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Development of Islamic boarding school-based learning tools on social arithmetic material to improve students' numeracy skills

Abstract

The numeracy abilities of students in Indonesia are still considered inadequate or quite low and must continue to be improved. One of the efforts made to improve students' numeracy abilities is by implementing learning tools that can support the development of these abilities. The research aims to develop learning tools that can be declared valid, practical, and effective, especially in social arithmetic material, and improve students' numeracy skills. This research is a development research with the 4D model from Thiagarajan. Thiagarajan's 4D stages include the definition, design, development, and deployment stages. The data collection techniques used are observation, questionnaires, and tests. The research results on developing Islamic boarding school-based learning tools are classified as valid, practical, and effective. The level of validity can be seen from the validation value: for the teaching module, it is 3.47; LKPD is 3.44; for the learning achievement test, it is 3.32; and the manual is 3.31 (maximum score 4), which is included in the valid category. The practicality value obtained from the students' activities was 90.7%, which was in the very good category; the implementation of learning was 3.56, which means high value; as well as the students' response questionnaire showed a positive value. The effectiveness value seen from the students' learning outcomes data was obtained at 87.0% classical completion. Not only that, effectiveness can be seen from the students' numeracy ability test, namely the results *pre-test*, which was an average of 34.87% increase in revenue *post-test* to 82.0%, which was then analyzed using the N-Gain test to obtain an average result of 0.73 which was included in the high category. Thus, Islamic boarding school-based learning tools on social arithmetic material can effectively be used to improve students' numeracy skills.

Keywords: Numeracy, social arithmetic, Islamic boarding school-based learning

Abstrak

Kemampuan numerasi peserta didik di Indonesia masih tergolong kurang atau cukup rendah dan masih harus terus ditingkatkan. Salah satu upaya yang dilakukan untuk meningkatkan kemampuan numerasi peserta didik adalah dengan menerapkan perangkat pembelajaran yang dapat menunjang berkembangnya kemampuan tersebut. Adapun penelitian yang dilakukan ini memiliki tujuan untuk mengembangkan perangkat pembelajaran yang dapat dinyatakan valid, praktis, dan efektif, khususnya pada materi aritmatika sosial serta mampu meningkatkan kemampuan numerasi santri. Penelitian ini termasuk dalam jenis penelitian pengembangan dengan model 4D dari Thiagarajan. Tahapan 4D dari Thiagarajan mencakup tahap pendefinisian, perancangan, pengembangan, dan penyebaran. Teknik pengumpulan data yang digunakan adalah observasi, angket, dan tes. Hasil dari penelitian pengembangan perangkat pembelajaran berbasis pesantren tergolong ke dalam kriteria valid, praktis, dan efektif. Tingkat kevalidan dapat dilihat dari nilai validasi, untuk modul ajar sebesar 3,47; LKPD sebesar 3,44; tes hasil belajar sebesar 3,32; dan buku petunjuk sebesar 3,31 (skor maksimal 4) yang termasuk pada kategori valid. Nilai kepraktisan diperoleh dari aktivitas santri sebesar 90,7% yang masuk dalam kategori sangat baik, keterlaksanaan pembelajaran sebesar 3,56 yang berarti bernilai tinggi, serta angket respon santri yang menunjukkan nilai positif. Nilai keefektifan dilihat dari data hasil belajar santri diperoleh 87,0% tuntas secara klasikal. Tidak hanya itu, keefektifan dilihat dari tes kemampuan numerasi santri, yakni hasil *pre-test* yang semula rata-rata 34,87% meningkat pada hasil *post-test* menjadi 82,0%, yang kemudian dianalisis menggunakan uji N-Gain dengan memperoleh hasil rerata 0,73 yang masuk dalam kategori tinggi. Dengan demikian dapat disimpulkan bahwa perangkat pembelajaran berbasis pesantren pada materi aritmatika sosial sudah layak untuk digunakan dan terbukti efektif untuk meningkatkan kemampuan numerasi santri.

INTRODUCTION

Mathematical literacy (numeracy) skills are mathematical skills needed for learning in the 21st century. This ability allows a person to understand and calculate numbers, calculate time, calculate prices, and analyze data, which are essential everyday competencies. Numeracy literacy skills are needed in all aspects of life, both at home and in society. For example, when shopping, starting a business, planning an activity, etc., the information is usually expressed in numerical/numbers

or graphic form (Mahmud & Pratiwi, 2019). Therefore, numeracy literacy is an important part of the skills or abilities that students must have.

