Absis: Mathematics Education Journal
Vol. 7, No. 1, Mei 2025, pp. 40-56
ISSN 2686-0104 (print), 2686-0090 (online)
http://journal.univetbantara.ac.id/index.php/absis/index

Development of Student Worksheets (E-LKPD) to Strengthen Numeracy Literacy on Relations and Functions Material

Icha Cahyani [a,1], Yuli Fitrianti [a,2], Harisman Nizar [a,3*]

[a] Fakultas Keguruan dan Ilmu Keguruan, Pendidikan Matematika, UIN Raden Fatah Palembang, Palembang 30126, Indonesia
[1] cahyanii847@gmail.com; [2] yulifitrianti_uin@radenfatah.ac.id; [3] harismannizar_uin@radenfatah.ac.id*
* Corresponding Author

Received 10 April 2025; Accepted 19 Mei 2025; Published 31 Mei 2025

ABSTRACT

This study aimed to develop an Electronic Student Worksheet (E-LKPD) that is valid, practical, and has the potential to strengthen numeracy literacy on the topic of relations and functions. The type of research used was Design Research with a development study type that was divided into two stages, namely the preliminary stage and the prototyping stage with formative evaluation that included self evaluation, expert review, one-to-one, small group, and field test. The material used in the E-LKPD was relations and functions. Data collection techniques consisted of questionnaires, interviews, tests, and documentation. The questionnaires consisted of validity and practicality questionnaires. Validity data was obtained from the validity questionnaire which was analyzed quantitatively, while validator comments and suggestions were analyzed qualitatively. Practicality data was obtained through interviews and practicality questionnaire which were analyzed qualitatively and quantitatively at the one-to-one, small group, and field test stages. Meanwhile, potential effect data was obtained from student evaluation tests at the field test stage. The subjects of this study were eighth-grade students at SMP Negeri 7 Palembang. The result of the study showed that the developed E-LKPD was very valid, with an average validity percentage of 88.37%. The E-LKPD was also classified as practical with an average practicality percentage of 73.56%. Furthermore, the potential effect of the E-LKPD in strengthening students' numeracy literacy on the topic of relation and function was classified as moderate, with an average value of 70.63. This indicate that the developed E-LKPD had a potential effect to strengthen numeracy literacy on the topic of Relation and Functions.

KEYWORDS

E-LKPD
Numeracy Literacy
Relations and Functions
Development of Learning Media
Design Research

1. Introduction

The Merdeka Curriculum has been implemented since 2021 to improve education in Indonesia through the school mover program, which aims to improve the quality of learning (Masnun 2023). It is important for schools and educators to understand the curriculum structure, assessment, learning outcomes, learning objective flow, and project implementation. This curriculum carries the Merdeka Belajar concept which provides freedom to innovate, learn independently, and express creativity, with teachers as catalysts for change. The main goal is to produce competent students who have the profile of Pancasila students (Rahmadayanti dan Hartoyo 2022). Competency-based learning in the Merdeka Curriculum emphasizes relevant essential materials to give students time to develop creativity and master basic competencies. However, the implementation of the Merdeka Curriculum faces challenges, such as Indonesia's low mathematical literacy score in the 2022 PISA assessment, which indicates that numeracy literacy, which is important for understanding and solving everyday mathematical problems, needs to be strengthened (OECD 2023).

Absis: Mathematics Education Journal
Vol. 7, No. 1, Mei 2025, pp. 40-56

Numeracy literacy is defined as the knowledge and skills in using numbers and symbols related to basic mathematics to solve practical problems in various everyday contexts, analyze information presented in various forms (graphs, tables, and charts), and interpret it to make predictions and decision making (Han dkk. 2017).

One of the causes of low numeracy literacy is the difficulty in understanding important materials such as Relations and Functions, which are prerequisites for understanding other mathematical concepts (Rahmat dan Bernard 2023). Procedural errors in understanding this material also often occur (Anisa dan Kartini 2023). These errors are caused by lack of attention, inability to distinguish relations that are functions and non-functions, and rushing to perform algebraic operations without completing the problem to the final stage. This indicates the importance of a deep understanding of the correct definitions and procedures in solving mathematics problems, especially those related to Relations and Functions. In addition, the challenges in this learning are also caused by the limited open materials available in schools. Where, learning still does not utilize technology enough to create interactive and contextual teaching materials. The LKPD used at SMP Negeri 7 Palembang is still in the form of sheets of paper.

To overcome this problem, the use of technology in learning is a solution that can help improve students' understanding of difficult mathematics material. The use of technology in the form of software in mathematics learning in the 21st century has become a necessity, one of which is in the creation of interactive teaching materials that can help students understand the material and motivate them to learn. One of the software that can be used to support learning is "Canva" which allows teachers to help students to more easily understand difficult concepts, such as Relations and Functions. In addition, E-LKPD allows students to access teaching materials flexibly through digital devices such as smartphones or laptops, so that learning becomes more efficient and effective. According to (Apriliyani dan Mulyatna 2021), E-LPKD is an electronic worksheet that can be used using a laptop or smartphone anytime and anywhere. With E-LKPD which is designed interactively, students can more easily understand difficult concepts, such as Relations and Functions, and are motivated to be involved in mathematics learning.

Previous studies have shown that technology-based LKPD can improve numeracy literacy (Putri 2022; Sari dkk. 2023; Nurazizah dan Jana 2022). Based on these studies, the researchers consider it important to develop an E-LKPD to strengthen numeracy literacy on the topic of relations and functions, as it can help students understand difficult concepts through a more interesting and creative approach. This E-LKPD is designed using Canva to produce valid, practical products that have a potential effect on strengthening students' numeracy literacy.

2. Method

Based on the objectives of this study, the type of research that will be applied is the type of development research (Design Research) with the type of development study (Plomp dan Nieveen 2010). At the prototype development stage, it is carried out simultaneously with formative evaluation that adopts the Tessmer 1993 model. This development research consists of two stages, namely the preliminary stage and the prototyping stage using a formative evaluation flow that includes self-evaluation, expert review, one-to-one, small group, and field test.

2.1. Preliminary Research

As the beginning of development research, this stage consists of two stages, namely the preparation stage and the design stage.

