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VALIDITY OF STUDENT WORKSHEETS BASED ON COMPUTATIONAL THINKING WITH THE CONTEXT OF LOCAL WISDOM IN MUSI BANYUASIN TO SUPPORT NUMERACY SKILLS

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ABSTRACT
In the context of 21st-century education, numeracy skills are a required competency for students. Numeracy is a person's ability to understand and use mathematics in solving problems in everyday life. To ensure an effective learning process, supporting teaching materials are needed to enhance students' numeracy skills, such as student worksheets. This study aims to evaluate the validity of student worksheets based on computational thinking and local wisdom of Musi Banyuasin, supported by GeoGebra, to enhance students' numeracy skills. The validation process by experts produced validity test data collected using a validation sheet in the form of a Likert scale questionnaire, which was then analyzed to determine the level of validity of the student worksheets. The results of the average percentage of student worksheets were activity 1 reached 84.05% and activity 2 reached 84.82% in the first meeting. By the second meeting, activity 1 reached 86.2%, and activity 2 reached 86.51%. Thus, it can be said that the student worksheets developed has met the criteria of being very valid, so it is worthy of use. This indicates that the worksheets contribute positively to the field of mathematics education by providing effective support for improving students' numeracy skills.
Keywords : Student Worksheet, Computational Thinking, Validity, Numeracy

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PRELIMINARY

To improve the quality of education, the Indonesian government has started implementing the National Assessment in 2021. One important component in this assessment is the Minimum Competency Assessment (AKM), which measures students' reading and numeracy literacy skills. Numeracy includes the ability to understand and use mathematical concepts in everyday life, such as analyzing data, making decisions, and solving problems based on quantitative information (Kemendikbud, 2020). According to Nurcahyono (2023), numeracy encompasses the capacity to apply numerical ideas and counting techniques in everyday situations, alongside the ability to comprehend and interpret quantitative data in one's surroundings.

Every student needs to have numeracy skills because these skills allow them to apply mathematical concepts not only in the context of learning at school but also in various real-life situations (Oktavia et al., 2024). In line with Salvia et al. (2022) said that numeracy skills help students understand how mathematics is used in solving real life. This means that numeracy is not just the ability to count, but includes understanding and applying mathematics in everyday decision making, such as managing finances, reading data, or interpreting statistical information. Zafrullah et al. (2024) also emphasize the importance of developing numeracy from an early age so that individuals are ready to face more complex problems, including those that require computational thinking. Thus, strengthening numeracy from an early age not only forms the basis of strong mathematical literacy, but also becomes an important foundation for mastering 21st century skills that integrate logic, algorithms and technology-based problem solving.

In the process of solving problems related to mathematics, students are required to have good numeracy skills (Epran et al., 2025). However, the level of students' numeracy skills is still relatively low, which shows that their achievements have not met the expected standards or ideal values (Elina et al., 2024). According to R & Susanti (2019), the cause of low numeracy skills is that teachers rarely design teaching materials that integrate mathematical literacy (numeracy). Meanwhile, according to Badaruddin et al. (2023), teachers lack habits in relating learning material to situations or contexts of everyday life. In line with Khumairoh (2024), with computational thinking, students will be able to think logically and in a structured manner, analyze problems critically, and produce creative and appropriate solutions and strategies.

Statistics material, especially the presentation of data in the form of bar and circle diagrams, is one of the materials taught at the junior high school level (phase D). This material is related to everyday life and is very useful for students in understanding various information (Nugraha & Basuki, 2021). However, it turns out, there are still students who experience difficulties in learning statistical material, especially data presentation (Satiti et al., 2022). According to Nurmatin & Senjayawati, 2023, students experience obstacles in understanding problems presented through bar and pie charts, so they have difficulty responding or answering questions related to the information. This is because the availability of adequate teaching materials on data presentation materials in grade VII of junior high school is still limited, especially in helping students learn, analyze, and present data in the form of tables, graphs, or diagrams (Aini & Lestari, 2022).

