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Validity and Practicality of Learning Model Development of LAPS-Heuristics with Local Wisdom on Students' Metacognitive Ability

Andi Muhammad Irfan Taufan Asfar[1]*, Andi Trisnowali[2], Jarnawi Afgani Dahlan[3], Sufyani Prabawanto[4], Andi Muhamad Iqbal Akbar Asfar[5], Andi Nurannisa[6]

[1,2,6] Mathematics Education, Muhammadiyah University of Bone, Indonesia
[3,4] Mathematics Education, Indonesia University of Education, Indonesia
[5] Chemical Engineering, State Polytechnic of Ujung Pandang, Indonesia

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ABSTRAK

Metakognisi merupakan salah satu kemampuan yang sangat dibutuhkan dalam menghadapi era kompetitif dikarenakan melibatkan proses kognitif dalam berkomunikasi, penuh perhatian, ingatan, serta pemrosesan dan penggunaan informasi. Akan tetapi, fakta yang ada di lapangan menunjukkan bahwa kemampuan metakognisi siswa masih sangat rendah. Untuk mengatasi rendahnya kemampuan metakognisi, maka pembelajaran berbasis kearifan lokal menjadi alternatif solusinya. Penelitian ini bertujuan untuk mengembangkan dan menguji tingkat kelayakan model pembelajaran LAPS-Heuristics berkearifan lokal terhadap kemampuan metakognisi siswa. Jenis penelitian menggunakan penelitian pengembangan (research & development) hasil modifikasi Borg dan Gall dengan tiga tahapan, yaitu studi pendahuluan, uji coba model, dan eksperimen model. Adapun subjek penelitian yaitu siswa kelas IX di SMP Negeri 1 Kahu. Instrumen yang digunakan dalam penelitian meliputi observasi, wawancara, serta angket validasi dan praktikalitas. Hasil penelitian menunjukkan bahwa model pembelajaran LAPS-Heuristics berkearifan lokal yang dikembangkan telah valid dan praktis diterapkan dalam proses pembelajaran dengan rata-rata skor sebesar 3,5 atau berada pada persentase 92%, sehingga model pembelajaran LAPS-Heuristics berkearifan lokal dapat diimplementasikan dalam proses pembelajaran untuk mengatasi rendahnya kemampuan metakognisi siswa.

ABSTRACT

Metacognition is one of the skills needed in a competitive era because it involves cognitive processes in communication, attention, memory, and processing and using information. However, the facts show that students' metacognitive abilities still need to improve. The overcome the low ability of metacognition, local wisdom-based learning is an alternative solution. This study aims to develop and test the feasibility level of the LAPS-Heuristics learning model with local wisdom on students' metacognitive abilities. This type of research uses research & development modified by Borg and Gall with three stages: preliminary studies, model trials, and model experiments. As for the research subject, the student of class IX at SMP Negeri 1 Kahu. The instruments used in the research include observation, interviews, validation, and practicality questionnaires. The results showed that the LAPS-Heuristics learning model developed with local wisdom was valid and practically applied in the learning process with an average score of 3.5 or a percentage of 92% so that the LAPS-Heuristics learning model with local wisdom can be implemented in the learning process to overcome the low metacognitive ability of students.

1. INTRODUCTION

Metacognition is an important aspect of problem-solving that involves cognitive processes in communication, attention, and memory, as well as the processing and using information that can affect material understanding to make it more meaningful and lasting (Asignacion et al., 2021; Balashov et al.,

*Corresponding author.
E-mail addresses: andi87@gmail.com (Andi Muhammad Irfan Taufan Asfar)

2021). Metacognition ability is the control of the thinking process, which refers to the ability to plan, monitor and evaluate to support student productivity and development (Gurung et al., 2022; Hwang et al., 2020; Zubaidah Amir et al., 2021). Metacognition ability is one of the skills needed in solving problems based on Higher Order Thinking Skills (HOTS), which are widely used today in every aspect of student academic assessment in schools (Ding et al., 2016; Tanujaya et al., 2017; Yerizon, 2019). However, the phenomenon that often occurs in schools indicates that students' metacognitive abilities are still very low.