2.2. Prototyping Stage

The stages in formative evaluation include: self-evaluation, expert review, one-to-one, small group, and field test. The following is the implementation flow that will be carried out.

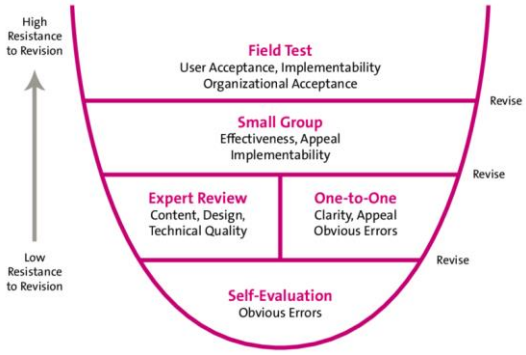


Fig. 1. Formative Evaluation Layer (Tessmer 1993)

At the Self Evaluation stage, the E-LKPD that has been developed will be evaluated by the researcher together with the supervising lecturer to find real errors so that improvements can be made. The results of the evaluation can be called prototype I. Then continued to the Expert Review and One-to-one stages, at this stage prototype I is tested for validity to 3 experts and tested to 3 students where comments and suggestions will be obtained which will be used as revision material to produce prototype II. Small group, at this stage it is done to see the aspects of effectiveness, efficiency, attractiveness and usability that can be seen from E-LKPD. Prototype II is tested on small groups, consisting of 6 students with low, medium and high ability levels to determine the practicality of the product being developed. at the Small group stage, comments and suggestions from students will be used to revise E-LKPD to produce prototype III. Field Test, at this stage the researcher tests prototype III to 1 class of students to determine the potential effects of the product being developed. At this stage the potential effect seen by the researcher is the strengthening of students' numeracy literacy.

Data collection techniques used in this study were questionnaires, tests, interviews, and documentation. The questionnaire sheet was used to determine the validity and practicality of the developed product. The questionnaire sheet used consisted of a validity questionnaire given to the validator and a practicality questionnaire given to students. The test was used to determine the potential effect of strengthening students' numeracy literacy. The interview used was an unstructured interview to obtain additional information related to the product according to the aspects being evaluated. Furthermore, documentation, where researchers collected documents in the form of validation sheets, practicality questionnaires, interview results, student worksheet results, and photos.

3. Result and Discussion

This study aims to produce E-LKPD to strengthen numeracy literacy on the material of Relations and Functions that are valid, practical and have a potential effect on numeracy literacy skills. This study consists of two stages, namely preliminary and prototyping stages using the formative evaluation design flow. The stages of developing E-LKPD to strengthen numeracy literacy on the material of relations and functions are as follows:

3.1. Preliminary Research

At this stage, the researcher conducted the preparation and design stages to develop E-LKPD to strengthen numeracy literacy in relation and function material. At the preparation stage, the researcher prepared himself for student analysis, curriculum analysis and needs analysis. The student analysis obtained that some students still had difficulties in learning mathematics, students were found to have difficulty in understanding story problems so that this became one of the causes of the hampered mathematics learning process. Curriculum Analysis, the curriculum used at SMP Negeri 7 Palembang is the independent curriculum. Needs analysis, obtained schools focused on

Absis: Mathematics Education Journal
Vol. 7, No. 1, Mei 2025, pp. 40-56

conventional learning which is a learning process that is fixated on textbooks so that it can be said that the learning used is still less interactive. Therefore, interactive teaching materials are needed such as electronic student worksheets (E-LKPD) so that they can help students understand the material given. So in this case, the researcher developed an electronic student worksheet (E-LKPD) with the hope of strengthening students' numeracy literacy to learn. Furthermore, at the design stage, several steps were taken in designing the E-LKPD product. First, the researcher collected references for Relation and Function materials that were not limited to printed books but also other references such as journals. Then the researcher collected images in the form of photos or sources on the internet. Second, the researcher designed the material and evaluation questions as attractively as possible using clear language. The design of the material was arranged according to the E-LKPD format.

Then the final stage, the researcher designed a learning video that is in E-LKPD. This video introduces the context of animal grouping and the steps of presenting relations that are packaged in an interactive video and then uploaded to the researcher's YouTube channel to then be inserted into E-LKPD.

3.2. Prototyping Stage (Formative Evaluation)

At the prototyping stage using formative evaluation developed by (Tessmer 1993), the results of the formative evaluation stage carried out are as follows:

3.2.1 Self Evaluation

After conducting the design process, the researcher self-evaluated the obvious errors by asking for input, comments and suggestions from the supervising lecturer on E-LKPD to strengthen the numeracy literacy of the Relation and Function material. The result of this self-evaluation revision is in the form of prototype I which will be tried in the next stage.

3.2.2 Expert Review

At the expert review stage, after the evaluation of prototype I, E-LKPD will be evaluated by validators or experts to determine the validity of the product. This validation involves 3 validators, namely 2 material experts from mathematics education lecturers and from mathematics teachers, while 1 validator is a media expert, namely an information systems lecturer. The validation technique that will be carried out by experts is by providing comments and suggestions on the product. The results of comments from experts will be used as a reference to improve E-LKPD.

The benchmarks used by researchers to determine experts at the expert review stage of E-LKPD development to strengthen numeracy literacy in relation and function material are as follows:

Table 1. List of Expert Review Names

Expert name	Institution	Areas of expertise	*Expert Riview*
Fe	UIN Raden Fatah Palembang	Information systems lecturer	Media
RA	UIN Raden Fatah Palembang	Mathematics education lecturer	Material
F	SMP Negeri di Palembang	Math teacher	Material

The comments and suggestions from the 3 validators are related to the assessment aspects of the material and media. The following comments and suggestions given by the validators can be seen in the table below.

