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Development of Numerical Literacy-Based Student Worksheet on Improving Mathematical Reasoning

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Abstract

The study background is that students' mathematical reasoning abilities must be improved through learning. Efforts to enhance mathematical reasoning are carried out with the Numerical Literacy-Based Student Worksheet Development process. The worksheet (LKS) development process must meet the eligibility to support learning. The study method uses Research and Development that includes ten steps—data collection techniques with interviews, questionnaires, and tests. The research subjects were fourth-grade elementary school students. The study results found that development begins with preliminary studies, analysis, formulation of learning media development, media design, prototypes, and instrument development. The validation of media experts scored 91.4% and material experts 80% with a valid predicate. The teacher's response questionnaire results were 84.2% in the very decent category, and the students' response questionnaire got 83.6% in the very like category. The results of the validity test of mathematical reasoning are valid because the value of r-count > r table (0.632). The reliability test obtains an alpha value of 0.979, which indicates the instrument is reliable. This study concludes that the Development LKS based on numerical literacy meets the needs analysis of students and teachers and obtains valid criteria from media and material experts. The development of numerical literacy-based student worksheets (LKS) also received good grades for improving students' mathematical reasoning.

INTRODUCTION

The Ministry of Education and Culture has attempted to create a literacy culture by launching the National Literacy Movement (GLN). GLN is an implementation of the Minister of Education and Culture Number 23 of 2015 concerning the Growth of Character. The government has announced that GLN is implemented through schools called the School Literacy Movement (GLS). GLS is defined as creating literate learner organizations and fostering character for school members through various activities, including reading non-learning books for 15 minutes [1]. The ability to read can be the first step in understanding other basic literacy, such as scientific, numeracy, digital, cultural, citizenship, and financial literacy [2].

One basic literacy that can be applied in elementary school education is numeracy literacy. Numerical literacy is defined as a person's ability to use reasoning. Reasoning means analyzing

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and understanding a statement by manipulating symbols or mathematical language in everyday life and expressing the message through writing or orally. Numerical literacy is part of mathematics, so the components of implementing numeracy literacy cannot be separated from the material covered in mathematics. Mathematics is a science related to exact knowledge that has been systematically organized, including rules, ideas, logical reasoning, and logical structures [4].

Research related to the development of worksheets has been carried out a lot.. Astuti and Sari [5] researched the story of student worksheets (LKS) in the mathematics subject of class X students. His research showed that the developed LKS could improve student learning outcomes and mastery and improve student learning classically. Dezricha Fannie and Rohati [6] examined the development of student worksheets (LKS) based on POE (Predict, Observe, Explain) in class XII linear programming material. The results showed that 82.36% of students achieved KKM classically. Based on the results of these studies, no one has studied the development of numerical literacy-based worksheets to improve mathematical reasoning.

Mathematical literacy skills are not just understanding and knowing mathematical concepts. However, I can also analyze mathematical problems and solve problems related to everyday life[7]. The purpose of giving mathematics subjects into five mathematical competencies that students must possess, including problem-solving, communication, reasoning, connection, and mathematical representation, all of which are mathematical literacy skills. Mathematical literacy is defined as the ability to use mathematical knowledge and understanding effectively in facing the challenges of everyday life. A mathematically literate person is not enough to only be able to use their expertise and experience but also must be able to use it effectively [8].

The cause of low student achievement in mathematics is not optimal learning [9]. The phenomenon was found that the teacher was busy explaining what he had prepared. Active students themselves become suitable recipients of the information. As a result, students only imitate what the teacher does without meaning and understanding, so in solving problems, they think it is enough to do what is exemplified. Mathematical literacy can form individual mathematical reasoning. Mathematical reasoning ability is one of the thinking skills that must be developed [10]. The formation of mathematical reasoning requires appropriate teaching material. This is done to create educational interactions between educators and students. An educator must be able to arrange learning resources that attract students' attention through practical learning [11].

