

Development of Mathematic Literature Questions Based on Profile of Pancasila Students with The Digital Quiz Platform Kahoot

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Abstrak

Literasi matematis menjadi penting tidak hanya karena literasi matematis merupakan tantangan yang terdapat pada pembelajaran abad 21, melainkan juga menjadi penting karena rendahnya tingkat literasi matematis yang dihasilkan oleh survei PISA (*Programme for International Student Assessment*) dari tahun ke tahun. Maka upaya dalam meningkatkan kemampuan literasi matematis di Indonesia harus tetap dilaksanakan. Adapun salah satu upaya untuk meningkatkan kemampuan literasi matematis siswa yaitu dengan membiasakan siswa dalam mengerjakan soal literasi matematis. Penelitian ini bertujuan untuk (1) menghasilkan soal literasi matematis berbasis profil pelajar pancasila melalui platform kuis digital kahoot di SMP/MTs yang valid, praktis, dan efektif sebagai upaya untuk meningkatkan kemampuan literasi matematis siswa. Penelitian ini menggunakan jenis penelitian pengembangan model ADDIE dengan lima tahapan didalamnya yaitu (1) *analysis*, (2) *design* (3) *development*, (4) *implementation*, dan (5) *evaluation*. Subjek penelitian ini adalah kelas VII E MTs Salafiyah Syafi'iyah Tebuireng Jombang. Instrumen yang digunakan adalah lembar validasi, angket respon, dan soal tes. Penelitian ini menghasilkan 14 butir soal literasi matematis berbasis profil pelajar pancasila melalui platform kuis digital Kahoot di SMP/MTs yang valid, praktis, dan efektif. Dengan skor kevalidan mencapai 90% yang berarti sangat valid, skor kepraktisan mencapai 83% yang menunjukkan sangat praktis, dan skor ketuntasan belajar siswa mencapai 76,6%. Sehingga produk yang dikembangkan dapat dikatakan valid, praktis, efektif atau memiliki efek potensial dalam meningkatkan literasi matematis siswa.

Kata kunci: Kahoot, Profil Pelajar Pancasila, Soal Literasi Matematis.

Abstract

Mathematical literacy has become important not only because mathematics literacy is a challenge to learning in the 21st century, but also because of the low level of mathematic literacy produced by the PISA (Programme for International Student Assessment) surveys from year to year. Then efforts in improving mathematical literacy in Indonesia must continue to be carried out. One of the attempts to improve students' mathematical literacy is to get them to work on mathematics literacy. This research aims to (1) produce mathematical literacy issues based on student profiles of pancasila through a valid, practical and effective digital quiz platform in SMP/MTs as an attempt to improve student mathematics literacy. This research uses the type of ADDIE model development research with five stages in it: (1) *analysis*, (2) *design* (3) *development*, (4) *implementation*, and (5) *evaluation*. The subject of this research is a class VII E MTs Salafiyah Syafi'iyah Tebuireng Jombang. The instruments used are validation sheets, response lifts, and test questions. The research produced 14 mathematical literacy details based on student profiles of pancasila through the valid, practical, and effective digital quiz platform Kahoot in junior high school. With a validity score of 90% which means very valid, a practicality score of 83% which shows very practical, and a student's learning accuracy

score of 76.6%, so that the product developed can be said to be valid, practical or effective or to have a potential effect in improving students' mathematical literacy.

Keywords: Kahoot, Mathematic Literature Questions, Student Profile of Pancasila.

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INTRODUCTION

Learning in the 21st century has the competence or skills that students need to master, namely basic literacy, then competence that refers to high-level thinking skills and then character formation (Laksono et al., [2018](#)). There are 16 skills that students need to master in this 21st century. The skills are divided into three categories as mentioned above, one of which is basic literacy which includes literacy, mathematics, science, ICT (Information and Communication Technology), financial, and cultural and citizenship literacy. By mastering literacy then students will be helped in developing their ability to understand, interpret and use information in various contexts because in this 21st century access to information is so abundant that students need to have the skills to judge the truth of information found (Mardhiyah et al., [2021](#)).