Table 2. Expert Comments on E-LKPD

Validator	Comment
Validator 1	• Start and menu buttons should use an oval shape and be more consistent • Place the layout in the user manual below • Enlarge the font • Add 20% background sound to the video to make it more interesting • Change the icon for working on questions so that it looks like there are questions • Consistent font spacing • Adjust the images in the questions
Validator 2	Comments and suggestions for field test questions: • Pay attention to the indicators, don't just modify the questions • For evaluation questions no. 1 and no. 2, they do not match the indicators and have different materials • While several other questions (except questions no. 1 and no. 2) align with the indicators, they still need to be reviewed and possibly modified. Comments and suggestions for E-LKPD: • The concept and characteristics of the function are not yet clearly visible • Give two or more examples of relations, then name that relations 1 and 2 are not functions and relations 3 and 4 are functions by containing one or both characteristics of the relation as a function. Let the students answer for themselves what the difference is between a relation that is not a function and a relation that is a function. • Next, use the term set not a collection for codomain and domain.
Validator 3	• From the E-LKPD presented, it is good but not neat in the arrangement/writing in the google form. • Use simpler language that is easy for students to understand. If necessary, provide additional explanations or more real examples regarding the concept of relations and functions.

Based on the results of the assessment using a questionnaire at the expert review stage by each expert, the following results were obtained.

Table 3. Results of Validator Questionnaire 1

Rated aspect	Likert Score					Amount
	5	4	3	2	1	
Content	2	1				3
Design	3	4	1			8
Number of statements selected	5	5	1			11
Total score	25	20	3			48

Table 4. Results of Validator Questionnaire 2

Rated aspect	Likert Score					Amount
	5	4	3	2	1	
Content Suitability		10				10
Language	1	2				3
Number of statements selected	1	12				13
Total score	5	48				53

Table 5. Results of Validator Questionnaire 3

Rated aspect	Likert Score					Amount
	5	4	3	2	1	
Content Suitability	6	4				10
Language	3					3
Number of statements selected	9	4				13
Total score	45	16				61

Based on the results of the assessment using a questionnaire at the expert review stage by experts, the following results were obtained.

Table 6. Expert Validator Questionnaire Sheet Analysis Results

No	Validator	Score obtained	Skor Maks.	Percentage (%)
1	Validator 1	48	55	87,2
2	Validator 2	53	65	81,5
3	Validator 3	61	65	93,8
Validity Percentage				87,53 %
Validity categories				Very Valid

Based on the table above, the validation results from the validator who has validated the E-LKPD material on relations and functions are classified as very valid with an average assessment of the three validators of 87,53%. In addition, it can also be seen that the validator has given a decision that it is worthy of being tested by revising based on the comments and suggestions given. Based on the suggestions and comments from the validator in table 2, the researcher will revise prototype I. The revision will be carried out after the researcher obtains the evaluation results from the one-to-one stage.

3.2.3 One-to-one

At the one-to-one stage, the researcher conducted a trial on 3 students who had different abilities from low, medium, and high. The three students were MF, N, and L, who were students in grade VIII of a public junior high school in Palembang. At this stage, the researcher began by first providing an explanation of the E-LKPD that would be used which would later be accessed on their respective cellphones. Then the students were invited to watch a video containing the context of the grouping of animals in the questions in the E-LKPD and work on the E-LKPD. After the students finished working on the E-LKPD, the students were given a questionnaire sheet containing questions about the E-LKPD that had been presented. The following are the results of the practicality questionnaire analysis at the one-to-one stage, which can be seen in table 7.

Table 7. Results of the One-to-one Practicality Questionnaire Analysis

Rated aspect	Likert Score					Amount
	5	4	3	2	1	
Appearance	2	4	5	1		12
Material	2	6	3	1		12
Usage interactions	5	11	10	1		27
Number of statements selected	9	21	18	3		51
Total score	45	84	54	6		189
Overall score						74,1 %
Practicality category						Practical

Based on the results of the one-to-one questionnaire analysis of E-LKPD, seen from 17 statements, a percentage of 74.1% was obtained, which is included in the practical category. After conducting trials at the one-to-one and expert review stages, then conducting an analysis to be revised together. The results of the Expert review and One-to-one stage analysis are as follows.

Table 8. Revised Results of Expert Review and One-to-one Decisions

Comments and Suggestions	Revision
• The start and menu buttons should use an oval shape and be more consistent.	• The start and menu buttons use an oval shape and are more consistent.
• The layout in the user manual is placed below • The font is enlarged and the font spacing is consistent	• Layout of the user manual has been changed • The font has been enlarged and the spacing has been made more consistent
• In the video, add 20% background sound to increase the interest.	• 20% background sound has been added to the video
• Change the icon for working on questions so that it looks like there is a question and adjust the image in the question.	• Changing the icon for working on questions with an envelope sign and adjusting the images in the questions by adding animal images.
• Give two or more examples of relations, then name that relations 1 and 2 are not functions and relations 3 and 4 are functions by containing one or both characteristics of a relation that is a function. Let the students answer for themselves what the difference is between a relation that is not a function and a relation that is a function.	• Presenting two or more examples of relations, then naming relations 1 and 2 are not functions and relations 3 and 4 are functions by containing one or both characteristics of relations that are functions. Then presenting questions about the differences between relations that are not functions and relations that are functions.
• Next, use the term set instead of collection for codomain and domain.	• The term group is changed to set
• Pay attention to the indicators, don't just modify the questions • For evaluation questions no. 1 and no. 2, they do not match the indicators and have different materials • Questions no. 1 and no. 2) match the indicators, but need to be considered again in modifying them.	• For evaluation questions no. 1 and no. 2, adjust them to the indicators
• The E-LKPD presented is good but the arrangement/writing on the Google form is not very neat.	• Tidy up the arrangement/writing in Google Form
• Lack of instructions for the liveworksheet	• Adding instructions in liveworksheet

3.2.4 Small Group

The small group stage is a continuation of the previous stage. This stage is a trial stage of prototype 2 of E-LKPD. Prototype 2 is the result of a revision of the expert review and one-to-one stages which focused on assessing the practicality of using E-LKPD and the ease of students using E-LKPD. The researcher conducted a small group trial on class VIII and selected 6 students, then the researcher divided the students into two groups. The six students were SA, AA, ADO, RN, HM, and AK. At the small group stage, students were formed into small groups consisting of three students with low, medium, and high abilities. So in one group there are students with medium and high abilities, medium and low, then students are asked to discuss with their group members independently. After completing the E-LKPD, students are asked to fill out a questionnaire. The following is a description of the results of the practicality questionnaire analysis at the small group stage. The following is table 9 of the results of the practicality questionnaire analysis at the small group stage.