Educators can consider the learning methods and assessment instruments used and develop aspects of mathematical literacy skills. Efforts that educators can make to improve students' mathematical literacy abilities are to carry out learning innovations [12]. The importance of reasoning abilities in learning mathematics explains that learning emphasizes reasoning and problem-solving activities closely related to high student achievement [13]. Solving problems in mathematics requires reasoning abilities; with reason, students are expected to view mathematics as a logical or reasonable study. Thus, students believe mathematics can be thought of, understood, evaluated, and proven [14]. The importance of numeracy literacy in elementary school students because it is a requirement in the implementation of the Minimum Competency Assessment (AKM). The performance of AKM is carried out in the middle of the school level, such as SD/MI in class V. This is done so that the results of the assessment are followed up by the school concerned to make improvements to the participant's students until when they graduate students have minimum competence for literacy and numeracy [15].

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METHOD

The study takes a research and development design that includes ten steps. The development procedure used in this study adapted the development procedure developed by [16], [17]. The ten steps in the research were (1) research and information gathering, (2) research planning, (3) developing the initial product, (4) product design validation, (5) phase I product design revision, (6) limited trial, (7) phase II product revision, (8) field trials, (9) Final Product Improvement, (10) Dissemination. The development research procedure is as follows:

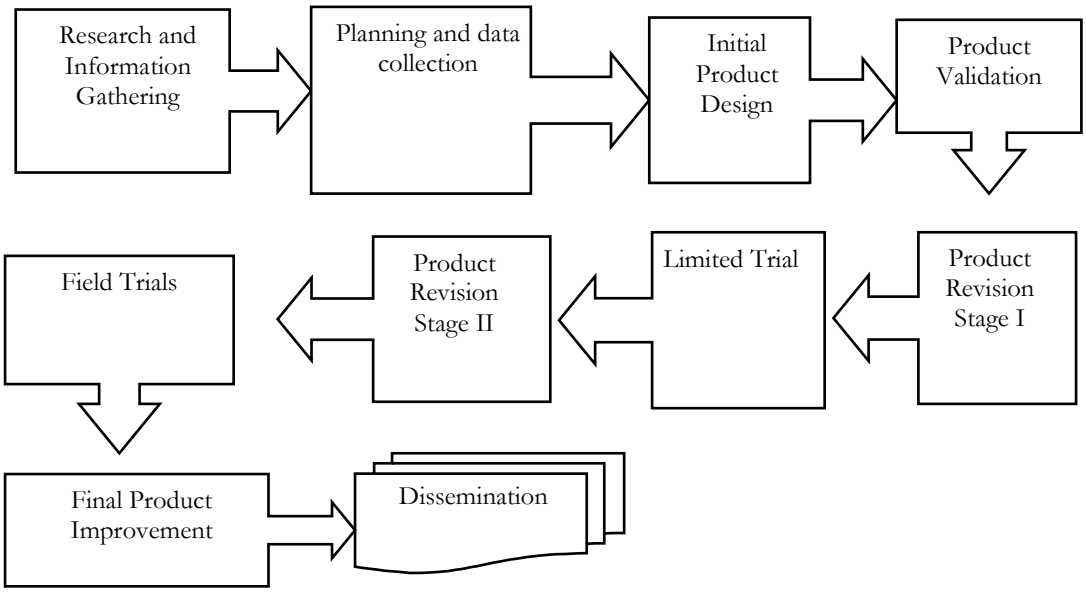

Figure 1. Development Research Procedures

Data collection techniques with interviews, questionnaires, and tests. The research subjects were fourth-grade elementary school students—sampling technique with purposive sampling. Furthermore, validation tests were carried out on experts, statistical inferential tests, practicality tests, and tests on the effectiveness of increasing students' mathematical reasoning with N-Gain.

RESULTS AND DISCUSSION

1. Needs Analysis

The study's results found that the analysis of the need for developing student worksheets (LKS) based on Numerical Literacy to Improve Elementary School Students' Mathematical Reasoning was based on interviews and observations of students learning. The interviews with ten children showed that children were interested in LKS teaching materials, were enthusiastic, needed literacy-based LKS, and most of the answers used so far were difficult to accept (8 people). In terms of presentation, students want the arrangement of worksheets coherently (6 people). So far, the production of LKS material is not fun and challenging, so teachers teaching fractional material worth improving numeracy literacy rarely use worksheets.