Efforts to overcome the low numeracy skills of students and the difficulties experienced by students in data presentation materials can be made through the development of contextual and interactive student worksheets (Sopani et al., 2024). A student worksheet is a form of written teaching material designed to make it easier for students to interact with the subject matter where the existence of a student worksheet encourages student activeness in the learning process because it contains a series of activities that they must do, as well as being a tool for teachers in implementing learning (Astuti, 2021). According to Rahayu (2023), the preparation of student worksheets aims to facilitate understanding of the material, present relevant assignments, encourage learning independence, and assist teachers in providing structured assignments and monitoring student learning progress. Based on the explanation above, a student worksheet is a written study guide made specifically for students. In it, there is important learning material and also activities that make students more active and understand what is being studied.

In order for the designed student worksheet to make it easier for students to solve everyday life problems, it is necessary to insert one of the relevant approaches, namely computational thinking. CT is a way of thinking and solving complex problems by breaking them down into a series of steps that are easier to understand and overcome (Ocktariya et al., 2023). According to Christi & Rajiman (2023), CT is very important in mathematics learning because it not only improves students' mathematical and reasoning skills but also hones critical, creative, and analytical thinking skills in solving problems, both in the world of computing and everyday life.

To strengthen the relevance of the material, the context of local wisdom is also important to be presented in learning so that students feel closer and understand the benefits of mathematics in their lives (Wandari et al., 2018). In this study, the context that will be used is the context of local wisdom in Musi Banyuasin Regency. According to Komar et al. (2022) stated that learning that links mathematical concepts with local wisdom in the student's environment can facilitate understanding of the material and increase their learning success. On the other hand, the use of technology such as the GeoGebra application can improve the understanding of mathematical concepts (Putri, 2024). With GeoGebra, users can interactively explore various mathematical concepts (Afhami, 2022).

Several previous studies have been conducted on the development of LKPD, such as the research of Sopani et al. (2024) entitled Development of LKPD with the Assistance of Artificial Intelligence (AI) Data Presentation Material to Strengthen Numeracy Skills

and research by Ostian et al. (2023) entitled Interactive E-student Worksheet Based on Computational Thinking with South Sumatera Traditional Game Context. However, no research has been found that develops LKPD based on computational thinking with the context of local wisdom of Musi Banyuasin assisted by GeoGebra data presentation material to support numeracy skills. Therefore, researchers want to develop student worksheets based on computational thinking using the context of the local wisdom of Musi Banyuasin and utilize GeoGebra to support students' numeracy skills. In order to ensure the quality of the student worksheet developed, it is important for its validity to meet the eligibility criteria. This article to aims evaluate the validity of student worksheets based on computational thinking and local wisdom of Musi Banyuasin, supported by GeoGebra, to enhance students' numeracy skills.

METHODS

This study employs design research within the realm of development studies. The research process is structured into three phases, namely preliminary, development/prototyping, and assessment. The Tessmer model will be used in this series of development research, which consists of two phases, namely preliminary and formative evaluation; in the formative evaluation phase, there are several stages, namely expert review, one-to-one, small group, and field test (Tessmer, 1993). In the formative evaluation phase, namely the expert review stage, the student worksheet development product is validated by 5 validators consisting of 4 Mathematics education lecturers and 1 Mathematics teacher. The validators were selected purposively based on their competence in the field of mathematics education, taking into account academic qualifications, experience in developing teaching materials, and publication track records.

The validity test is carried out by providing validation sheets to the validators to improve the quality of the student worksheet. The validity of the student worksheet is measured through a questionnaire that includes several categories, as presented in Table 1.

Table 1 Validation Sheet Assessment Categories

Score	Kategori
4	Very Good
3	Good
2	Fair
1	Poor

Source: Setiawan (2021)

After the validation data was collected, the researcher calculated the score using the following formula to test the validity of the designed LKPD.

$$Validity\ score = \frac{\sum score\ obtained}{\sum maximum\ score} \times 100\%$$

Then, the validity score that has been obtained is used to determine the level of validity of the LKPD that has been validated through the validity criteria presented in Table 2 below:

Table 2 Validity Criteria

Validity Level	Validity Criteria
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60%	Quite Valid
21% - 40%	Less Valid
1% - 20%	Not Valid

Source: Nurafriani & Mulyawati (2023)

RESULT AND DISCUSSION

In this study, the developed product is a student worksheet based on computational thinking using the context of the local wisdom of Musi Banyuasin, assisted by GeoGebra data presentation material to support valid student numeracy skills. The components contained in the student worksheet are the front page containing the title of the material, time allocation, class, learning instructions, learning outcomes, learning objectives, brief information, work steps, and activities that must be done by students.