Table 9. Results of the Analysis of the Practicality Questionnaire for the Small Group Stage

Rated aspect	Likert Score				Amount
	5	4	3	21	
Benefits of using E-LKPD	1	16	19		36
Students' attitudes towards the use of E-LKPD	3	10	11		24
Use of E-LKPD	8	9	13		30
Number of statements selected	12	35	43		90
Total score	60	140	129		329
Overall score					73,1%
Practicality category					Practical

Based on the results of the interview and the results of the questionnaire, the students' understanding will be used to revise prototype II. The results of the revision decisions along with the improvements that have been made are in the following table.

Table 10. Small Group Revision Decision

Comments and Suggestions	Revision
• In the domain, codomain, and range sections, the image needs to be improved to make it clearer and more attractive, for example using better colors that are not blurry.	• Improve the image to make it clearer
• Google form cannot be opened, this is because you are not logged into Gmail	• Added instructions in the user manual for logging into Gmail so you can work on questions in Google Forms

After conducting a series of trials at the One-to-one stage and the small group stage to class VIII students at SMP Negeri Palembang, the practicality and products developed by the researcher can be seen. In the results of interviews with students at the one-to-one and small group stages, there were comments and suggestions submitted by students. Overall, it can be concluded that students gave a positive response to the E-LKPD that was developed. So that qualitatively, which is the result of the interview, it is known that the E-LKPD that was developed can be used by students.

3.2.5 Field Test

The final stage in the prototyping stage is the field test. This stage was carried out on September 23, 2024 in class VIII consisting of 20 students as research subjects. During the learning process, students will use the E-LKPD which was developed to see the potential effects on students' numeracy literacy through evaluations in the form of numeracy literacy-based questions that researchers will distribute. After completing the evaluation questions, researchers will distribute questionnaires to students to be filled in according to the students' assessment of the product. The following are the practicality questionnaire scores for each student obtained from the field test stage.

Table 11. Results of the Practicality Questionnaire Analysis at the Field Test Stage

Rated aspect	Likert Score					Amount
	5	4	3	2	1	
Manfaat pengunaan E-LKPD	18	34	68			120
Sikap siswa terhadap penggunaan E-LKPD	28	36	56			120
Jumlah pernyataan yang di pilih	46	70	124			240
Jumlah skor	230	280	372			882
Skor keseluruhan						73,5%
Practicality category						Practical

Based on the table above, the results of the practicality of all aspects at the field test stage showed that E-LKPD for strengthening numeracy literacy had an average practicality value of 73,5% with the criteria of "practical". Based on the results of the field test above, it can be concluded that the E-LKPD developed in accordance with the numeracy literacy indicators is good

and students can also use it to make it easier to understand the material on relations and functions and to solve problems listed in the E-LKPD activity.

Furthermore, to determine the potential effect of E-LKPD learning the material on relations and functions for strengthening numeracy literacy skills, evaluation practice questions were given to students. At this stage, students were given 4 questions that had numeracy literacy indicators. Where, question No. 1 part a is a level 1 question, and part b is a level 2 question. As for question No. 2 is a level 3 question, while question No. 3 is a level 4 question. question No. 4 part a is a level 5 question and question No. 4 part b is a level 6 question.

The discussion regarding the analysis of the level of students' numeracy literacy skills is as follows:

Question 1 part a

https://www.liputan6.com/hot/read/4528281/10-jenis-ikan-koi-beserta-harga-dan-cara-merawatnya-yang-benar

Ikan koi adalah ikan hias air tawar yang populer di kalangan penggemar akuarium. Seorang ahli ikan hias sedang mempelajari pertumbuhan ikan koi dalam sebuah kolam taman.

Ia menemukan hubungan yang menarik antara panjang dan berat badan ikan koi. Hubungan ini dapat dimodelkan dengan persamaan berikut:

$$f(x) = 0{,}05\,x + 0{,}2$$

Dimana:
f(x) = panjang ikan koi dari ekor hingga mulut ikan (m)
x = berat badan ikan koi (kg)

a. Berapakah panjang (dalam meter) seekor ikan Pesut yang memiliki berat badan 6 kilogram?

Evaluation question number 1 part a has a general context and is often encountered in everyday life. All the information needed to solve the problem is provided directly, and the question is clear, namely finding the length of the fish. This question is a type of descriptive question that tests level 1 numeracy literacy, where they only need to substitute values into equations and simple calculations, without complex analysis or understanding of concepts. The answer for student F is as follows:

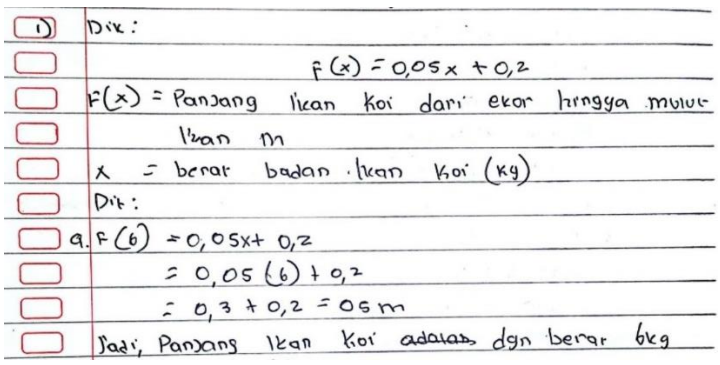


Fig. 2. Answer no. 1 part a student F

ISSN 2686-0104 (print), 2686-0090 (online)
Absis: Mathematics Education Journal
Vol. 7, No. 1, Mei 2025, pp. 40-56

F answered correctly, starting by writing down the relevant symbols and numbers. F also completely presented the known data and all parts of the question. In solving F, substituted the weight value of the koi fish in the equation, did the calculations correctly, and wrote the conclusion clearly.

Question 1 part b

https://www.liputan6.com/hot/read/4528281/10-jenis-ikan-koi-beserta-harga-dan-cara-merawatnya-yang-benar

Ikan koi adalah ikan hias air tawar yang populer di kalangan penggemar akuarium. Seorang ahli ikan hias sedang mempelajari pertumbuhan ikan koi dalam sebuah kolam taman.