Previous study stated that metacognition skills greatly affect students' mathematical communication skills. The low ability of metacognition results in students needing help communicating well, so the learning process is very passive (Handayani et al., 2022). In line with other research that state students' low metacognitive abilities make the learning process boring and saturated due to the lack of student activity (Taufik, 2021). Meanwhile, metacognitive ability is knowledge about oneself or learning how to learn. In this case, learning emphasizes students' ability to think and express the results of their thoughts in general (Atmaja, 2021; Kasli et al., 2020). However, this ability still needs to be improved by students. It is due to the lack of student activity in learning, and most students still memorize learning materials without understanding what is being taught. As a result, when students are given questions that stimulate thinking in finding solutions to problem-solving, students tend to be less capable of providing good explanations in answering questions (Eppe et al., 2022; Habsah, 2017; Sriwahyuni & Maryati, 2022). In addition, conventional teaching habits have low potential in developing students' metacognitive abilities, so it is very important to pay attention to the accuracy of using learning models. The learning model is one of the important components that support the success of the learning process. The learning model is a plan or pattern used to arrange the curriculum, design instructional materials, and guide the teaching process in different classrooms or settings (Harefa et al., 2022; Joyce & Weil, 2009). One of the learning models that can be applied to support the improvement of students' metacognitive abilities is the LAPS-Heuristics learning model. It is one of the problem-solving learning models carried out in several stages, from understanding to solving problems to raising students' curiosity, motivation, and activeness (Ashar et al., 2022; Mulyadi & Ahmad, 2022). However, in reality, the learning model applied by the teacher in the classroom has yet to be able to meet the needs of students. Teachers at SMP Negeri 1 Kahu have yet to be able to apply the learning model well, even though they have followed every existing learning stage. The teacher still seems to be active or dominant in delivering the material, and students become passive in listening to the teacher's delivery, and there needs to be more feedback.

Efforts to increase student activity need to link subject matter with local wisdom, impacting students' knowledge in recognizing local cultural wisdom (Jumriani et al., 2021; Suprapto et al., 2021). In learning mathematics, local wisdom is useful for making learning more interesting and supporting thinking, communication, and collaboration skills (Ladona et al., 2022; Mulyatna et al., 2021). However, the learning model applied in schools has yet to show any integration with local cultures, one of which is in Bone Regency, which is rich in culture. Thus, efforts need to be made to instill and increase knowledge about local wisdom by interpreting it into the learning process (Amri et al., 2021; Hilaliyah et al., 2019; Samala et al., 2022). The development of learning models must follow applicable development rules, including the feasibility of the model, before it is used in learning. A practicality analysis was carried out on the locally developed LAPS-Heuristics learning model to meet the learning model's feasibility and validity. According to previous study the validity analysis is reviewed based on the conditions to prepare the learning model: didactic, construction, and technical requirements (Tanjung & Nababan, 2022). Then it reinforce by other study that stated the practicality analysis was carried out using a practicality questionnaire by teachers and students (Febriyanti & Ain, 2021). Practicality is an aspect that can determine an instrument that is easy to use, practical, and uncomplicated. Therefore, this research was conducted to develop and test the feasibility level of the LAPS-Heuristics learning model with local wisdom on students' metacognitive abilities.

2. METHOD

This research is a research & development type using the modified Borg and Gall development model. The steps of the development model consist of three stages, namely: (1) a preliminary study which includes literature study, field study, and preparation of the initial draft of the product; (2) a trial with a limited sample (limited trial) and a wider sample trial (broad trial); and (3) product testing through experiments (Punaji, 2013; Sukmadinata, 2011). The research consists of a preliminary study stage and a trial stage. A good learning model will be obtained if the second stage has been carried out, so the development objectives have been fulfilled. The product to be developed is the LAPS-Heuristics learning model with local wisdom, which will begin with validity and practicality testing to determine the feasibility level of the developed model. Visually the flow of development research can be seen in Figure 1.