Interviews were conducted with class teachers to obtain a direct description of the implementation of learning by teachers so far in improving mathematical reasoning. The interviews with teachers showed that teachers learning to improve numerical literacy mostly did

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not use worksheets. Teachers were enthusiastic about teaching numerical literacy. Teachers experienced problems in using media, and existing worksheets were difficult for students to accept. All teachers agreed that there were teaching materials for improving mathematical reasoning, but the teacher did not allow students to ask questions and observe. The teacher does not allow students to collect, process, and communicate information. In addition, teachers also need teaching materials that support learning because books that do not present literacy skills and existing worksheets do not make it easier to learn numeracy literacy.

The results of these interviews clearly show that learning has not used suitable media, so it is not easy to stimulate mathematical reasoning abilities. The results of these interviews indicate the need to develop Numerical Literacy-Based Student Worksheets to Improve Elementary School Students' Mathematical Reasoning. Previous research found that the pre-test indicated the analysis of the needs of LKS learning media to obtain an overview of the problems in learning mathematics. This is a follow-up to the results of observations and interviews with teachers as described in the background. The results of data analysis on students' mathematical problem-solving abilities before the implementation of the action showed that the highest score on the pre-test was 91.67, and the lowest score on the pre-test was 8.33. The percentage of students with incomplete initial test scores was 90.00%, namely 18 people [18].

The initial stage of this study did not use cycles but was based on interviews and learning observations for needs analysis in improving mathematical reasoning in learning equivalent fractions. The analyzing requirements in the learning process consist of front-end analysis, student analysis, task analysis, concept analysis, and specification of learning objectives. Front-end analysis is used to determine common problems encountered in learning activities, student analysis to assess student characteristics, task analysis to detail the Core Competencies (KI) and Basic Competencies (KD) to be used, and concept analysis analyses the main concepts contained in the material. In contrast, the specification of learning objectives aims to formulate learning objectives that students must achieve according to KI and KD. This analysis is to determine media development planning.

Previous research found that the mathematical literacy of elementary school students was still relatively low. The results of the analysis of student answers for students' problem-solving abilities are still tricky in solving mathematical problems. In this case, students experience difficulties applying various approaches and strategies to solve problems, build new mathematical knowledge or ideas, and have difficulties reflecting on the process of solving mathematical problems.[19] According to NCTM, indicators that can show whether a student has problem-solving abilities are: (1) Able to apply and adapt various approaches and strategies to solving problems, (2) solving problems that arise in mathematics or other contexts involving mathematics, (3) building new mathematical knowledge through problem-solving, and (4) monitoring and reflecting on the process of solving mathematical problems [20].

Schools' efforts to solve math problems emphasize results rather than processes without considering students' reasoning processes. Learning seems to place more emphasis on writing than verbal to express mathematical ideas. There needs to be a relationship between the mathematical communication process and student reasoning in solving problems.[21] Other research explains that teachers can develop conceptual, problem-solving, and mathematical sense through communication [9]. The initial stages of development research are context and need analysis, literature review, and concept or framework development. In this study, a needs analysis

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was carried out by reviewing the literature regarding PISA results and students' mathematical literacy in Indonesia, and the learning resources students were carried out by interviewing teachers and students regarding using worksheets in class. The literature review focused on the topic of LKS preparation and the characteristics of the questions in PISA. This stage resulted in the conclusion that it is necessary to develop literacy-based worksheets to familiarize students with numeracy literacy problems [22].

Improving students' mathematical reasoning abilities requires systematic teaching materials. The teaching material used in this research is in the form of student worksheets (LKS). The researcher's analysis of several worksheets shows that the teacher is still dominated by associating/reasoning in presenting worksheets. In learning mathematics, teachers have not designed LKS with a scientific approach, especially in the questioning process [23].

Based on the study results, students were more interested in using worksheets than textbooks. This was because there were too many theoretical explanations in the books used by students, so The worksheets used so far do not necessarily guide students to build their understanding actively. Besides that, the worksheets used are also less attractive, and the paper is blurry and still confuses students because the work instructions are difficult to understand and unclear. The teaching materials needed are those with principles when teaching mathematics that must be presented from context. Hence, students understand the material better and will not have difficulty understanding abstract mathematical material. Besides that, the availability of appropriate teaching materials is also needed to facilitate learning and improve students' mathematical reasoning abilities, such as Student Worksheets (LKS). The teaching material becomes fun because it uses contextual problems to increase students' reasoning abilities [24].