Ia menemukan hubungan yang menarik antara panjang dan berat badan ikan koi. Hubungan ini dapat dimodelkan dengan persamaan berikut:

$$f(x) = 0{,}05\,x + 0{,}2$$

Dimana:
f(x) = panjang ikan koi dari ekor hingga mulut ikan (m)
x = berat badan ikan koi (kg)

b. Jika peneliti ingin membuat sebuah akuarium khusus untuk ikan Koi dengan panjang maksimum 1,5 meter. Berapa kilogram berat maksimum ikan Koi yang dapat hidup nyaman di akuarium tersebut menurut model/persamaan diatas?

This question involves a more complex situation, namely determining the size of an aquarium based on the maximum length of a fish. This type of question is included in level 2 numeracy literacy, where students are expected to be able to interpret and recognize situations in contexts that require direct inference and select relevant information from a single source and use a single representation method. The answer for student F is as follows:

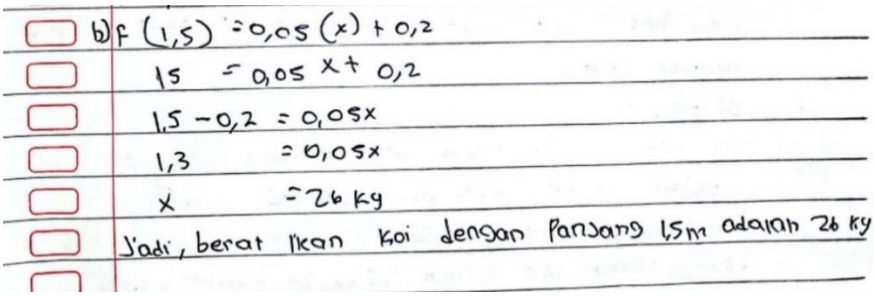


Fig. 3. Answer no. 1 part b student F

In the work, student F answered correctly. F read the question and understood that the maximum length of the aquarium (1,5 meters) limits the maximum length of the koi fish, which is a direct inference: if the fish is too long, it will not fit in the aquarium. F then found the maximum weight of the fish that corresponds to that length, replacing f(x) with 1,5 in the equation. F identified important information and solved the problem using the existing equation. The conclusion is written clearly in the context of the question. A total of 18 students were able to answer question number 1 part b correctly.

Question 2

https://jogja.tribunnews.com/2023/09/25/5-fakta-unik-tentang-pesut-mahakam-si-lumba-lumba-air-tawar-yang-hampir-punah

Gambar di atas adalah seekor ikan Pesut. Ikan Pesut adalah salah satu hewan yang hidup di sungai Mahakam Kalimantan Timur. Hubungan antara panjang ikan Pesut (p) dan berat badannya (b) adalah sebagai berikut :

P = 0,1 b + 0,4

Dimana:

p = panjang ikan Pesut dari ekor hingga mulut ikan (m)

b = berat badan ikan Pesut (kg)

a. Seekor ikan Pesut memiliki berat 8 kg. Tentukan berapa panjang ikan Pesut……. m

b. Seekor ikan Pesut memiliki panjang 2 m. Tentukan berat badan ikan Pesut. Berat badan ikan Pesut..... kg

Then in question number 2 parts a and b, the type of question tested is a descriptive question. This question is one form of level 3 numeracy literacy question, with the indicator that students can carry out procedures well and clearly, including procedures that require sequential decisions. They can choose and apply simple problem-solving strategies. Student R answered correctly. A total of 16 students were able to answer question number 2 correctly. Student R's work can be seen as follows:

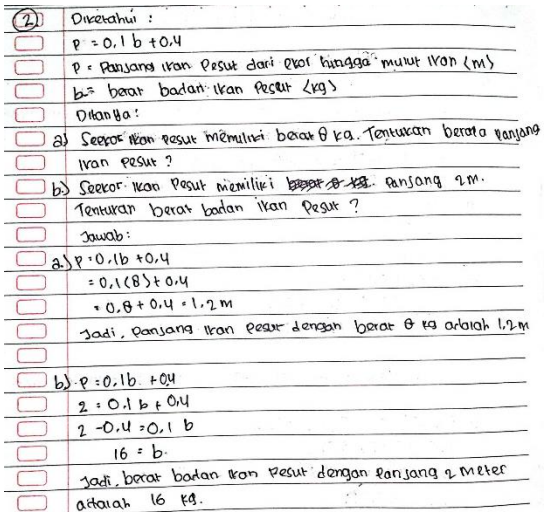


Fig. 4. Answer no. 2 student R

In working on this problem, students read the problem and understand the context of the relationship between the length and weight of the Pesut fish. Students identify the known information and realize that they need to find the length of the fish (p) and its weight. The equation given relates the length and weight of the fish, so students decide to use a substitution strategy. This procedure is carried out well and clearly, including steps such as substitution, multiplication, and addition. Finally, students write a conclusion correctly.

Question 3 part b

1. Jean ingin mengetahui berapa banyak penguin di koloni dalam beberapa tahun ke depan. Dia membuat beberapa asumsi:

- Pada awal tahun, ada 10.000 penguin (5000 pasang).
- Setiap pasangan penguin memiliki satu anak setiap tahun pada musim semi.
- Pada akhir tahun, 20% dari semua penguin (baik dewasa maupun anak) akan mati.