Numeracy is the ability to think using procedural concepts, facts, and mathematical tools to solve everyday problems in various types of contexts that are relevant for individuals as Indonesian citizens and global citizens (Center for Assessment and Learning, 2020). According to Singh et al.(2021), numeracy is a fundamental mathematical concept in everyday life that includes skills in counting, comparing and being able to differentiate, recognizing shapes and positions, and solving problems. Numeracy includes the skill of applying mathematical concepts and rules in real everyday situations, where problems are often unstructured, and there are many ways to find complete solutions (GLN Team, Ministry of Education and Culture, 2017).

Although the numeracy results in Indonesia experienced an increase in rank, Indonesia's rank is still below the OECD average. Indonesia's PISA ranking position is ranked 69th out of 81 PISA participating countries with a score of 366 (OECD., 2022). This indicates that many Indonesian students still struggle with situations requiring problem-solving skills using mathematics(Puspendik, 2019). One of the factors causing low numeracy literacy skills in Indonesia, according to Fuadi et al. (2020), is due to low numeracy literacy skills, namely learning that is not contextual, meaning that the emphasis on understanding basic concepts and basic understanding of science is not linked to matters related to everyday life. If you want to improve students' numeracy skills, students should be used to solve problems related to everyday life.

Not only focused on the existing PISA results, based on the results of the pre-test that was carried out at the Mujadi Education Unit (SPM) Wustha Al-Amiryyah Banyuwangi, it was found that the average numeracy ability of students at the Mujadi Education Unit (SPM) Wustha Al-Amiryyah Banyuwangi was classified as requiring special intervention. After the publication of Minister of Religion Regulation (PMA) No. 18 of 2014, the Mujadi Education Unit is an official education program under the Directorate of Early Education and Islamic Boarding Schools of the Indonesian Ministry of Religion. This is equated with Madrasah Tsanawiyyah and "Aliyah" education, which is under the Directorate of Madrasah and Islamic Religious Education of the Indonesian Ministry of Religion. Islamic boarding schools can independently plan to develop the competencies of their students while still receiving a recognized diploma.

One of the reasons for the need for special intervention at the Wustha Al Amiriyyah Banyuwangi Mujadi Education Unit (SPM) is that the learning tools that are prepared are only adapted to student characteristics and learning outcomes, where mastery of existing basic literacy has not yet been developed, especially mathematical literacy. In general, to make learning more focused and meaningful, teachers use learning tools as a form of preparation before starting the learning process (Syamsiyah, 2015). According to the Decree of the Minister of Education and Culture No. 56 of 2022 concerning Guidelines for Implementing Curriculum in the Context of Learning Recovery, teaching tools are various teaching materials used by educators to achieve the Pancasila student profile and learning outcomes.

Based on the problem explained, it is necessary to have learning tools that can facilitate students in learning and improving numeracy skills in mathematics. This is because later, the learning tools

will be adapted to current learning, where teachers must carry out more learning activities that lead to student involvement and participation in and outside of class (Angraini et al., 2021). The learning tools in question consist of Teaching Modules, Student Worksheets (LKPD), and numeracy skills questions. Using everyday life contexts helps students learn abstract mathematical concepts through representation, thereby increasing students' motivation to study mathematics (Putri & Zulkardi, 2020). In line with this, the concept of social arithmetic is widely applied in everyday life (Satiti et al., 2021). Therefore, the learning tools that will be prepared will use mathematical problems from the Islamic boarding school context, which is suitable for learning social arithmetic.

Previous research related to the development of Islamic boarding school-based learning tools was carried out by Azhari and Mohammad Nadzir (2022). The research related to numeracy skills was conducted by Putri et al. (2022) entitled Development of Learning Tools Based on Lesson Study for Learning Communities with Cultural Values Using to Improve numeracy. The novelty of this research is that the researchers optimized the learning process by developing Islamic boarding school-based learning tools to create a conducive learning atmosphere by taking advantage of the students' habits or daily lives to improve the students' numeracy skills. Therefore, researchers are interested in conducting research titled **"Development of Islamic Boarding School-Based Learning Tools on Social Arithmetic Material to Improve Santri Numeracy Skills."**

METHOD

This research aims to create learning tools that include teaching modules, device user manuals, student worksheets, and test packages that are valid, practical, and effective. Therefore, this research is classified as development research that uses the 4D development model. The 4D model was chosen because of some reason. First, the stages used in the 4D model are more detailed and systematic, making the development process more manageable. Second, it involves experts' judgment in determining the final quality of a product being developed (learning tools) to guarantee that the prototype is constructed consistently based on the theory. Third, a defined stage is targeted to reflect or review the real needs based on the students' or learners' perspectives. The 4D stages are presented in Figure 1.

