. *JPMB: Jurnal Pemberdayaan Masyarakat Berkarakter*, *4*(2), 249–260. http://journal.rekarta.co.id/index.php/jpmb/article/view/379%0Ahttps://journal.rekarta.co.id/index.php/jpmb/article/download/379/368