The validity test at the expert review stage aims to identify the characteristics of the designed student worksheet so that it can be concluded that this student worksheet meets the testing requirements. A student worksheets was reviewed by four mathematics education lecturers and one mathematics teacher. The study aimed to determine the worksheet's validity based on their evaluations of its content, construct, and language. The following are the results of the student worksheets validation in activity 1 of the 1st meeting by experts, which can be seen in Table 3.

Table 3 Results of Student Worksheet Validation in Activity 1, 1st Meeting

No.	Rated Aspect	Percentage (%)
A.	**Validity of Content**	
	1. The computational thinking-based student worksheet that was created is in accordance with the learning outcomes (CP)	90
	2. The computational thinking-based student worksheet that was created is in accordance with the learning objectives (TP)	90
	3. The problems in the student worksheet are in accordance with the data presentation material, namely the bar chart	100

	4. The problems in the student worksheet can help students apply fundamental mathematical numbers and symbols to solve real-world problems	85
	5. Problems in student worksheets can train students to present data in the form of a bar chart	80
	6. Problems in student worksheets can train students to interpret the results of problem analysis in predicting and making decisions	80
	7. Questions in the decomposition component are appropriate and lead to data presentation material (bar chart)	80
	8. Questions in the pattern recognition component are appropriate and lead to data presentation material (bar chart)	85
	9. Questions in the abstraction component are appropriate and lead to data presentation material (bar chart)	80
	10. Questions in the algorithmic thinking component are appropriate and lead to data presentation material (bar chart)	85
	11. The context in the student worksheet is appropriate for data presentation material (bar chart)	95
	12. Activities in student worksheets encourage students to think	90
	13. Problems in student worksheets contain important information	95
Average		**87,31**
B.	**Validity of Construct**	
	1. Activities in student worksheets are based on Computational Thinking components	90
	2. Questions at the decomposition component stage are appropriate	80
	3. Questions at the pattern recognition component stage are appropriate	85
	4. Questions at the abstraction component stage are appropriate	80
	5. Questions at the algorithmic thinking component stage are appropriate	85
	6. Problems in student worksheets can bring out students' ability to apply fundamental mathematical numbers and symbols to solve real-world problems	80
	7. Problems in student worksheets can bring out students' ability to present data in the form of a bar chart	80
	8. Problems in student worksheets can bring out students' ability to interpret the results of problem analysis to predict and make decisions	80
	9. Problems in student worksheets are in accordance with the context of local wisdom of Musi Banyuasin	90
	10. Compliance with the completeness of student worksheet components (Title, Identity, learning objectives, time allocation, learning instructions, brief information, and work steps)	90
Average		**84**
C.	**Validity of Language**	
	1. The language used is good and correct according to Indonesian grammar rules	80
	2. The language used is easy for students to understand	80
	3. The sentence structure in the student worksheet is clear	85
	4. The sentences used in the student worksheet are easy to understand	80
	5. The punctuation used in the student worksheet is correct	80
	6. Instructions for using the student worksheet are written clearly	80
Average		**80,83**

Table 3 above shows that the validity criteria of the content, construct, and language aspects are respectively 87.31%, 84%, and 80.83%. So, overall, the student worksheet has met the criteria of being very valid, with an average validation score of the three aspects reaching 84.05% so that it can be used in the learning process without the need for major revisions. Furthermore, the following are the results of the student

worksheet validation in activity 2 of the first meeting by experts, which can be seen in Table 4.