The definition stage is the first step in determining the terms or needs of learning. The design stage aims to compile the learning device until it becomes a

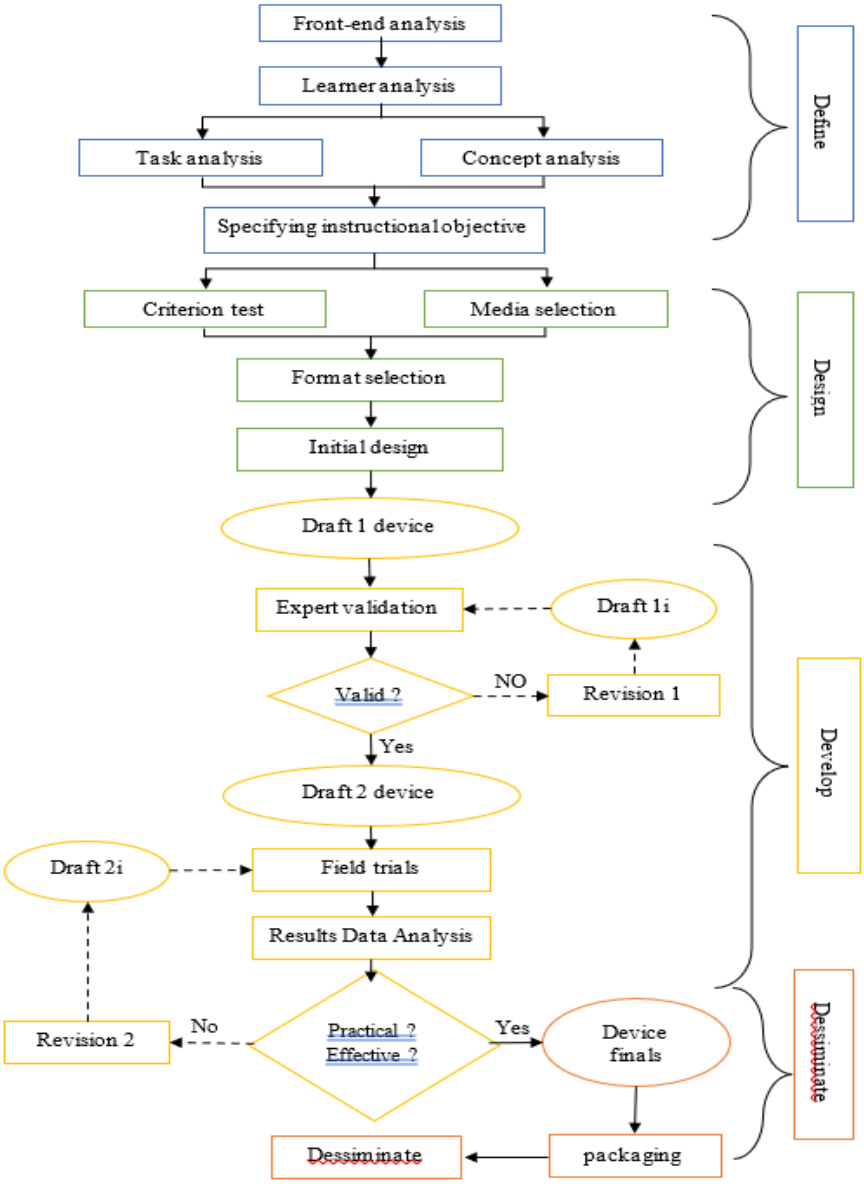


Figure 1. 4D Model Level

prototype. The development stage aims

to produce *draft* one learning tools, then *draft 1*. These are validated by experts and improved based on expert input and suggestions, which will then produce results *in draft* two, which is valid and ready to be carried out in the field trials; in the field trial process, there are two stages, namely small group trials in this stage to determine the readability of the learning tools and large group trials carried out to determine the practicality of the learning tools. The final process is the dissemination stage, which distributes the results of learning tools declared valid, practical, and effective within a broader range.

The testing area in this research was the Mujadi Wustha Al-Amiriyyah Banyuwangi Education Unit, with the sample for small group testing (readability test) being six students from class VIII and the large group testing sample consisting of 23 students from class VIIC. As for activities *pre-test* and *post-test* were given to analyze the increase in students' numeracy skills before and after participating in learning activities with Islamic boarding school-based learning tools. The practicality and effectiveness of data analysis will be carried out after the trial is complete.

This data's validity is analyzed to ensure that the learning tools and research instruments function properly. Next, the validation data is analyzed by summarizing the assessment data for each validator, calculating the average value of the validator results for each indicator, calculating the average value for each aspect, and calculating the total average value for all aspects (V_a). Then, learning tools and research instruments are declared valid if their validity score obtains a minimum average score of 3 for each validation item (maximum score of 4) (Hobri, 2021).