2. Design Development

The purpose of the design stage is to design a learning device prototype (instructional material). Activities at this stage can be carried out after finding behaviour objectives for learning devices. The selection of media and formats for materials and the production of initial versions underlie the significant aspects of the design stage.

a) b) c)

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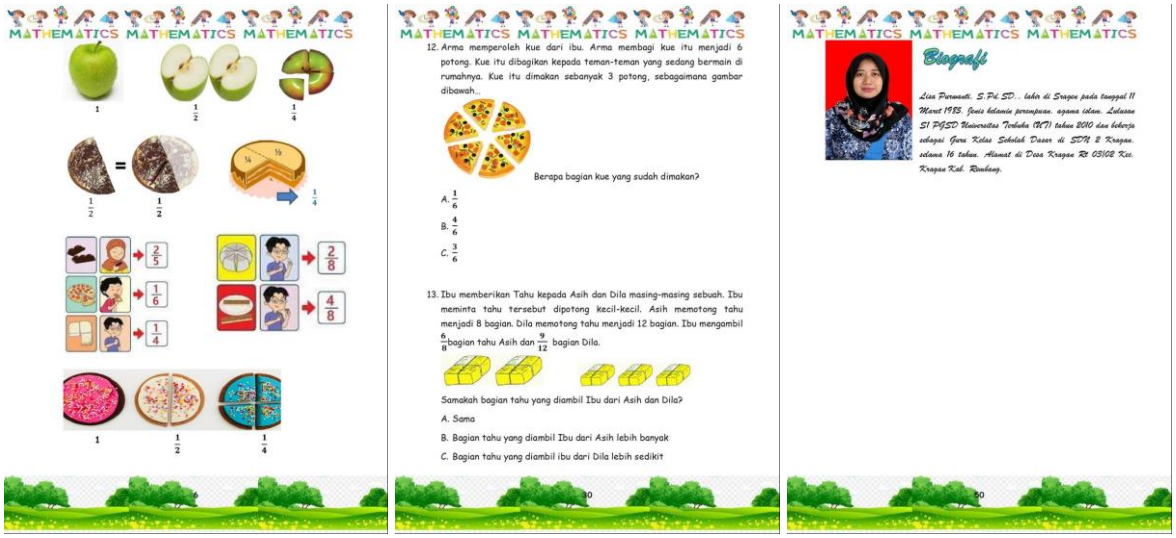

d) e) f)

Figure 2. a) Cover, b) authors, c) Foreword, d) Material, e) Exercise, f) Biography LKS

In developing this media, researchers analyzed several components, including the Development design chart numerical literacy-based student worksheets (LKS) is described by a hypothetical model as follows;