Laksono et al. ([2018](#)) explains that literacy development needs to be applied to learning in all subjects, as in mathematics subject so that such literacy can be called mathematical literacy. Specifically, mathematical literacy is an individual's ability to think mathematically and formulate, employ, and interpret mathematics to solve problems in various real-world contexts. It covers concepts, procedures, facts and tools to describe, explain and predict phenomena that can help individuals to know the role of mathematics in the world and to make the judgments and decisions required by 21st-century students who are constructive, engaged and reflective (OECD, [2023](#)).

Mathematical literacy has become important not only because mathematics literacy is a challenge to learning in the 21st century, but also because of the low level of mathematic literacy produced by the PISA (Programme for International Student Assessment) surveys from year to year. Then efforts in improving mathematical literacy in Indonesia must continue to be carried out. As for one of the attempts to improve students' mathematical literacy, it is to get them to work on mathematics literacy (Tarisa et al., [2023](#)).

Apart from the literacy category, there are two other categories of skills that students need to master in this 21st century: competencies that refer to high-level thinking skills and character formation. The challenge in the formation of this character became a reference to the planned profile that is loaded in the independent curriculum and should be owned by 21st

century Indonesian students namely Student Profile Pancasila. The student profile of Pancasila has six dimensions in it: 1) believing, fearful of the One God and being noble, 2) being global, 3) roaring, 4) self-reliant, 5) critical, and 6) creative (Irawati et al., [2022](#)). The six dimensions indicate that Pancasila's student profile is not only focused on cognitive abilities, but also attitudes and behaviour as an Indonesian nation and world citizen (Suprayitno, [2020](#)).

In addition to the above-mentioned learning challenges of the 21st century, the use of technology in learning is also a challenge that is being implemented. Based on this, teachers are required to use technology through digital platforms in their learning processes such as learning implementation or evaluation implementation in order to produce a generation capable of technology and information. One digital platform that can support the implementation of assessments using technology is Kahoot (Saraswati et al., [2022](#)). Kahoot is a game-based digital quiz platform used to review students' knowledge, for formative assessments or to leave traditional class activities (Wang & Tahir, [2020](#)).

There is a study carried out by Tarisa et al. ([2023](#)) entitled "Development of mathematical literacy based on profile of students of pancasila for students of secondary school/MTs". The research resulted in 13 valid and reliable questions based on student profile of Pancasila after being tested on students of class IX D. Therefore, in this research, the researchers are also developing similar products using digital technology. In this study, the Pancasila student profile dimensions used only 4 among others (1) global self-reliance, (2) critical, (3) creative, and (4) independent.

METHOD

This research uses developmental research. The development model used in this research is the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The ADDIE model was developed by Dick and Carry and is used to design a product in learning such as learning models, learning strategies, teaching materials, media, test instruments and so on (Mulyatiningsih, [2013](#)). The model consists of five steps which initially combine its activities: analysis, design, development, implementation, and evaluation. As for each step in this model, it is interrelated and focused on the evaluation stage. This suggests that the evaluation phase can be carried out at any other stage if necessary, as in the [Figure 1](#) of the ADDIE phase according to Tegeh & Kirna ([2013](#)).