Data analysis related to practicality (easily to use) refers to the results of data that has been collected from the observation sheet on the implementation of the learning tool plan and then analyzed to see the practicality of the learning tool, namely by recapitulating the results of the observations, determining the average value of the observation results for each indicator, calculating the average value for each aspect. Observations and calculate the total average value from the average value for all aspects (I_0). Learning tools are declared practical if they obtain high criteria results with a minimum score of 3 for each aspect (maximum score of 4) (Hobri, 2021). Then, the device is said to be practical if the category of student activity observation that is met is at least good, and the number of students who answer in the affirmative, which is expressed as a positive response to each aspect, is more than equal to 80%.

Data analysis to effectiveness criteria can be seen from the test of learning outcomes and improvement of students' numeracy skills. The device is categorized as effective when the learning result test data is more than 70% of the total number of santri who complete classical with minimum completeness criteria 70, and the increase in the numeracy ability of santri in the N-Gain category of moderate numeracy ability is more than 70%.

The increase in students' numeracy abilities was measured from the numeracy ability learning outcomes test, which was then analyzed using N-Gain. The N-Gain formula is as follows.

$$g = \frac{St - Si}{Sm - Si} \times 100\%$$

Information :

g = *N-Gain percentage*
St = *score post-test*
Si = *score pre-test*
Sm = *maximum score*

RESULTS AND DISCUSSION

Results

Below, we will describe the process and results of developing Islamic boarding school-based mathematics learning tools using the PBL model to improve the numeracy skills of students using the 4D model, which includes the stages of definition, design, development, and dissemination.

Definition stage (define)

This stage consists of beginning-to-end analysis, student analysis, concept analysis, task analysis, and specification of learning objectives. Based on the initial and final activities, it was found that the existing problems were learning tools that needed to be more optimal for students to develop numeracy skills, learning resources still depended on textbooks, and learning methods were monotonous using lectures and assignments. Then, from the student analysis activities, it was found that the average data on the numeracy abilities of class VII students was still relatively low. The age range for class VII students is between 12 and 13 years, according to Jonh Piaget (Kamila et al., 2022); these students are already at the formal operational stage. Therefore, they can participate in the problem-solving process in class.

Then, concept analysis was carried out to identify the material content related to social arithmetic. This material is adapted to the Merdeka Curriculum, namely the Number Element, concerning taxes, profits, and discounts. This analysis can be in the form of tasks that lead to numeracy skills so that achievement indicators are maximized. Next, the learning objectives and outcome specifications in Phase D of the curriculum used in this learning tool will be determined.

Planning stage (design)

Activities at this stage include test preparation, media selection, format selection, and initial design. At the test preparation stage, numeracy test questions are prepared and arranged in the form of essay questions consisting of 3 questions and referring to numeracy indicators. This activity begins with making a test grid with alternative answers and scoring guidelines oriented toward numerical indicators. Media selection is carried out to assist in presenting learning material. The media used are whiteboards and LKPD, prepared based on the Problem-Based Learning (PBL) model. The function of the whiteboard media is to help students be actively involved in writing down and explaining the solutions they obtain during presentation activities. The choice of format is aligned with the Islamic boarding school-based learning model. The final step at the design stage is to design all learning devices, including teaching modules, device use manuals, Student Worksheets (LKPD), and learning outcomes tests.

The first design is a teaching module, which consists of 3 meetings. The teaching modules that will be developed refer to the Merdeka curriculum. Teaching modules are essential in supporting teachers in planning learning (Nesri & Kristanto, 2020). There is a cover and three main components in the teaching module. The main components are school identity, initial competencies, Pancasila student profile (P3), facilities and infrastructure, target students, and learning models used. The main components of learning include learning objectives, meaningful understanding, trigger questions, learning preparation, learning activities, assessment, enrichment, remedial,

and teacher and student reflection. In addition, attachments include LKPD, teacher and student reading materials, a glossary, and a bibliography(Maulida, 2022).

Then, the second plan is in the form of a device usage instruction book, which has a cover, PBL syntax, numeration indicators, and procedures to implement PBL model learning from the beginning to the end; this is arranged to help teachers create a learning process that matches the stages in the teaching module and aims to improve students' numeracy skills. According to Indrawati (2021), the instruction book provides information and guidance for the reader to carry out activities according to the instructions.

The third design is the Student Worksheets (LKPD) design, which consists of three LKPDs, which include the cover, student identity, learning objectives, problem presentation, *scaffolding*, solutions, and conclusions from problem-solving. There are three subjects used, namely taxes, profits, and discounts. The development of this LKPD can facilitate and make it easier for students to follow the learning process in class to create effective interaction between students. The existence of an exciting worksheet that meets the learning criteria must be there to stimulate student activity and train students' psychomotor skills and skills in the learning process in class (Maharani & Sari, 2024).