Table 4 Results of Student Worksheet Validation in Activity 2, 1st Meeting

No.	Rated Aspect	Percentage (%)
A.	**Validity of Content**	
	1. The computational thinking-based student worksheet that was created is in accordance with the learning outcomes (CP)	90
	2. The computational thinking-based student worksheet that was created is in accordance with the learning objectives (TP)	90
	3. The problems in the student worksheet are in accordance with the data presentation material, namely the pie chart	90
	4. The problems in the student worksheet can help students apply fundamental mathematical numbers and symbols to solve real-world problems	85
	5. Problems in student worksheets can train students to present data in the form of a pie chart	80
	6. Problems in student worksheets can train students to interpret the results of problem analysis in predicting and making decisions	80
	7. Questions in the decomposition component are appropriate and lead to data presentation material (pie chart)	80
	8. Questions in the pattern recognition component are appropriate and lead to data presentation material (pie chart)	85
	9. Questions in the abstraction component are appropriate and lead to data presentation material (pie chart)	80
	10. Questions in the algorithmic thinking component are appropriate and lead to data presentation material (pie chart)	85
	11. The context in the student worksheet is appropriate for data presentation material (pie chart)	90
	12. Activities in student worksheets encourage students to think	90
	13. Problems in student worksheets contain important information	95
Average		**86,15**
B.	**Validity of Construct**	
	1. Activities in student worksheets are based on Computational Thinking components	90
	2. Questions at the decomposition component stage are appropriate	80
	3. Questions at the pattern recognition component stage are appropriate	85
	4. Questions at the abstraction component stage are appropriate	80
	5. Questions at the algorithmic thinking component stage are appropriate	85
	6. Problems in student worksheets can bring out students' ability to apply fundamental mathematical numbers and symbols to solve real-world problems	85
	7. Problems in student worksheets can bring out students' ability to present data in the form of a pie chart	80
	8. Problems in student worksheets can bring out students' ability to interpret the results of problem analysis to predict and make decisions	80
	9. Problems in student worksheets are in accordance with the context of local wisdom of Musi Banyuasin	95
	10. Compliance with the completeness of student worksheet components (Title, Identity, learning objectives, time allocation, learning instructions, brief information, and work steps)	90
Average		**85**
C.	**Validity of Language**	
	1. The language used is good and correct according to Indonesian grammar rules	85
	2. The language used is easy for students to understand	80
	3. The sentence structure in the student worksheet is clear	80
	4. The sentences used in the student worksheet are easy to understand	80

	5. The punctuation used in the student worksheet is correct	85
	6. Instructions for using the student worksheet are written clearly	90
Rata-rata		**83,33**

Table 4 above shows that the validity criteria of the content, construct, and language aspects are respectively 86.15%, 85%, and 83.33%. So, overall, the student worksheet met the criteria of being very valid, with an average validation score of the three aspects reaching 84.82% so that it can be used in the learning process without the need for major revisions. The validation results for activity 1 at the second meeting by experts are presented in Table 5 below.

Table 5 Results of Student Worksheet Validation in Activity 1, 2nd Meeting

No.	Rated Aspect	Percentage (%)
A.	**Validity of Content**	
	1. The computational thinking-based student worksheet that was created is in accordance with the learning outcomes (CP)	90
	2. The computational thinking-based student worksheet that was created is in accordance with the learning objectives (TP)	90
	3. Problems in the student worksheet are in accordance with the data interpretation material in the bar chart	90
	4. Problems in the student worksheet can help students apply fundamental mathematical numbers and symbols to solve real-world problems	95
	5. Problems in the student worksheet can train students to analyze information displayed in the form of a bar chart	80
	6. Problems in the student worksheet can train students to interpret the results of problem analysis in predicting and making decisions	80
	7. Questions in the decomposition component are appropriate and lead to the data interpretation material in the bar chart	90
	8. Questions in the pattern recognition component are appropriate and lead to the data interpretation material in the bar chart	80
	9. Questions in the abstraction component are appropriate and lead to the data interpretation material in the bar chart	85
	10. Questions in the algorithmic thinking component are appropriate and lead to the data interpretation material in the bar chart	85
	11. The context in the student worksheet is appropriate for the data interpretation material in the bar chart	95
	12. Activities in student worksheets encourage students to think	90
	13. Problems in student worksheets contain important information	95
Average		**88,1**
B.	**Validity of Construct**	
	1. Activities in student worksheets are based on Computational Thinking components	90
	2. Questions at the decomposition component stage are appropriate	90
	3. Questions at the pattern recognition component stage are appropriate	80
	4. Questions at the abstraction component stage are appropriate	85
	5. Questions at the algorithmic thinking component stage are appropriate	85
	6. Problems in student worksheets can bring out students' ability to apply fundamental mathematical numbers and symbols to solve real-world problems	95
	7. Problems in student worksheets can bring out students' abilities in analyzing information displayed in the form of a bar chart	90
	8. Problems in student worksheets can bring out students' ability to interpret the results of problem analysis to predict and make decisions	85