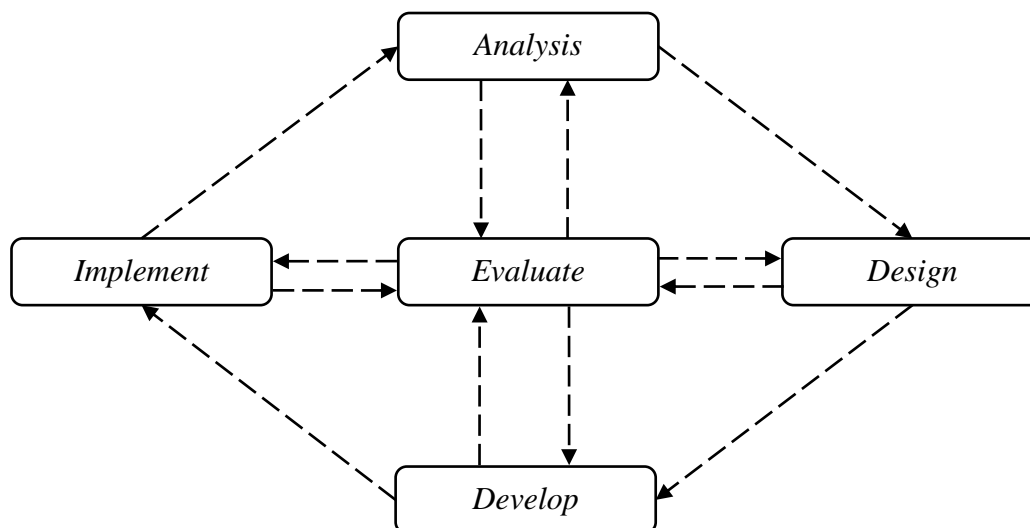


Figure 1. ADDIE Model Phase

Subjects in this study are as many as 30 students of class VII E school year 2023/2024. In this study, samples from the VII E class of 30 students were selected based on several scientific reasons that support the validity and relevance of the results. First, class VII E represents a student population in the transitional phase from basic learning to a more complex level in mathematics, which is a crucial period for introducing and developing mathematical literacy skills. Second, a sample of 30 students is a sufficient sample size to carry out statistical analysis and allows researchers to obtain representative data without facing large logistical challenges and resources, as well as enabling in-depth analysis related to students' responses to the issues developed. Third, grade VII E is selected on the basis that the class has homogeneous characteristics in terms of the level of initial ability and educational background, which can help reduce unwanted variability in research results. Overall, sampling from the VII E class of 30 students provides a balance between practicality and accuracy in this study, enabling researchers to obtain quite representative and relevant data in the context of development and evaluation of mathematical literacy based on Pancasila Student Profile through the Kahoot platform.

The data-gathering techniques used in this study are validation sheets, response lifts, and test questions. In this study there are three data analysis techniques, among others: (1) validity test of the product carried out by material experts and media experts before the product is implemented, (2) product practicality test seen from the results of the evaluation or student response after using the product, and (3) product effectiveness test from the result of

students working on mathematical literacy based on the profile of students pancasila with the help of the digital quiz platform Kahoot.

Validator writes the evaluation results on each validation sheet where each material expert and media expert has some aspects that need to be evaluated in it. As for the material expert validating sheet, there are aspects among others (1) content validation aspects, (2) presentation aspects of material, and (3) language aspects. While the media expert validation sheet has aspects such as (1) graphics, (2) media accessibility, and (3) visual communication. In this case the scale used is the likert scale with 5 categories of evaluation namely: Very Low (value 1), Less (values 2), Good enough (3), Good (4), and Very Good (5) (Sumandani & Saraswati, [2022](#)). The evaluation results obtained from the validators are calculated on an average using the formula:
$$\text{Score percentage} = \frac{\text{sum of assessment score per aspect}}{\text{maximum assessment score per aspect}} \times 100\%$$

Further, the average results obtained are classified according to certain criteria for determining the level of viability of the developed product. The product is said to be valid if each aspect has a minimum criterion that is sufficiently valid. As for product validity criteria as [Table 1](#).

Table 1. Product Validation Criteria

Validity Score interval	Criteria
$0 \leq x \leq 20\%$	Invalid
$20\% < x \leq 40\%$	Less valid
$40\% < x \leq 60\%$	Enough valid
$60\% < x \leq 80\%$	Valid
$80\% < x \leq 100\%$	Very valid

Source: (Sumandani & Saraswati, [2022](#))

Data on the practicality of the product developed is seen from the results of the evaluation or student response after using a product of mathematical literacy based on student profile pancasila presented digitally using the digital quiz platform of Kahoot. In this case, the assessed aspects include (1) aspects of user response to the digital Quiz platform, (2) the user response aspects to the question, and (3) the response of the user to the sustainability of the use of the Digital Quiz platform. In general, the analysis of the data is done by grouping the data and then calculating the average of each aspect and the total average. Further, the average results are classified on the basis of the criteria applicable to the determination of the level of practicality of the developed product. A product is said to be practical if each aspect gets a

minimum criterion that is quite practical. Here are the provisions of the criteria presented in the [Table 2](#).