The fourth design is a learning outcomes test, which consists of a grid for preparing a numeracy test, a set of questions containing all of the statement items in the test, a scoring rubric, and a question-answer key. The test preparation grid is also adjusted to the Learning Outcomes in social arithmetic material. The test questions developed are contextual questions that are close to students, such as habits often carried out by students, characteristics of Islamic boarding schools, and so on. Tests are designed to measure students' qualities, abilities, skills, or knowledge against given standards, with a final assessment of whether they are acceptable (Indahri, 2021). When the test questions are relevant to the student's experience, knowledge, and interests, they will be more involved in measuring numeracy abilities more accurately. This learning outcomes test is used to analyze the device's effectiveness in terms of performance *pre-test* and *post-test*.

Development stage (develop)

At this stage, the teaching modules, device user manuals, LKPD, and learning outcomes tests are validated by experts who then carry out assessments and provide suggestions for revision so that later field trials can be carried out. Validation results can be seen in Table 1.

Table 1. Validation results of learning tools

Learning media	*Va*	Category
teaching modules	3,47	Valid
Devise user manuals	3,31	Valid
Student Worksheets (LKPD)	3,44	Valid
learning outcomes tests	3,32	Valid

Based on Table 1. The validation results of the four Islamic boarding school-based learning tools are in the score interval $3 \leq And < 4$ is categorized as valid. The conclusion is that the learning tool is declared valid.

Then, the development stage aims to analyze the practicality and effectiveness of the device. Student Worksheets (LKPD) and valid learning results tests, then a small group trial (readability test) was carried out in class VIII with the subject of 6 students whom the teacher had

selected to determine readability; the result was that there were no words or sentences that needed to be revised again. Then, the device was tested in the field, namely in class VIIC, for three meetings, and students were asked to work on test questions at the beginning and end of the meeting. Before starting learning, the teacher reads the user manual first so that learning can begin at the stages of creating the teaching module, which aims to improve students' numeracy skills. Then, follow the stages according to the teaching module that uses the PBL learning model.

At the first meeting, students were given a *pre-test*, which lasted 40 minutes. Then, the teacher starts the lesson by asking questions and daily problems so that the teacher can find out the students' problem-solving abilities, which will later be used to measure numeracy abilities. It is in line with the opinion that numeracy ability is a skill acquired in solving everyday problems (Mahmud & Pratiwi, 2019).

The next activity is to form groups of 4-5 students and continue distributing LKPD. Based on the results of observations, students' numeracy abilities emerged during the solving process, namely in the third PBL step. The first indicator that appears is applying various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life. Students use evidence when solving problems listed on the LKPD and express reasons for solving the problem. The following is picture 2—examples of problems on the student sheet.

When writing down the concepts that will be used, the students are still confused because they do not know the meaning of the concepts used, so the teacher gives them *scaffolding* to the students to produce the second indicator, namely, the students carry out an analysis of the explanations presented in various forms. This was confirmed by Yuliawanti et al. (2019) with the use of *scaffolding*. In problem-based learning activities, students' ability to solve problems is hoped to increase.

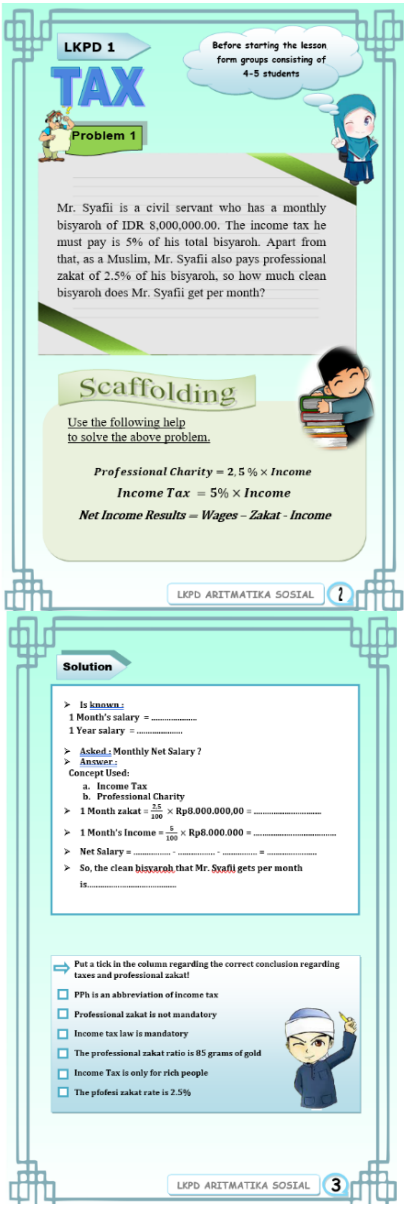


Figure 2. Problems that exist on students' worksheets

During the step of developing and presenting the results of their work, the students make a presentation by bringing up the third indicator, namely Interpreting the results of the analysis to predict and make decisions; they explain the conclusions of the problems that have been solved, the students also evaluate the

problem-solving process, actively discuss and ask questions between groups. In line with the opinion of Naja et al. (2022), the PBL model can help students interact with each other and work together to achieve group success. As a result, using this learning tool will help students master the material, solve problems, and improve their numeracy skills.