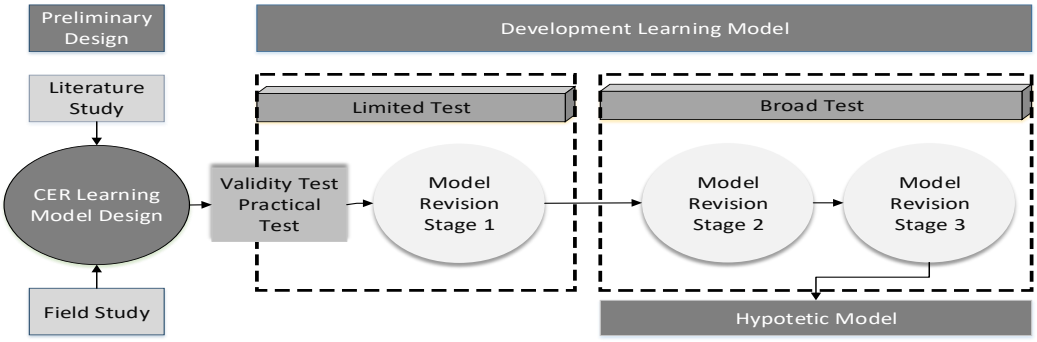

Figure 1. Research Flowchart

The location selection was based on data on the number of study group classes and the readiness of teachers sampled for research and development, which was at SMP Negeri 1 Kahu. This research begins with preparing a grid that pays attention to learning objectives and indicators, then develops questions and statements. After that, a trial was conducted, which finally determined the question of local wisdom metacognitive ability test and a valid and practical metacognitive ability attitude scale. The instruments used in this study were observation, interviews, validation, and practicality questionnaires. Validity data analysis was obtained by calculating the value of the model validation results by expert validators. The criteria for the validity of the developed learning model can be seen in Table 1.

Table 1. Validity Criteria

Score intervals	Validity criteria
3,5 ≤VR ≤ 4	Very valid
2,5 ≤VR < 3,5	Valid
1,5 ≤VR < 2,5	Less Valid
1 ≤VR < 1,5	Not Valid

The learning model developed can be considered valid if it meets the validity criteria of *to* .5. If the value of the validity result is < 2.5, then the learning model will be revised, and the validity test will be re-tested by the expert validator. The analysis of practicality data was obtained by analyzing practicality questionnaires that teachers and students had filled out. The practical criteria for the learning model developed can be seen in Table 2.

Table 2. Practical Criteria

Score Percentage	Practicality Criteria
> 75% - 100%	Very practical
> 50% - 75%	Practical
> 25% - 50%	Less practical
0% - 25%	Not practical

The local wisdom LAPS-Heuristics learning model developed in this study is considered practical if it has a practicality value of > 50%. If the practicality value is *to* 0%, then the learning model will be revised, and teachers and students will re-conduct a practicality test.

3. RESULT AND DISCUSSION

Result

The development of the LAPS-Heuristics learning model with local wisdom on students' metacognitive abilities in this study was carried out in two stages: preliminary study and product trials (limited and broad trials). The trial was conducted to determine the feasibility level of the developed model and whether it met the valid and practical criteria.

Preliminary Studies

This stage begins with reviewing literature studies and field studies. The literature study aims to obtain a theoretical basis for learning models to improve students' metacognitive abilities. The field study was carried out in a limited way to examine the analysis of the needs of teachers, students, and learning

tools that could be supporting factors and inhibiting the application of the developed learning model. The following describes the preliminary study results that became the basis for developing the LAPS-Heuristics learning model with local wisdom in improving students' metacognitive abilities. Base on study of literature, the highly frequent fact in schools shows the low metacognitive ability of students due to the lack of student activity in learning, as well as the habits of students who tend to memorize without understanding the material. Based on the results of National Examination (UN), mathematics obtained the lowest score among other subjects, which was 39.33, which was below the standard passing criteria of 55 (scale 0-100). It was also found in students in Bone Regency who only got a UN score of 34.25 in the less category. One of the materials that hinder student achievement is geometry material, with a score of 29.57. Geometry is a field of mathematics that focuses on studying points, lines, planes, and spaces and relating to abstract concepts or symbols formed from inductively defined elements. Meanwhile, the classroom learning process is still conventional, so they cannot develop students' metacognitive abilities and require the application of appropriate learning models to overcome them.

Then the results of field studies through observation and interviews show that students need a learning model with an interesting presentation, one of which is local wisdom. It is evidenced by the results of the learning model analysis, which shows that students still need to fully understand the math problems given, especially on the geometric material (building space), which is more visual in nature. Students are not accustomed to working on questions that require them to think about solving problems and are not accustomed to answering questions by presenting information known through planning, monitoring, and assessment, which leads to student metacognition. This problem is caused by the need to give questions that stimulate students to think and reason. The field study results are also supported by an analysis of teacher needs, where there has been a change in the learning process from conventional methods to applying PowerPoint media. However, they still tend to lecture with occasional questions and answers. In addition, the interaction of teachers with students is only dominant in one or two students classified as smart. It means that the teacher has not been able to master the class comprehensively. The results of the curriculum analysis showed that the implementation of the 2013 curriculum at SMP Negeri 1 Kahu could have been more optimal due to the limited hours of lessons. Learning tools are also important in determining the learning model to be developed. So far, the learning tools teachers use include lesson plans, textbooks (materials), and individual exercises that refer to textbooks.