Table 2. Product practicality criteria

Practicality score intervals	Criteria
$0 \leq x \leq 20\%$	Non-practical
$20\% < x \leq 40\%$	Less practical
$40\% < x \leq 60\%$	Quite practical
$60\% < x \leq 80\%$	Practical
$80\% < x \leq 100\%$	Very practical

Source: (Nesri & Kristanto, [2020](#))

Analysis of product effectiveness data obtained from student learning outcomes, in this case is characterized by the accuracy of learning students who reached the KKM. Data analyzed is the student's score of results working on the product of the topic developed. The KKM (Minimum Qualification Criteria) value used by is 75. The maximum value of the learning outcome is 100. The classical learning qualification is achieved when more than 75%. The following is the classical quantity of learning outcomes calculated using the following formula:

$$\text{Percentage of Qualifications} = \frac{\text{sum of student who have passed the test}}{\text{sum of student taking the test}} \times 100\%$$

RESULTS

The development of mathematical literacy based on student profiles presented digitally through Kahoot begins with the phase of analysis, but the things that need to be analyzed related to this research are curriculum analysis and material analysis.

a) Curriculum Analysis

The curriculum used are independent curriculums so that the entire device refers to the independent Curriculum. Curriculum analysis is used as a reference in formulating product frames that match Learning Access (CP) and Defence Objectives. (TP). As for the material used in mathematical literacy based on the student's profile, these pancasila are lines and angles, flat build, flat side building, and curved side building. These materials are included in Phase D, which is the measurement and geometry elements of the Learning Achievement provided by the Students. As for the CP on the measurement

element is at the end of phase D students can explain ways to determine the surface area and volume of building space (prisma, tube, ball, limas and nodules) and solve the related problems. Whereas on the geometry element is at the end of phase D students can use the inter-angle relationship formed by two intersectional lines, and by two parallel lines cut a transversal line to solve the problem and At the end of phase D students can explain how to determine the area and circumference of square flat buildings (square, long square, semi-shaped, lattice and trapezium) and solve the related problems.

b) Analysis of Materials

The mathematics lesson of the 7th semester is a little different from the one that is generally applied to the other classes, because to anticipate the occurrence of the reappearance of the previously taught material. Thus the mathematics teachers agreed on the mapping of new material with such considerations that have been made. In this full semester the ongoing material in class VII includes lines and angles, building flat, building a flat side space, and building a curved side space. In the matter of lines and angles students learn about the understanding of lines, the position of two lines (even and cut), the kinds of angles (latent, elbow-like, narrow, straight, and reflective), the relationship between angles, and the relation between the angles formed from two parallel lines cut by another line (frontal, one-sided, opposite, and backward).

In flat building materials, students learn square and triangular flat builds such as the elements they possess as well as the wide and surrounding formula. A square flat building covers square, square lengths, squares, slopes, trapeziums, and pavements. In this material students are required to be able to find the space and the circumference on each of these flat buildings as well as can solve the problems related to the area and the surrounding on the flat building.

In the building material of a flat side space, students learn about the kinds of builds of a plane side space: beams, cubes, prisms, and limas, then the elements of the building as well as the formulas to find the surface area and volume of each building. In this material students are required to be able to find the surface area and volume of each building space as well as to solve problems related to the area of surface and volume on building space.

The last one is the building material of the curved side space. In this material students learn about the kinds of buildings of curved side space namely tubes, nodes, and balls then the elements that have such buildings as well as the formulas used to find the size of surface and volume on each build. In this material students are required to be able

to find the surface area and volume of each building space as well as to solve problems related to the size of the surface and volume on building such space.

The second stage of this research is planning. (design). The creation of mathematical literacy plans based on the profile of students of Pancasila through the digital quiz platform Kahoot is based on curriculum and material applicable in MTs Salafiyah Salafi'iyah Tebuireng Jombang, in particular a set of CPs, TPs, and ATPs that have been obtained. At the planning stage, this includes the creation of a grid of subjects developed by mapping mathematical literacy and student profiles of pancasila. Here's a draft on mathematical literacy based on profile of student pancasila with digital quiz platform Kahoot the [Table 3](#).