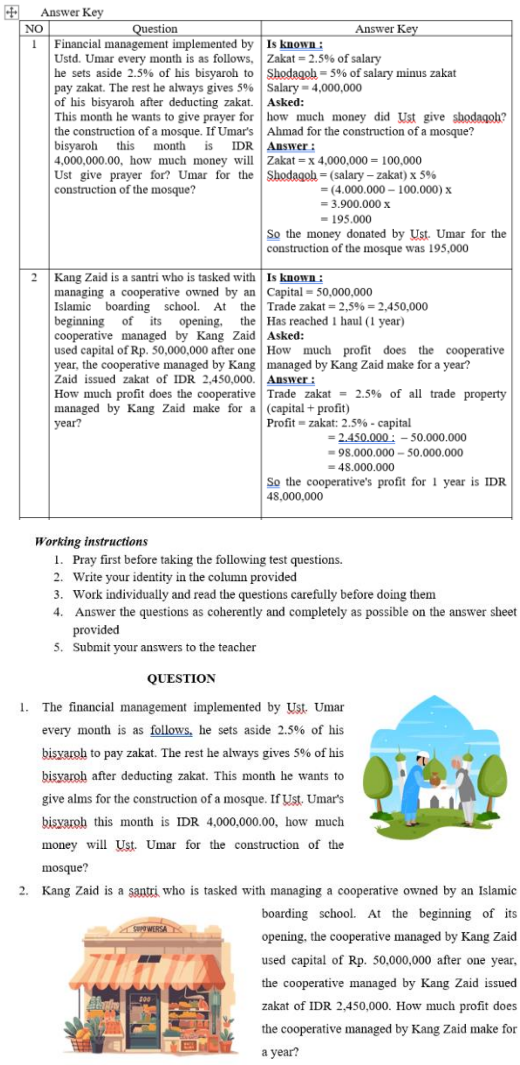
Next, the results of the practical analysis were carried out on the students' activities and learning tools, which were tested by observing the implementation of learning and observing the students' activities. The results of the practicality test can be seen in Table 2.

Table 2. Results of observations of student activities and implementation of learning

Results of observations	Meeting to-		
	1	2	3
student activities	89,5%	91%	91,5%
implementation of learning	3,25	3,58	3,83

The results of observations of student activities, the implementation of learning tools, and student response questionnaires were used as references for data analysis related to the practicality of the equipment. The average result of observing student activities was 90.7%, included in the very good category. The average result of observing the implementation of learning tools is 3.56, which is classified as high. The results of the student questionnaire responses were positive because more than 92% of the students answered "Agree" to each question asked. Thus, the teaching tools that have been prepared can be practical based on this data.

The following analysis determines the effectiveness criteria based on learning outcomes data and students' numeracy abilities. The first indicator related to learning outcomes data showed that 19 out of 23 students had a mean of 82.1 and a classical completion percentage of 87.0%. The second indicator is related to students' numeracy abilities, which can be seen from the increase in N-Gain. The average N-Gain is 0.73, which is included in the high category. Thus, the learning tools that have been prepared can also be effective based on this data. Here is picture 3. Questions and answer keys for the numeracy test.



Answer Key

NO	Question	Answer Key
1	Financial management implemented by Ustd. Umar every month is as follows, he sets aside 2.5% of his bisyaroh to pay zakat. The rest he always gives 5% of his bisyaroh after deducting zakat. This month he wants to give prayer for the construction of a mosque. If Umar's bisyaroh this month is IDR 4,000,000.00, how much money will Ust give prayer for? Umar for the construction of the mosque?	**Is known :** Zakat = 2.5% of salary Shodaqoh = 5% of salary minus zakat Salary = 4,000,000 **Asked:** how much money did Ust give shodaqoh? Ahmad for the construction of a mosque? **Answer :** Zakat = x 4,000,000 = 100,000 Shodaqoh = (salary – zakat) x 5% = (4.000.000 – 100.000) x = 3.900.000 x = 195.000 So the money donated by Ust. Umar for the construction of the mosque was 195,000
2	Kang Zaid is a santri who is tasked with managing a cooperative owned by an Islamic boarding school. At the beginning of its opening, the cooperative managed by Kang Zaid used capital of Rp. 50,000,000 after one year, the cooperative managed by Kang Zaid issued zakat of IDR 2,450,000. How much profit does the cooperative managed by Kang Zaid make for a year?	**Is known :** Capital = 50,000,000 Trade zakat = 2,5% = 2,450,000 Has reached 1 haul (1 year) **Asked:** How much profit does the cooperative managed by Kang Zaid make for a year? **Answer :** Trade zakat = 2.5% of all trade property (capital + profit) Profit = zakat: 2.5% - capital = 2.450.000 : – 50.000.000 = 98.000.000 – 50.000.000 = 48.000.000 So the cooperative's profit for 1 year is IDR 48,000,000