	9. Problems in student worksheets are in accordance with the context of local wisdom of Musi Banyuasin	90
	10. Compliance with the completeness of student worksheet components (Title, Identity, learning objectives, time allocation, learning instructions, brief information, and work steps)	90
Average		**88**
C.	**Validity of Language**	
	1. The language used is good and correct according to Indonesian grammar rules	85
	2. The language used is easy for students to understand	85
	3. The sentence structure in the student worksheet is clear	80
	4. The sentences used in the student worksheet are easy to understand	80
	5. The punctuation used in the student worksheet is correct	80
	6. Instructions for using the student worksheet are written clearly	85
Average		**82,5**

Table 5 above shows that the validity criteria of the content, construct, and language aspects are 88.1%, 88%, and 82.5%, respectively. So, overall, the student worksheet met the criteria of being very valid, with an average validation score of the three aspects reaching 86.2% so that it can be used in the learning process without the need for major revisions. Details of the validation results for activity 2 at the second meeting by experts can be seen in Table 6.

Table 6 Results of Student Worksheet Validation in Activity 2, 2nd Meeting

No.	Rated Aspect	Percentage (%)
A.	**Validity of Content**	
	1. The computational thinking-based student worksheet that was created is in accordance with the learning outcomes (CP)	90
	2. The computational thinking-based student worksheet that was created is in accordance with the learning objectives (TP)	90
	3. Problems in the student worksheet are in accordance with the data interpretation material in the pie chart	90
	4. Problems in the student worksheet can help students apply fundamental mathematical numbers and symbols to solve real-world problems	95
	5. Problems in the student worksheet can train students to analyze information displayed in the form of a pie chart	80
	6. Problems in the student worksheet can train students to interpret the results of problem analysis in predicting and making decisions	80
	7. Questions in the decomposition component are appropriate and lead to the data interpretation material in the pie chart	90
	8. Questions in the pattern recognition component are appropriate and lead to the data interpretation material in the pie chart	80
	9. Questions in the abstraction component are appropriate and lead to the data interpretation material in the pie chart	85
	10. Questions in the algorithmic thinking component are appropriate and lead to the data interpretation material in the pie chart	85
	11. The context in the student worksheet is appropriate for the data interpretation material in the pie chart	90
	12. Activities in student worksheets encourage students to think	90
	13. Problems in student worksheets contain important information	95
Average		**87,7**
B.	**Validity of Construct**	
	1. Activities in student worksheets are based on Computational Thinking	90

	components	
	2. Questions at the decomposition component stage are appropriate	90
	3. Questions at the pattern recognition component stage are appropriate	80
	4. Questions at the abstraction component stage are appropriate	85
	5. Questions at the algorithmic thinking component stage are appropriate	85
	6. Problems in student worksheets can bring out students' ability to apply fundamental mathematical numbers and symbols to solve real-world problems	95
	7. Problems in student worksheets can bring out students' abilities in analyzing information displayed in the form of a pie chart	90
	8. Problems in student worksheets can bring out students' ability to interpret the results of problem analysis to predict and make decisions	85
	9. Problems in student worksheets are in accordance with the context of local wisdom of Musi Banyuasin	95
	10. Compliance with the completeness of student worksheet components (Title, Identity, learning objectives, time allocation, learning instructions, brief information, and work steps)	90
Average		**88,5**
C.	**Validity of Language**	
	1. The language used is good and correct according to Indonesian grammar rules	85
	2. The language used is easy for students to understand	80
	3. The sentence structure in the student worksheet is clear	80
	4. The sentences used in the student worksheet are easy to understand	80
	5. The punctuation used in the student worksheet is correct	85
	6. Instructions for using the student worksheet are written clearly	90
Average		**83,33**