Table 3. The plan of the matter

Mathematical Literacy	Student Profile Pancasila	Summary of Subjects
Formulate	Global superstition	4
	Critical thinking	2
	Independent	1
Employe	Global superstition	1
	Critical thinking	2
	Creative	1
	Independent	1
Interpret	Global superstition	1
	Independent	1
Total summary of items		14

The third stage of this research is development. (development). At this stage of development, a realisation of the previous planning phase was carried out, namely the creation of mathematical literacy issues based on student profiles of pancasila by guiding on the grids that have been made. Here's an exhibition in the development process. The fourteenth of them can be seen in the following [Table 4](#).

Table 4. Details about

Nomor soal	Materi	Literasi matematis	Profil pelajar pancasila
1	Lines and angles	Formulate	Bernalar Kritis
2	Lines and angles	Formulate	Global superstition
3	Lines and angles	Formulate	Independent
4	Flat building materials	Employe	Creative

5	Flat building materials	Formulate	Global superstition
6	Flat building materials	Interpret	Global superstition
7	Building material of a flat side space	Formulate	Global superstition
8	Building material of a flat side space	Employe	Global superstition
9	Building material of a flat side space	Formulate	Critical thinking
10	Building material of a flat side space	Employe	Independent
11	Building material of the curved side space	Formulate	Global superstition
12	Building material of the curved side space	Employe	Critical thinking
13	Building material of the curved side space	Interpret	Independent
14	Building material of the curved side space	Employe	Critical thinking

Once the whole draft is done, then the questions that the researchers have designed are presented on the Kahoot digital quiz platform. Here's an overview of some of the 14 questions on the Kahoot Digital Quiz platform.

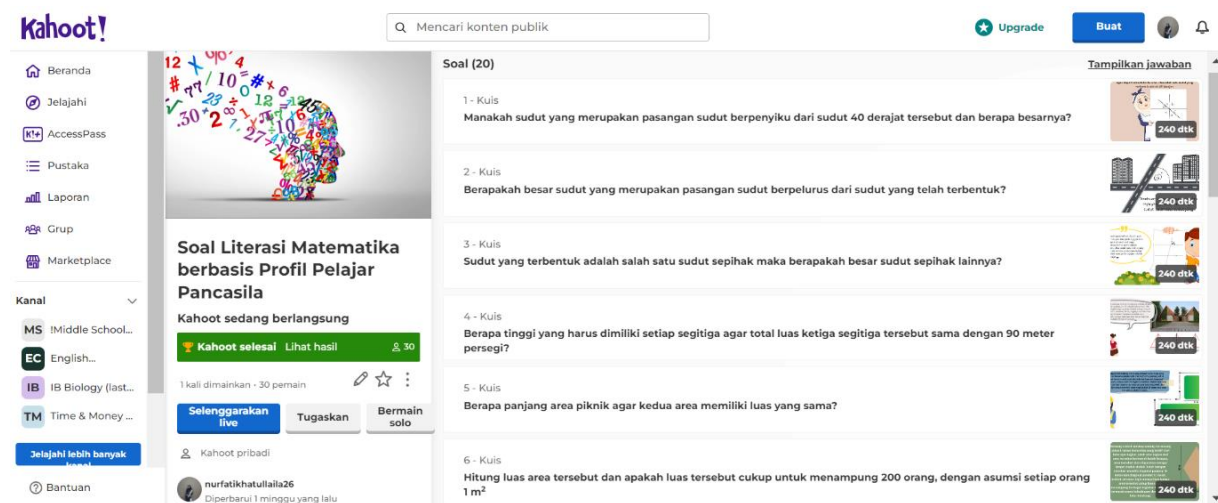


Figure 2. Question view on the kahoot

Once the product is fully realized, the next stage is validation. At the development stage, validation is carried out by two validators, the material expert and the media expert, with each validator being one person. In the process of validation, the researcher obtains criticism and advice that is used as a reference for improving the product in question. Criticism and advice given by the media expert validator only on the use of image illustration on the subject, besides by the validator media expert on this subject has been considered valid

from the media side. So the action carried out by the researchers later is to make improvements by using image illustrations that correspond to the subject as a whole. While the criticism and advice of the validator of the material is generally based on the language aspect, the researcher then performs the revision on the basis of the critique and advice by the material expert.