Working instructions

1. Pray first before taking the following test questions.
2. Write your identity in the column provided
3. Work individually and read the questions carefully before doing them
4. Answer the questions as coherently and completely as possible on the answer sheet provided
5. Submit your answers to the teacher

QUESTION

1. The financial management implemented by Ust. Umar every month is as follows, he sets aside 2.5% of his bisyaroh to pay zakat. The rest he always gives 5% of his bisyaroh after deducting zakat. This month he wants to give alms for the construction of a mosque. If Ust. Umar's bisyaroh this month is IDR 4,000,000.00, how much money will Ust. Umar for the construction of the mosque?

2. Kang Zaid is a santri who is tasked with managing a cooperative owned by an Islamic boarding school. At the beginning of its opening, the cooperative managed by Kang Zaid used capital of Rp. 50,000,000 after one year, the cooperative managed by Kang Zaid issued zakat of IDR 2,450,000. How much profit does the cooperative managed by Kang Zaid make for a year?

Figure 3. Questions and answer keys for the numeracy test

Deployment stages (Disseminate)

Mathematics learning tools are distributed offline, namely at the Mujadi Wustha Al-Amiriyyah Banyuwangi Education Unit, online, namely social media, which

includes Instagram, WhatsApp, Facebook, and also Islamic boarding school communication forums by providing a Google Drive link which contains all the tools so that the learning tools can be accessed by other teachers. Apart from that, this learning device also has intellectual property rights.

Discussion

The results of development research carried out in class VIIC of the Mujadi Wustha Al-Amiriyyah Banyuwangi Education Unit produced an Islamic boarding school-based learning tool with a PBL model that is valid, practical, and effective and can provide an opportunity to improve the numeracy skills of students. Valid criteria are obtained based on three validators' validity tests to determine whether the learning device carries out the measuring function correctly. Practicality criteria were obtained from student activities of 90.7%, learning implementation of 3.56, which means high value, and student questionnaire responses, which showed positive value. Meanwhile, the effectiveness criteria from the learning outcomes data obtained 87.0% classical completion. Not only that but effectiveness can also be seen from the numerical ability to increase N-Gain, which shows an average of 0.73 in the high category.

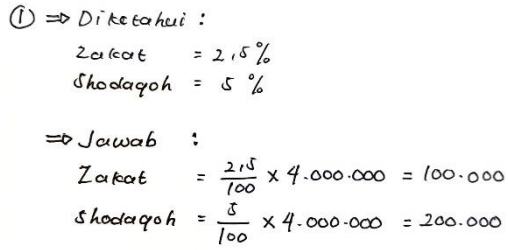
The exciting thing about this research is that it is at the development stage. It can be seen from the data obtained by observers that at the first meeting, it was 3.25, while at the second meeting, it increased to 3.58, and at the third meeting, it increased to 3.83. There was always an increase at each meeting. It shows that teachers were not used to using Islamic boarding school-based learning tools with the PBL model at the first meeting. Then, at the first meeting, there were some students who acted passively; there were no visible numeracy indicators and no initiative to ask questions; then, at the next meeting, the students slowly showed themselves to behave more actively, such as using concepts, facts, and reasons to complete the problem-solving process.

Based on observation data, this success is supported by teachers who intensively read user manuals that guide teachers' learning processes according to teaching modules using the PBL model. This data was obtained based on the results of interviews conducted with model teachers after the learning was completed. It is in line with Arifin (2020), that the instruction book is not only a direction but also a teacher's guide in making it easier to explain the material through the achievement of learning objectives.

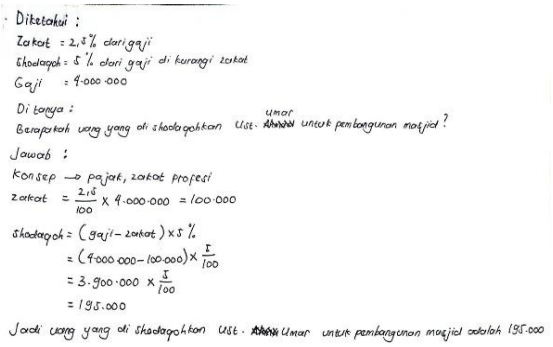
Figure 4. Learning process

Student Worksheets (LKPD), which are developed in such a way that uses the PBL model and numeracy indicators, can improve students' numeracy skills. Based on Figure 2, the students are more enthusiastic and eager to learn and discuss with their groups to solve the problems in the LKPD that has been distributed. This can also be seen from the results of observations, from initially only 1-2 groups that were active and showing numeracy indicators to almost the entire group showing good numeracy indicators during the problem-solving process. This is in line with research conducted by Festina & Warniasih (2021) that Student Worksheets (LKPD) with the PBL model can facilitate mathematical problem-solving abilities, as well as the problem-solving process, encouraging students to learn mathematics themselves (Pambudi et al., 2020).