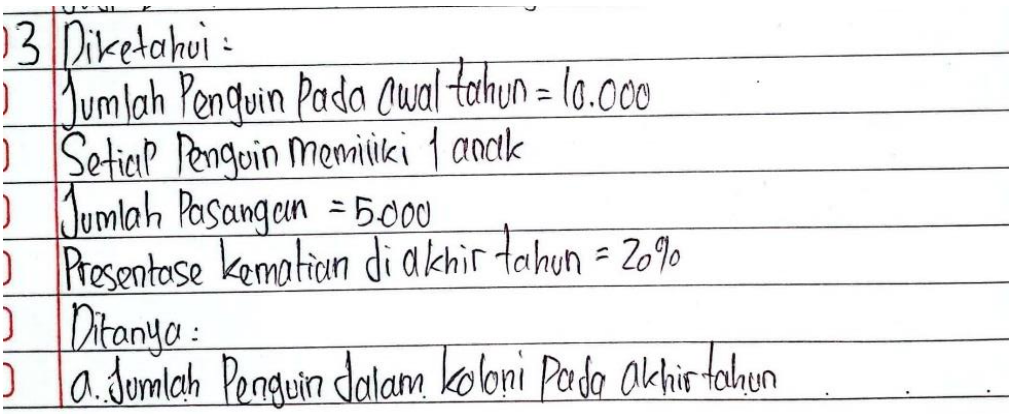
a. Pada akhir tahun pertama, berapa banyak penguin (dewasa dan anak) yang ada di koloni?

b. Selanjutnya, Jean juga berpikir bahwa koloni akan terus berkembang dengan aturan berikut:

- Pada awal tahun, koloni berisi penguin jantan dan betina dengan jumlah yang sama yang membentuk pasangan penguin.
- Setiap pasangan penguin memiliki satu anak penguin pada musim semi setiap tahun (konstan).

Berdasarkan aturan di atas, berapa banyak penguin yang ada setelah 5 tahun?

In question number 3 part b, included in level 4 numeracy literacy, with the indicator that students can work effectively with models in concrete but complex situations. They can select and integrate different representations, and relate them to real situations. Solving this question requires several steps, starting from analyzing information, building models, to interpreting the results. The following are the answers of AMT students:



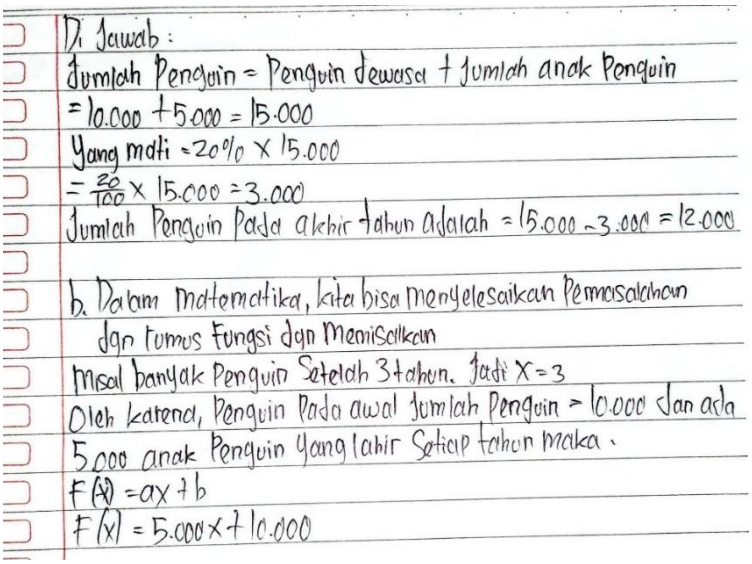
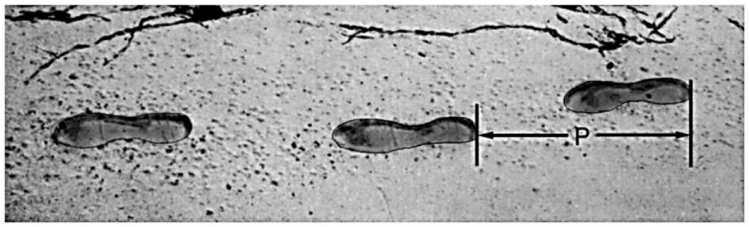


Fig. 5. answer No. 3 for AMT students

In their work, AMT students did not answer completely correctly because on average students only answered up to part a. In solving this problem, students first analyzed the available information. Then AMT students determined the number of penguins in the colony at the end of the year, then determined the function formula, but the solution of these students was not completed until the final stage.

Question 4 part a and part b



Gambar di atas menunjukkan jejak kaki seorang berjalan. Panjang langkah x adalah jarak antara titik belakang dua jejak kaki yang berturutan. Untuk laki-laki, hubungan antara jumlah langkah per menit **x** dan panjang langkah f(x) dirumuskan sebagai:

f(x) = 1/140x

ket:
x adalah jumlah langkah per menit
f(x) = panjang langkah dalam meter

a. Jika Adi berjalan 60 langkah per menit, berapakah panjang langkah Adi menurut rumus di atas? Tulis langkah penyelesaiannya.
b. Disisi lain, jika Adi mengetahui panjang langkahnya 0,8 meter, jika rumus di atas diterapkan pada Adi. Hitunglah kecepatan Adi berjalan dalam meter per menit dan dalam kilometer per jam. Tulis langkah penyelesaiannya

Questions in part a are included in level 5 numeracy literacy, where students are expected to be able to work with models in complex situations, know the constraints faced, and make guesses. They can choose, compare, and evaluate strategies to solve complex problems with mathematical

ISSN 2686-0104 (print), 2686-0090 (online)
Absis: Mathematics Education Journal
Vol. 7, No. 1, Mei 2025, pp. 40-56

concepts related to this model. For example, students must calculate Adi's stride length with the given formula. QS students successfully calculated Adi's stride length when walking, but also realized that the formula did not apply when Adi ran. This shows that students can not only calculate, but also understand and evaluate the mathematical model used. The QS answer is as follows:

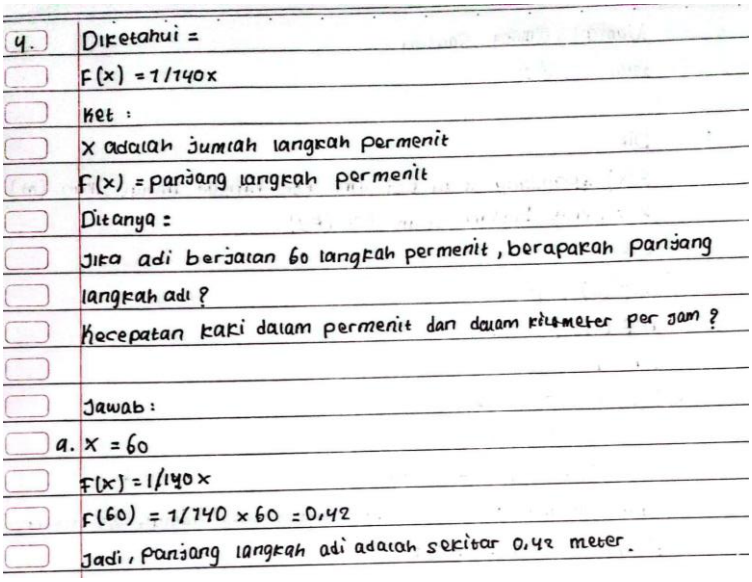
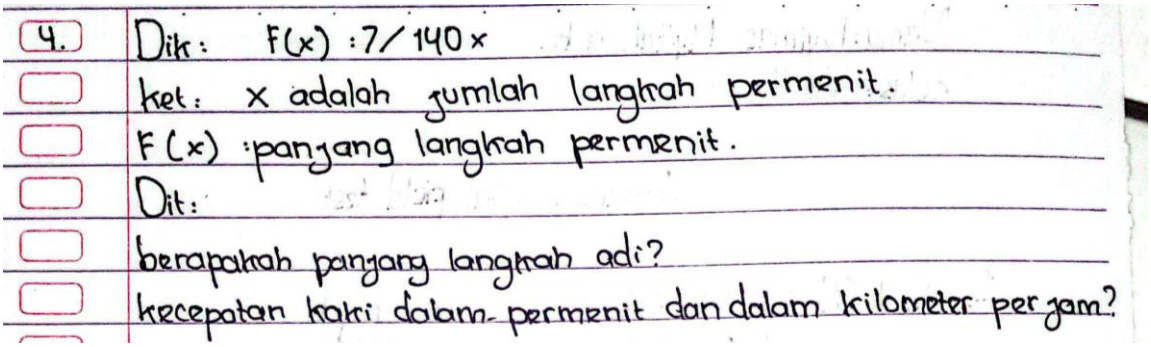

4. Diketahui =
F(x) = 1/140x
Ket :
x adalah jumlah langkah permenit
F(x) = panjang langkah permenit
Ditanya :
Jika adi berjalan 60 langkah permenit, berapakah panjang langkah adi ?
Kecepatan kaki dalam permenit dan dalam kilometer per jam ?
Jawab :
a. x = 60
F(x) = 1/140 x
F(60) = 1/140 x 60 = 0,42
Jadi, panjang langkah adi adalah sekitar 0,42 meter.

Fig. 6. Answer no. 4 part a QS students

QS students answered correctly. QS first analyzes the available information, then calculates the stride length by substituting the given values into the equation. In question number 4 part a, only 9 students managed to answer correctly.

Furthermore, question part b is included in numeracy literacy level 6, where students are expected to be able to conceptualize and generalize using information based on modeling and review in a complex situation. Students need to analyze patterns and make general conclusions. In answering the question, students understand that the formula f (x) shows the average stride length. They then realize the relationship between stride length, number of steps per minute, and speed. They also understand the importance of changing units from meters per minute to kilometers per hour. Students then calculate the number per minute using the given formula and convert it to kilometers per hour. They can also explain how to change speed units in general. And they understand other factors that can affect walking speed. This shows the students' ability to understand and relate mathematical models to real situations. The QS answers are as follows:


4. Dik: F(x) : 7/140x
Ket: x adalah jumlah langkah permenit.
F(x) : panjang langkah permenit.
Dit:
berapakah panjang langkah adi?
kecepatan kaki dalam permenit dan dalam kilometer per jam?

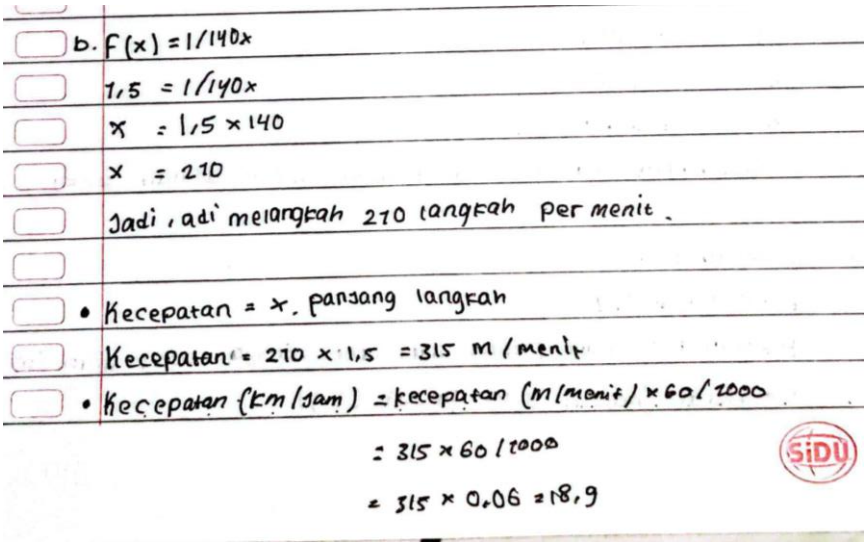


Fig. 7. Answer No. 4 part b QS students

QS students answered correctly. QS built models, analyzed patterns, and made generalizations based on the results of the analysis. QS first analyzed the available information, then substituted the values in the equation and finally generalized by changing the distance unit of steps per minute to kilometers per hour. A total of 7 students were able to answer question number 4 part b correctly. The following is a recapitulation of students' field test scores.