In addition to the criticism and advice given by the validator, the evaluation based on the validation sheet is also given by a validator to determine the validity of the issues developed. As for the percentage of the score obtained from the number of scores gained on each aspect divided by the maximum score of each aspect and then multiplied by 100% the [Table 5](#).

Table 5. Material expert validation results

Num	Assessment Aspects	Total score	Score percentage	Criteria
1	Content validity	30	100%	Very Valid
2	Presentation of Materials	34	97%	Very Valid
3	Language	33	94%	Very Valid
	Average		97%	Very Valid

On the basis of [Table 5](#), it can be seen that the results of the evaluation of the material expert obtained an average of 97% which is very valid. Whereas the validation of material expert is presented in the following [Table 6](#).

Table 6. Media expert validation results

Num	Assessment Aspects	Total score	Score percentage	Criteria
1	Graphics	31	88%	Very Valid
2	Media accessibility	25	83%	Very Valid
3	Visual communication	29	82%	Very Valid
	Average		84%	Very Valid

Based on [Table 6](#), it can be seen that the value obtained from the media expert validator of 84% or entered the criteria is very valid.

After all the processes in the development phase are completed through the improvement then the product is tested in the implementation phase. The test was conducted on 7th grade E as many as 30 students on Wednesday 19th June 2024. This test is used to determine the level of practicality and effectiveness on mathematical literacy issues based on student profiles of pancasila through the digital quiz platform Kahoot. As for the level of

practicality of the product, it is seen from the student's response after using the product of [Table 7](#).

Table 7. Results of product practicality analysis

Assessment aspect	Percentage	Criteria
User response to Kahoot digital quiz platform	85%	Very practical
User Response to Question	78%	Practical
User response to continued use of the Kahoot digital quiz platform	88%	Very practical
Average	83%	Very practical

Based on the results of the product practicality analysis, an average of 83% is obtained which shows the criteria are very practical. Then it can be known that the product developed namely Mathematical Literacy Based Student Profile Pancasila through the Kahoot Digital Quiz Platform at the VII E can be said to be very practical.

The next is the effectiveness of the product that can be seen from the results of students working on mathematical literacy based on the profile of students pancasila through the digital quiz platform Kahoot [Table 8](#).

Table 8. Students' learning outcomes

Num	Number student	Summary score	Description
1	230145	86	Reach
2	230146	78	Reach
3	230147	78	Reach
4	230148	78	Reach
5	230149	36	Non-reach
6	230150	71	Non-reach
7	230151	71	Non-reach
8	230153	86	Reach
9	230155	78	Reach
10	230156	36	Non-reach
11	230157	71	Non-reach
12	230158	78	Reach
13	230159	93	Reach
14	230162	78	Reach
15	230163	78	Reach
16	230164	86	Reach
17	230165	100	Reach
18	230166	78	Reach
19	230167	71	Non-reach
20	230168	36	Non-reach
21	230169	86	Reach
22	230170	78	Reach

23	230171	78	Reach
24	230172	78	Reach
25	230173	78	Reach
26	230174	78	Reach
27	230175	86	Reach
28	230176	78	Reach
29	230179	86	Reach
30	230180	78	Reach
Summary score		2.271	
Average score		75,5	Reach
Percentage of Qualifications		76,6%	

Based on [Table 8](#), which is the result of the students of VII E from working on mathematical literacy based on the profile of students of Pancasila through the digital quiz platform Kahoot, it is known that 7 of the 30 students are not qualified or do not meet the KKM scores set by the school. As for the percentage of accuracy obtained, it was 76.6%. In the development research on mathematical literacy based on student profiles of pancasila through the digital quiz platform Kahoot is said to be effective when the percentage of student accuracy exceeds 75% of the total student. Thus it can be concluded that the question of mathematical literacy based student profile pancasila through the digital quiz platform Kahoot can be said to be effective or have a potential effect in improving student mathematics literacy.