The scaffolding in the Student Worksheets (LKPD) aims to guide students independently in solving problems. This was confirmed by Yuliawanti et al. (2019), who stated that the scaffolding involved in PBL syntax can accommodate students' problem-solving abilities. Based on the results of observations at meeting 3, the students were more enthusiastic, and learning was progressing conducive; the students worked together to solve problems, and the entire group solved problems independently by utilizing the scaffolding on the Student Worksheets (LKPD). During the presentation activity, each group representative asked questions for the presenting group, and the entire group concluded the results of the learning that had been carried out. In line with this, the use of learning tools in the context of everyday life helps students learn abstract mathematical concepts through representation, thereby increasing students' motivation to study mathematics (Putri & Zulkardi, 2020).



Translate: Given
Zakat : 2,5%
Shodaqoh : 5%
Answer :
Zakat : 2,5/100 x 4.000.000 = 100.000
Shodaqoh : 5/100 x 4.000.000 = 200.000



Given :
Zakat = 2.5% of salary
Shodaqoh = 5% of salary minus zakat
Salary = 4,000,000
Asked:
how much money did Ust give shodaqoh? Umar for the construction of the mosque?
Answer :
Zakat = 2.5/100 x 4,000,000 = 100,000
Shodaqoh = (salary – zakat) x 5%
= (4.000.000 – 100.000) x 5/100
= 3.900.000 x 5/100
= 195.000
So the money donated by Ust. Umar for the construction of the mosque was 195,000

Figure 5. Pre-test and post-test results of students' numeracy abilities

Then, after the learning using Islamic boarding school-based learning tools is completed, a test is held to determine whether there has been an improvement in the students' numeracy skills. Based on Figure 5. It can be seen from the pre-test (upside) results that the students have been able to simplify known problems. However, they have not yet been able to design a problem-solving strategy,

so the answers are still incorrect, and they have not been able to conclude and interpret the results of the answers in the students' sense. Meanwhile, in the post-test results (downside), the students have produced the three numeracy indicators, namely, being able to simplify problems by using mathematical concepts correctly. They have been able to design a solution strategy correctly and have been able to interpret and conclude the results of the answers reasonably.

Based on Figure 5. The numeracy skills of students can be increased by applying problems that are appropriate to the context of everyday life, which in this case is the problem of zakat, which is very closely related to the daily life of Islamic boarding schools. This is in line with research conducted by (Wahyuningtyas et al., 2020), which states that the contextual approach effectively supports students' numeracy abilities.

From the description presented, this research produces Islamic boarding school-based learning tools with a PBL model that is valid, practical, and effective and can improve students' numeracy skills. These good numeracy skills impact students in terms of helping them understand the application of mathematics in everyday life. Apart from that, students can use numeracy skills to project and interpret data and solve everyday problems (Masfufah & Afriansyah, 2021). In this way, we can develop qualified individuals to manage natural resources so that we can compete with other nations (Masjaya & Wardono, 2018).

Implications of Research

Further research is expected to use the findings of this research as reference material to apply more varied and innovative teaching and learning activities. Other researchers should conduct additional research to develop learning tools that use various materials and numeracy skills by a broader research subject.

Limitations

This research has limitations, namely that at the dissemination stage, it was carried out on a limited basis, and it was only distributed at the Mujadia Wustha school in Banyuwangi and several other sites. *Online* just. In addition, the research was conducted only at one school and for a limited time. In addition, it is hoped that dissemination activities will not only aim to be widely disseminated but that later, the tools developed can be used by other teachers and tested, thus allowing for criticism and suggestions for continuous improvement based on input from other people regarding the tools.

CONCLUSION

In the discussions that have been carried out, the PBL model Islamic boarding school-based mathematics learning tools developed using the 4D model can improve the numeracy skills of students. Findings obtained during the learning process were that there were no learning tools that could improve the numeracy skills of students, so the existence of Islamic boarding school-based mathematics learning tools with the PBL model provided an alternative for teachers and students to familiarize themselves with numeracy skills and improve numeracy skills as evidenced by the average gains. The average N-Gain value is in the high category. So, the development of Islamic boarding school-based learning tools using the Problem-Based Learning model has fulfilled the valid, practical, and effective categories.

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