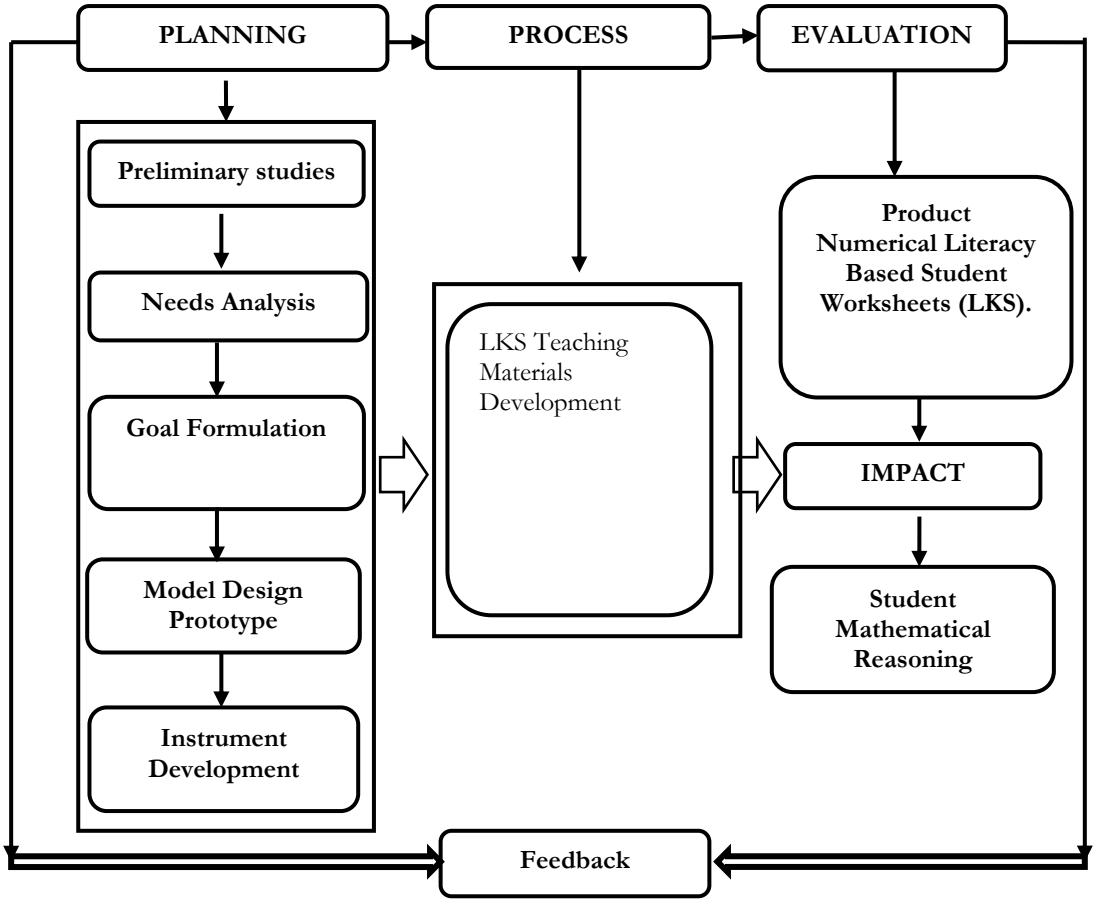

Figure 2. LKS Development Chart

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a. Media Selection

Learning Devices are media or tools teachers and students use in class learning. Learning devices are several materials, tools, media, instructions, and guidelines used in the learning process. So, learning tools are several media used by teachers and students to carry out the learning process in class, and learning tools are expected to help teachers and students create effective learning to achieve the desired goals. According to Ibrahim in Andi Prastowo, the learning tools needed in managing the teaching and learning process can be in the form of Learning Implementation Plans (RPP), Student Activity Sheets (LKS), Evaluation Instruments, or Learning Outcomes Tests (THB), learning media, and student textbooks. The learning tools referred to in this study are limited to Learning Implementation Plans (RPP) and Student Activity Sheets (LKS).

b. Format Selection

The development of learning tools is adapted to the stages of the numerical literacy-based learning model. The preparation and systematics of the RPP developed are guided by Permendikbud No 22 of 2016.

c. Define Theme

The theme in this study is the subject of mathematics with the composition of equivalent fractions.

d. Setting Goals

This study aims to improve the Mathematical Reasoning of Elementary School Students using Numerical Literacy-Based Student Worksheet Development. Learning objectives: (1) students can mention the elements of fractions; (2) students can compare and sort fractions; (3) students can explain equivalent fractions with concrete pictures and models; (4) students can determine the form of fractions equivalent to demonstration; (5) students can determine equivalent fractions; and (6) students can explain equivalent fractions with concrete pictures and models.

e. Determining Learning Resources

The developed LKS contains instructions for understanding equivalent fraction material. The outline of the LKS format is as follows:

1) LKS displays Graduation Criteria Standards (SKL), Core Competencies (KI), Basic Competencies (KD), instructions for using LKS, and learning objectives that students must achieve while participating in learning activities.
2) LKS is equipped with brief material for each sub-chapter so that students can understand the material they are studying. Temporary material is also given using language that students easily understand.
3) LKS is divided into several parts: fractional elements, comparing fractions, explaining fractions with pictures and models, determining the form of bits by demonstration, sorting particles, solving equivalent fraction problems, practice questions, and summaries.

f. Initial Design

The LKS design is made on 21 x 29.7 cm quarto paper, making the cover design on A5 paper. Determine the cover design according to the contents of the LKS. Determine content design (typography), namely designing media content starting from the cover page, preface, table