Table 12. Table of Total Recapitulation of Student Field Test Scores

No	Name	Question Items Based on Numeracy Literacy Indicators								Total Points	Value
		Question 1		Question 2		Question 3		Question 4			
		a	b	a	b	a	b	a	b		
1	MRP	3	0	1	0	0	0	0	0	4	16.67
2	MFAK	3	3	3	3	2	0	3	3	20	83.33
3	DA	3	3	3	3	3	2	3	3	23	95.83
4	SPA	3	3	3	3	3	3	2	0	20	83.33
5	QS	3	3	3	3	2	2	3	3	22	91.67
6	F	3	3	3	3	3	3	3	3	24	100
7	AF	3	3	3	3	2	0	3	0	17	70.83
8	DAF	2	3	2	3	2	2	2	2	18	75
9	MA	3	3	3	3	2	3	3	3	23	95.83
10	AOV	3	3	1	0	0	0	0	0	7	29,17
11	MRP	0	2	1	1	0	2	1	0	7	29.17
12	AMT	3	3	3	3	3	2	0	0	17	70.83
13	MRS	3	3	3	3	0	0	0	0	12	50
14	R	3	3	3	3	3	2	3	0	20	83.33
15	N	3	3	3	3	3	3	3	3	24	100
16	NSR	3	3	3	3	3	3	3	3	24	100
17	A	3	3	3	3	3	0	0	0	15	62.5
18	MS	3	3	3	3	3	3	0	0	18	75
19	MR	3	3	3	3	0	0	0	0	12	50
20	AF	3	3	3	3	0	0	0	0	12	50
		Grand total value									1413
		Average									70.63

Table 13. Percentage of Numeracy Literacy Achievement at Each Level

Indikator Kemampuan Literasi Numerasi					
Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
93.9%	93.9%	87.5%	50%	53.3%	38.3%

It can be seen in Table 13 that the highest percentage is at level 1-3 with an average of 91,3%, while the lowest percentage is at level 4-6 with an average of 47,2%. Furthermore, to categorize the level of numeracy literacy, we need to calculate the average score of students and their standard deviation. The average score of students is 70,63, with a standard deviation of 25,67. These numbers are then used in the formula to determine the level of numeracy literacy ability. Thus, the following are the results of the analysis of student learning based on the scores obtained from the numeracy literacy indicators.

Table 14. Final Ability Question Analysis Results for the Field Test Stage

Intervals	Category	Frequency
$x \geq 96.29$	High	6
$44.95 \leq x < 96.29$	Medium	8
$x < 44.95$	Low	6

Based on the table 12, it is known that the average evaluation score is 70.63, which is obtained from the total score divided by the number of students. From these results, it can be concluded that the analysis of the evaluation questions shows that the potential effect on students' numeracy literacy skills is included in the moderate category. In this context, students' numeracy literacy is considered to be strengthened because it is in the moderate category, which indicates that they receive positive reinforcement through the learning that is carried out, so that their numeracy literacy skills can develop and be maintained. This reinforcement occurs because students get positive feedback that encourages them to continue to improve their numeracy literacy skills.

4. Conclusion

Based on the results of the analysis and discussion in this study, it can be concluded that the E-LKPD for strengthening numeracy literacy on the Relation and Function material developed is stated to be very valid with a validity percentage of 88.37% based on the validation results of three experts on the media and material aspects, so it is suitable for use after revision according to suggestions. In addition, this E-LKPD is also practical to use in learning, with an average practicality of 73.56% based on trials at the One-to-One, Small Group, and Field Test stages, where students considered this E-LKPD interesting and easy to use. Furthermore, E-LKPD has a potential effect in improving numeracy literacy, which is shown through an increase in students' ability to solve problems with a final average value of 70.63 (medium category), as well as increasing students' involvement and curiosity about the material being studied.

References

Anisa, Uirma Isnani, dan Kartini. 2023. "Analisis Kesalahan Siswa Berdasarkan Teori Kesalahan Kastolan dalam Menyelesaikan Soal Relasi dan Fungsi Kelas VIII SMP IT Bangkinang." *Edumatica: Jurnal Pendidikan Matematika* 13 (02): 172–80.

Apriliyani, Sita Wahyu, dan Fauzi Mulyatna. 2021. "Flipbook E-LKPD dengan Pendekatan Etnomatematika pada Materi Teorema Phytagoras." *Seminar Nasional Sains* 2 (1): 491–500.

Han, Weilin, Dicky Susanto, Sofie Dewayani, Putri Pandora, Nur Hanifah, Miftahussururi, Meyda Noorthertya Nento, dan Qori Syahriana Akbari. 2017. *Materi Pendukung Literasi Numerasi*. Jakarta: Kementerian Pendidikan dan Kebudayaan.

Masnun, Moh. 2023. "Kesiapan Madrasah Ibtidaiyah Dalam Menghadapi Implementasi Kurikulum Merdeka." *Jurnal Cahaya Mandalika* 4: 235–46. https://doi.org/10.36312/jcm.v4i1.1327.

Nurazizah, Ervi, dan Padrul Jana. 2022. "Pengembangan LKPD Matematika Berbasis Open Ended Problem Berorientasi Literasi." *Jurnal Gammath* 7 (2): 133–42. https://doi.org/10.32528/gammath.v7i2.8429.

OECD. 2023. *PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA. Perfiles Educativos.* Vol. 1. Paris: OECD Publishing. https://doi.org/https://doi.org/10.1787/53f23881-en.

Plomp, T, dan N M Nieveen. 2010. *An introduction to educational design research*.

Putri, Mona Yulivia. 2022. "Pengembangan LKPD Berbasis PMR Untuk Meningkatkan Kemampuan Literasi Numerasi Siswa Di MTsN 17 Tanah Datar." Institut Agama Islam Negeri (IAIN) Batusangkar.

Rahmadayanti, Dewi, dan Agung Hartoyo. 2022. "Potret Kurikulum Merdeka, Wujud Merdeka Belajar di Sekolah Dasar." *Jurnal Basicedu* 6 (4): 7174–87. https://doi.org/10.31004/basicedu.v6i4.3431.

Rahmat, Agus, dan Martin Bernard. 2023. "Rahmat, A., & Bernard, M. (2023). Analisis Kesalahan Siswa Kelas VIII dalam Menyelesaikan Soal Relasi dan Fungsi." *JPMI - Jurnal Pembelajaran Matematika Inovatif* 6 (1): 83–90. https://doi.org/10.22460/jpmi.v6i1.11091.

Sari, Riska Novita, Isnaniah, Rusdi, dan Ulva Rahmi. 2023. "Pengembangan LKPD Berbasis Model Pembelajaran Problem Based Learning dengan Konteks Literasi Numerasi Peserta Didik Kelas X SMK N 1 Palembayan." *Journal on Education* 5 (4): 15490–502.

Tessmer, M. 1993. *Planning and conducting formative evaluations improving the qualitiy of education and training (pertama)*. Kogan Page.