Model Development

The model development phase includes drafting the model, limited trials, and extensive trials. The draft model is prepared based on the theoretical basis of the results of the preliminary study and combines the suitability of the characteristics of the developed model with the characteristics of mathematics learning and the conditions of junior high school students who are the target of using the model. The initial draft was reviewed through limited discussions with teachers and experts (expert judgment). The resulting initial draft model was then tested in a limited way to a group of classes selected as a limited trial, namely, class VIII E. During the trial run, the researcher evaluated and reflected through observations on the implementation of the trial, the progress achieved, and difficulties or obstacles encountered. The evaluation results are the basis for conducting phase 1 revisions to complete and improve the model. Revision of the model is done by improving the structure of the presentation of the material and learning methods/techniques until a pattern of model implementation is found to achieve more optimal results. After the draft model was revised, a wider trial was carried out in two study groups: class VIII B and class VIII C. At this stage, an evaluation of the process and results of model implementation was re-conducted. Based on the evaluation results, stage 2 was revised to obtain an operational model. The operational model obtained results from developing the LAPS-Heuristics learning model with local wisdom that has met the valid and practical criteria.

Learning Model Validation

The validation test of the learning model is carried out by paying attention to several other supporting aspects in the learning process, including lesson plans, materials, LKPD, and metacognitive ability tests. The validation test of the model and learning tools was obtained from two lecturers who are experts in the field of development. The following is a recapitulation of the validity of the LAPS-Heuristics learning model developed with local wisdom as show in Table 3.

Table 3. Results of Model Validity Analysis

No	Component	Score Validator		Average Score	Criteria
		1	2		
1	Syntax	3.3	4	3.6	Valid

No	Component	Score Validator		Average Score	Criteria
		1	2		
2	Social system	3.3	4	3.6	Valid
3	Reaction Principle	3.5	3	3.3	Valid
4	Instructional and nurturant effect	3.5	4	3.8	Valid

Base on Table 3 show the results of the validation of the components of the LAPS-Heuristics learning model with local wisdom by two experts as user validation assessors show valid criteria. The results of the validation test of the developed learning devices can be seen in Table 4.

Table 4. Results of Learning Tool Validity Analysis

No	Assessment	Final Average	Category
1	Lesson Plan	3.1	Valid
2	Material	3.7	Very Valid
3	Students Worksheet (LKPD)	3.5	Very Valid
4	Metacognitive Ability Test	3.1	Valid

Based on Table 4 show the results of the validity analysis, the RPP assessment and metacognitive ability test each obtained a final score (Va) of 3.1, the material assessment was 3.7, and the LKPD assessment was 3.5. After matching the final average with the validity category, the learning device is included in the valid category.

The Practicality of the Learning Model

The practicality of the LAPS-Heuristics learning model with local wisdom is seen from filling out the teacher and student response questionnaires conducted at SMP Negeri 1 Kahu. The teacher and student response questionnaires' indicators include management, activity, knowledge, and effectiveness. The result of practical analysis of learning model is show in Table 5.

Table 5. Results of Model Practicality Analysis

Indicator	Teachers	Students
Management	32	30
Liveliness	24	24
Knowledge	28	22
Effectiveness	16	16
Percentage (%)	100	92
Criteria	Very Practical	Very Practical

Based on Table 5 show the results of the analysis of the practicality of the LAPS-Heuristics learning model with local wisdom, it is proven that its use in terms of management, activity, knowledge, and effectiveness is very easy and practical. This can be seen from the results of the teacher's response questionnaire, which obtained a percentage of 100%, also supported by the percentage of student responses of 92%. This means that the locally developed LAPS-Heuristics learning model does not need to be revised and can be used in learning to improve students' metacognitive abilities.