Table 6 above shows that the validity criteria of the content, construct, and language aspects are 87,7%, 88,5%, and 83,33%, respectively. So, overall, the student worksheet has met the very valid criteria, with an average validation score of the three aspects reaching 86.51% so that it can be used in the learning process without the need for major revisions.

Based on the results of the analysis that has been carried out, the validation results that have been carried out by 5 expert validators from the aspects of content, construct, and language at the development stage indicate that the LKPD that has been developed is very feasible for use. Overall, the student worksheet contains material that is in accordance with learning achievements and learning objectives, questions at the computational thinking stage are in accordance with the material, and activities in the student worksheet are able to train students' numeracy skills by solving problems that are close to their lives. This indicates that the material prepared is not only in accordance with learning outcomes, but also shows the integration between the CT approach, local wisdom of a region, and numeracy reinforcement. This integration can be seen from how the activities in the worksheets are designed to trigger algorithmic and systematic thinking which are the main characteristics of CT. In addition, the use of local context in the questions strengthens the

relevance of learning to students' daily lives, which can ultimately increase motivation and understanding. Numeracy activities do not only focus on calculations, but also involve critical thinking skills in solving authentic problems.

In line with Hendriani & Gusteti (2021) that a student worksheet is a written teaching material containing summaries, instructions, and assignments that must be completed by students according to basic competencies and involves problem-solving so that it can train students' abilities. Student worksheets that have fulfilled the principles of depth and accuracy of material have included problems related to daily life and clear steps so that they can guide students to construct their knowledge (Suriani & Putri, 2023).

According to Sari et al. (2022), validity is the main foundation for developing quality teaching materials so that teachers and students can utilize them. Student worksheet that meets the eligibility standards has the potential to increase students' enthusiasm for learning and facilitate independent learning; in line with that, to support learning, a student worksheet that has been tested for its eligibility by experts because a student worksheet functions as a guide to activities that require students to apply their understanding to real situations through tasks that must be completed (Desrinelti & Miaz, 2022). This can be seen in the worksheets developed, where high validity reflects the quality of content, structure, language, and integration of the material with real contexts, so that it can encourage students to be more active in understanding and applying mathematical concepts.

The validation results from 5 expert validators show that overall, the computational thinking-based student worksheet using the context of Musi Banyuasin local wisdom assisted by Geogebra that was produced has met the criteria for being very valid. However, there are several comments and suggestions from expert validators. Among them is the addition of instructions or small questions at the computational thinking stage. This is in line with Su & Yang (2023) that each step in the CT component must have instructions that are easy to understand and clear. Then, from the language aspect, it must use the language according to Indonesian grammar rules; the sentences used are simple, clear, and easy for junior high school students to understand. According to Suriani & Putri (2023), a quality student worksheet is one that uses simple, communicative language, according to the level of development of students and clear sentences so that it can be understood by students well and is able to direct students to get the expected answers.

CONCLUSION

Based on the findings and analysis detailed earlier, the validation of the CT-based student worksheet for the first meeting's activity 1 yielded an average percentage of 84.05%, while activity 2 achieved 84.82%. For the second meeting, activity 1 scored 86.2% and activity 2 reached 86.51%. Overall, the student worksheet, designed with CT principles and the local wisdom context of Musi Banyuasin, supported by GeoGebra, is deemed highly valid across content, construct, and language. Consequently, this worksheet is suitable for use and can provide a positive contribution to the field of mathematics education by providing effective support to improve students' numeracy skills. As a suggestion for further implementation, it is suggested that this worksheet be tested in a wider class scope and accompanied by teacher training on the integration of CT, numeracy, and local wisdom to optimize its effectiveness and ensure uniformity in its implementation.

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