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of contents, contents, bibliography, and biography. The preparation of the LKS framework refers to the map of needs previously determined. The writing uses Comic Sans MS with size 14. There are three sections in the LKS, namely the beginning, body, and end. The initial part contains the cover, preface, LKS features, competency maps, and table of contents. The contents section contains material sheets, practice questions, summaries, and question packages. The final section includes a bibliography and biography. Binding. This book was bound using a stapler.

g. Compilation of Assessment Instruments

This stage also designs learning device assessment sheets, student response questionnaires, learning implementation observation sheets, and mathematical reasoning ability test questions. Develop learning device assessment instruments. The learning device assessment instrument consists of four tools: lesson plans, LKS assessment sheets by expert lecturers, and LKS assessment sheets by math teachers.

The results of the study found that based on the needs analysis, the implementation of learning had not used learning media that matched the needs of students to develop mathematical reasoning. Therefore, it is necessary to create Numerical Literacy Based Student Worksheets (LKS). The development of this LKS is adapted to the analysis of core competencies and essential competencies of elementary school students in learning equivalent fractions. The researcher designed a prototype learning device (instructional material) in the subsequent development stage. The selection of media and formats for materials and the production of initial versions underlie the significant aspects of the design stage. Previous research by Prabawati (2019) stated that in the needs analysis results, LKS products were designed. In designing the initial product, an analysis of the material concept of a system of two-variable linear equations was carried out, determining a prototype that was adapted to the eligibility requirements of worksheets (didactic, construction, and technique) as well as loading aspects of a problem-based approach and training students to solve problems through the stages of the mathematical literacy process.

The development stage is the stage of product design and development with improvements. The parts of the LKS are repeatedly repaired (revised) based on the product draft evaluation results. At this stage, an evaluation of the validity and practicality of the worksheet is carried out. Experts used the LKS validity assessment sheet to evaluate the validity evaluation. The validity assessment sheet determines three assessment aspects: content, construction, and language. LKS is considered valid if the experts (validators) state that all validity criteria (indicators) are met. After the LKS was declared valid by the experts, the LKS was tested on six students, with two students each having high and medium mathematical abilities. The validator stated that all LKS had met all the assessment criteria and that both validators declared the LKS valid. The next stage is testing the LKS and FGD. Students are appointed based on suggestions from math teachers [22].

The learning tools in this study were limited to Learning Implementation Plans (RPP) and Student Activity Sheets (LKS). The development of learning tools is adapted to the stages of the numerical literacy-based learning model, namely selecting the format, determining the theme and objectives, making the initial design, cover, content design, and final section. The next stage is compiling research instruments, learning devices, student response questionnaires, observation sheets of learning implementation, and mathematical reasoning ability test questions. The development of LKS also tested the validity of media and material experts and assessed the

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responses of teachers and students [23]. The initial worksheet product design consisted of an identity page for the worksheet (Title of the worksheet, columns for student and school identity, subject identity, and core competencies/fundamental competencies/indicators), the student activity page presented material with contextual problems that lead students to discover material concepts. Students' mathematical reasoning abilities can be improved by developing learning tools like syllabi, Learning Implementation Plans (RPP), Student Books, Student Worksheets (LKS), and Mathematical Reasoning Ability Tests. The increase in mathematical reasoning can be seen from the difference between the mathematical reasoning abilities of the experimental and control classes. The average value of the practical class mathematical reasoning ability test was 80.95. [25]

LKS contains a set of essential activities that students must carry out to maximize understanding to form basic abilities according to indicators of achievement of learning outcomes that must be taken. LKS comprises six components: titles, study instructions (student instructions), achievable competencies, supporting information, assignments, work steps, and assessment. Designing the systematics and structure of LKS.[26] LKS that are good at learning should have eligibility requirements for three aspects: didactics, construction, and not technique. Didactic requirements refer to the principles of effective learning, including paying attention to individual differences, emphasizing the process of discovering concepts, having a variety of stimuli, and developing children's social, moral, and aesthetic communication. In addition, construction requirements are conditions related to the use of language, sentence structure, vocabulary, level of difficulty, and clarity, which, in essence, must be effective because the user or student can understand them. Technical requirements include writing arrangement, provision of pictures, and attractive packaging/appearance [27].