DISCUSSION

Based on the presentation of the above research results, this study produced a set of mathematical literacy issues based on student profiles of pancasila on line and angle material, flat build, flat side space build, and curved side space building presented digitally through the Kahoot quiz platform. According to Tarisa et al. ([2023](#)), accustoming students to working on literacy is one of the efforts to improve student mathematical literacy. Then by integrating the values of pancasila in each subject is also an effort in the formation of student character. It supports the development of mathematician literacy based on student profile of Pancasila where in its composition based on indicators of process components on mathematics literacy and the elements that are present on the dimension of student profile pancasila. The product has been developed through several stages according to the ADDIE model development procedure which includes the phases of analysis, design, development, implementation, and evaluation. This research is aimed at producing a product, but not only

that, this research is also done to find out the level of validity, practicality, and effectiveness of the topic developed.

As for the data obtained on the validation of the media expert validator, we can see in [Table 6](#), where of the three assessed aspects there is the lowest score on the visual communication aspect with an average of 82%, this is because the images presented are less in line with the situation on the subject so the researchers corrected them. Based on [Table 5](#) and [Table 6](#), the development of mathematical literacy based on the profile of students of Pancasila through the digital quiz platform Kahoot obtained the percentage of average values from media expert validator is 84% and material expert is 97%. So from the results can be summarized that the topic developed reaches the criteria "very valid". This is in line with the opinion of Nesri & Kristanto (2020) which says that percentages of more than 80% to 100% are included in very valid criteria.

After the validation and improvement phase, the issues developed are then tested at the implementation stage. In this case, the test was carried out in class VII E as many as 30 students. In this large class test, the data obtained is the student's response after using the product to know the level of practicality of the product and the students' learning results from working with the product in order to know its effectiveness. The results of practicality analysis can be seen in [Table 7](#), on the [Table 7](#) it is seen that the achievement of the percentage of average student response score is 83%. By guiding the opinion of Nesri & Kristanto (2020) that stated that percentages of more than 80% to 100% are included in the criteria very practical, then it can be concluded that the issue of mathematical literacy based on profile of students pancasila through the digital quiz platform Kahoot said was highly practical.

Then the level of effectiveness of the topic developed can be seen from the score of the students working on the subject. In the [Table 8](#) can be seen the learning results of students of VII E from working on mathematical literacy based on student profile pancasila through the digital quiz platform Kahoot, known 7 of 30 students are not qualified or do not meet the grade of KKM set by the school is 75. As for the percentage of qualification obtained is 76.6%. Whereas in the development research of mathematics literature based on profile of students Pancasila via the digital Quiz platform Khoot is said to be effective when meeting the average KKM is 75 and percentages of student learning qualification reaches more than 75% of all students. This is in line with the opinion of Saraswati et al. (2021) which states that the effectiveness of test instruments is seen from the student learning test results, and students are said to be qualified when they have obtained the minimum grade of the established KKM

then the percentage of qualifying is achieved if at least 75% of the total number of students are qualified. Thus, the question of mathematical literacy based on student profile of pancasila through the digital quiz platform Kahoot can be said to be effective or have a good effect in improving student mathematics literacy.

Based on the exposure that has been mentioned above, generally about mathematical literacy based profile students pancasila through the digital quiz platform developed Kahoot able to train students to work on literacy so that in the future students literacy can be improved. Because one of the attempts to improve students' mathematical literacy is to get them to work on mathematics literacy (Tarisa et al., [2023](#)).

CONCLUSION

Based on the presentation of the results and the discussion of the previous research, then some things can be concluded as follows. The results of the development of mathematical literacy issues based on the profile of students of pancasila through the digital quiz platform of Kahoot are as follows:

- a) The validity or validity of the topic developed qualitatively is obtained from the validation results by the material experts and media experts with the criterion "very valid" and the average percentage amount reaches 97% for the material expert and 84% for the media expert.
- b) The practicality of mathematical literacy based on the profile of students of Pancasila through the digital quiz platform Kahoot in SMP/MTs developed was obtained from the response of large class students, namely grade VII E after using the product. From these results, the average percentage reached 83%, so it can be concluded that the issues developed reached criteria very practical.
- c) The effectiveness of mathematical literacy based on the profile of student pancasila through the digital quiz platform Kahoot can be obtained from the results of the student test of the major class working on the subject.

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