Discussion

Based on the study's results, developing the LAPS-Heuristics learning model with local wisdom can be implemented at SMP Negeri 1 Kahu to improve students' metacognitive abilities. It can be seen from the aspects of the validity and practicality of the developed learning model. The results of the validation of the components of the LAPS-Heuristics learning model with local wisdom by two experts as user validation assessors show valid criteria. The average score obtained from the syntax component is 3.6, with valid criteria. It shows that the LAPS-Heuristics learning model developed with local wisdom has a clear and systematic syntax or learning steps. In line with previous research, that state the learning model with systematic and clear stages can make it easier for students to understand the subject matter quickly (Iklina & Fadilah, 2022; Santhi & Pangestika, 2021).

Considering the components of the social system, the average score obtained is 3.6 with valid criteria. It shows that the learning model developed has a relatively constant social system. The roles of teachers and students in the learning process should have a relatively constant balance so that social interaction can be established in the learning process where students are active as learning subjects and

teachers as facilitators and motivators (Nurfatirah et al., 2022; Sukarni et al., 2021). In line with the components of the social system, in terms of the principle of reaction in the LAPS-Heuristics learning model with local wisdom, the average validator score is 3.3 on the valid criteria. It indicates that the LAPS-Heuristics learning model with local wisdom has a clear reaction principle between teacher activities and student activities. The principle of reaction is an activity in the learning process that describes how the teacher treats students, including responding (Aspan, 2021; Mahardin et al., 2022). The general description of the learning process using the LAPS-Heuristics model with local wisdom emphasizes student discussion activities, where students are active in groups completing the given worksheets, and the teacher monitors student activities by helping with questions that students need to understand (Retnawati, 2017; Rosidin et al., 2019).

From the perspective of the instructional impact and accompaniment components, the average score obtained is 3.8 on the valid criteria. It means that the LAPS-Heuristics learning model with local wisdom can have a clear instructional impact and accompaniment impact in the learning process, such as increasing students' collaboration and communication skills during learning (Retnawati, 2017; Rosidin et al., 2019). The LAPS-Heuristics learning model with local wisdom is identical to the stages based on local wisdom, so students can easily understand the questions that impact their metacognitive abilities. Indirectly, learning LAPS-Heuristics with local wisdom can increase students' interest and motivation to learn. In general, the validation results of the expert team showed a positive response stating that the LAPS-Heuristics learning model developed with local wisdom was based on consistent and interrelated model components (Amalliyah et al., 2021; Mulyadi & Ahmad, 2022). The validator's responses are generally very good and provide suggestions or revisions on learning steps in teacher and student activities so that learning activities are made in separate columns. The validation team's suggestions have been added and clarified in the syntax section of the local wisdom LAPS-Heuristics learning model.

The results of the validation of the locally developed LAPS-Heuristics learning model are also supported by practical user results, which show that the local wisdom LAPS-Heuristics learning model is easy to use, practical, and uncomplicated (Eppe et al., 2022; Sriwahyuni & Maryati, 2022). From the teacher's and student's response questionnaire in terms of management indicators, it shows a score with a good category. It means that the LAPS-Heuristics learning model developed with local wisdom can manage the class systematically and well so that students have clear learning readiness. Considering the activity indicators, teachers and students were assessed with a score in the good category. It shows that the LAPS-Heuristics learning model with local wisdom can increase student activity in learning. The implication of this study is providing activity that can be used as reference that students understand the material given. The results of student activity are also supported by the knowledge indicators, which are in the good category. These results prove that the LAPS-Heuristics learning model with local wisdom can build students' knowledge regarding learning materials. Meanwhile, in terms of effectiveness indicators, the responses of teachers and students were found in the good category. The effectiveness referred to in this case is the effective learning process applied according to the desired target, such as the suitability of the time allocation and the achievement of the desired learning objectives. Therefore, it is recommended that mathematics teachers use this local wisdom LAPS-Heuristics learning model to improve students' metacognitive abilities. The learning model developed has been said to be valid and practical but has yet to be effective. Hopefully, this learning model can be analysed for its effectiveness in subsequent research to complement the aspects carried out in developing a learning model.

4. CONCLUSION

Based on the research explanation above, it can be concluded that developing the local wisdom LAPS-Heuristics learning model uses the Borg and Gall development model, which consists of three stages: preliminary studies, limited sample trials (limited trials), and wider sample trials (extensive trial), and product testing through experimentation. The research consists of a preliminary study stage and a trial stage because if the second stage has been carried out, a good learning model has been obtained, so the development objectives have been met. The development of the LAPS-Heuristics learning model with local wisdom obtained valid and practical test results that showed the feasibility of the model to be applied.

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