The validation results for media experts with indicators of size, cover design, and content design obtained a score of 91.4%, so if based on the table of media expert validation scores, it is categorized as valid (very feasible). The validation of material experts obtained 80% results with a proper predicate, so the Development of Numerical Literacy-Based Teaching Materials to Improve Students' Mathematical Reasoning is appropriate for use in mathematics learning, especially on the theme of equivalent fractions. The study also found that the results of a questionnaire given by the teacher regarding the application of Numerical Literacy-Based Student Worksheet Development (LKS) trials to Improve Mathematical Reasoning of Elementary School Students showed a positive response of 118 out of 140 points, which means the percentage was 84.2% in the very decent category. The development of Numerical Literacy-Based Student Worksheets (LKS) has a perfect effect and is needed by teachers in learning the theme of equivalent fractions. The questionnaire results about the student's responses showed positive responses obtained by a total score of 92 out of 110, so the percentage of positive responses was 83.6% with the very like category.

The results of the validity of numeracy literacy obtained valid instruments because the value of r-count > r-table (0.632) at a significance level of 5% and got an alpha value of 0.979 with a very high predicate. These results indicate that applying LKS in improving mathematical reasoning is valid and reliable. Previous research stated that expert validation uses indicators of worksheets' readability, attractiveness, and practicality. LKS has beauty for students. For the usefulness of LKS seen from the student response questionnaire of 70.83% (good) and 100% of

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the student response categories were good, it was concluded that student responses to LKS were positive. The purpose of LKS validation is to see the eligibility level of LKS in terms of didactic, technical, and construction requirements. To test the ability of mathematical literacy, content validation is carried out. Mathematical literacy ability tests are classified as valid and reliable, with an alpha value of 0.72 in the high category [23].

CONCLUSIONS

The development of Numerical Literacy-Based Student Worksheets (LKS) begins with preliminary studies, analysis, formulation of learning media development, media design, prototypes, and instrument development. Media expert validation consists of 3 parts: size, cover design, and content design. Assessing media experts, the results obtained were that the total score reached 91.4%, so if it was based on the media expert validation score, it was categorized as valid—the material expert validation results with a valid predicate. The teacher's response questionnaire results showed that the number of positive responses was very decent. The students' response questionnaire showed positive response results in positive responses. The results of the validity test of mathematical reasoning are valid and reliable.

The results of this study can provide implications; Teachers should provide clear directions to students so that there is no confusion when learning by using Numerical Literacy-based worksheets and monitoring student activities during learning. The teacher's creativity in presenting mathematics learning by applying more interesting Numerical Literacy-based worksheets will not cause boredom for students when learning takes place.

REFERENCES

[1] F. W. Prihartini, *Analisis Pelaksanaan Gerakan Literasi Sekolah (GLS) Pada Kelas Rendah di SDN Punten 1 Batu*. Malang: FKIP UMM, 2017.

[2] Kemendikbud, *Menumbuhkan Budaya Literasi di Sekolah*. Jakarta: Kementerian Pendidikan dan Kebudayaan Direktorat Jenderal Guru dan Tenaga Kependidikan, 2017.

[3] H. Y. Abidin, Yunus, Tita Mulyati, *Pembelajaran Literasi Strategi Meningkatkan Kemampuan Literasi Matematika, Sains, Membaca, dan Menulis*. Jakarta: Bumi Aksara, 2017.

[4] S. A. Widodo and A. S. Purnami, "Mengembangkan Norma Sosiomatematik Dengan Team Accelerated Instruction," *Numer. J. Mat. dan Pendidik. Mat.*, pp. 29–48, Jun. 2018.

[5] A. Astuti and N. Sari, "Pengembangan Lembar Kerja Siswa (Lks) Pada Mata Pelajaran Matematika Siswa Kelas X Sma," *J. Cendekia J. Pendidik. Mat.*, vol. 1, no. 2, pp. 13–24, 2017.

[6] R. Dezricha Fannie and Rohati, "Pengembangan Lembar Kerja Siswa (LKS) Berbasis POE (Predict, Observe, Explain) pada Materi Program Linear Kelas XII SMA," *J. Sainmatika*, vol. 8, no. 1, pp. 96–109, 2014.

[7] N. Rohmayasari, "Literasi Matematika Di Sekolah Inklusi," *Pros. Semin. Nas. Pendidik. Mat. dan Mat. Unviersitas Muhammadiyah Tangerang*, 2018.

[8] S. Fadjar, *Kemahiran Matematika*. Jakarta: Permendiknas, 2016.

[9] Sumaji, "Kegagalan Komunikasi Matematis Siswa dal am Pemecahan Masalah ditinjau Berdasarkan Karakterisiknya," *J. Math Educ. Nusant. Wahana Publ. karya tulis Ilm. di Bid. Pendidik. Mat.*, 2021.

Print ISSN: 25803573, Online ISSN: 25802437

[10] R. Mardiah, R. dan Charitas, "Model Guided Inquiry Student Team Achievement Division dan Kemampuan Penalaran Matematis Siswa," *J. Tadris Mat.*, vol. 10, no. 2, 2017.

[11] C. Zaman, B dan Eliyawati, *Media Pembelajaran*. Bandung: Universitas Pendidikan Indonesia., 2013.

[12] A. W. Wardono dan Kurniasih, "Peningkatan Literasi Matematika Mahasiswa melalui Pembelajaran Inovatif E-Learning Edmodo Bermuatan Karakter Cerdas Kreatif Mandiri," *J. Mat. Kreat. Inov.*, vol. 6, no. 1, pp. 95–102, 2015.

[13] R. Mawaddah, "Pengembangan Perangkat Pembelajaran Matematika Berbasis Pendekatan Matematika Realistik untuk Meningkatkan Kemampuan Penalaran Matematis dan Kemampuan Literasi Matematis Siswa MTs Negeri 2 Asahan," 2020.

[14] D. Ekowati, "Literasi Numerasi Di SD Muhammadiyah," *ELSE (Elementary Sch. Educ. Journal) J. Pendidik. dan Pembelajaran Sekol. Dasar*, vol. 3, no. 1, 2019.

[15] OECD, "Assessment and Analysis Framework: Science, Reading, Mathematic and Financial Literacy," *OECD Publishing*, 2021.

[16] S. Sunaryo, Utaminingsih and S. Suryani, Fitri Budi, Sumaji, "E-Module Based on Flip PDF Corporate of Integer Materials to Improve Mathematics Learning Outcomes Elementary School," *Numer. J. Mat. dan Penidikan Matmatika*, vol. 6, no. 2, pp. 153–162, 2022.

[17] I.-J. O. S. S. A. H. ; Purwanto, E. Rismiyanto, and Sumaji, "The Development of Adobe Animate Based Media in Learning Mathematics Class Five," *ICCCM J. Soc. Sci. Humanit.*, vol. 1, no. 5, pp. 1–6, 2022.

[18] A. Pamungkas, "Pengembangan Bahan Ajar Untuk Peningkatan Kemampuan Penalaran Matematis Mahasiswa Calon Guru Matematika," *JPPM*, vol. 9, no. 2, 2016.

[19] O. Dores, "Pengembangan Lks Berbasis Dongeng Untuk Meningkatkan Literasi Matematis Siswa Sekolah Dasar Se-Kota Sintang," *J. Pendidik. Mat. Indones.*, vol. 3, no. 2, 2018.

[20] A. Mullis, I. V., Martin, M. O., Foy, P., & Arora, *TIMSS 2015 International Results In Mathematics*. Boston College, 2015.

[21] S. Sumaji, Sa'dijah C., Susiswo, "Mathematical Communication Process of Junior High School Students in Solving Problems based on APOS Theory," *J. Educ. Gift. Young Sci.*, vol. 8, no. 1, 2020.

[22] J. Wildani, "Pengembangan Lembar Kerja Siswa (LKS) Berbasis Literasi Matematis Pada Materi Statistika," *AKSIOMA J. Mat. dan Pendidik. Mat.*, vol. 11, no. 1, 2020.

[23] M. Prabawati, "Pengembangan Lembar Kerja Siswa Berbasis Masalah dengan Strategi Heuristic untuk Meningkatkan Kemampuan Literasi Matematis," *Mosharafa J. Pendidik. Mat.*, vol. 8, no. 1, 2019.

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