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## DEVELOPMENT STUDENT WORKSHEET ASSISTED WITH NUMBERED HEAD TOGETHER MODEL RELATED TO MATHEMATICS PROBLEM SOLVING ABILITY

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### Abstract

The capacity to fathom scientific issues can offer assistance a understudy unravel a mathematical issue inside the scope of learning conjointly in existence. Powerless issue understanding capacities experienced by students can result in not accomplishing the objectives of learning results within the learning process. This investigate itself has the objective of creating a student worksheet learning apparatus utilizing the Numbered Head Together show which is anticipated to make strides students' mathematical issue tackling capacities, with substantial and down to earth categories. The type of research conducted was Research and Development, with 24 class VIII students as research subjects. The information analysis strategy utilized is legitimacy and common sense investigation. Information collection methods are interviews, surveys, and tests. Information analysis methods in this consider included preparatory information examination, information validity investigation by specialists, and information common sense examination by instructors and students. From the comes about of this think about, it was concluded that the advancement of student worksheet learning instruments with the assistance of the Numbered Head Together show to move forward students' mathematical issue tackling capacities based on master validators, teachers, and students in meeting the criteria of validity and practicality.

**Keywords:** Numbered Head Together; problem solving abilities; student worksheet

### Abstrak

Kemampuan pemecahan pada masalah matematika bisa membantu seorang siswa dalam memecahkan suatu permasalahan matematika didalam ruang lingkup pembelajaran dan juga didalam kehidupan sehari-hari. Lemahnya kemampuan pemecahan masalah yang dialami siswa bisa mengakibatkan tidak tercapainya tujuan dari hasil belajar pada proses pembelajaran. Penelitian ini sendiri mempunyai tujuan menghasilkan suatu perangkat pembelajaran LKPD dengan menggunakan model Numbered Head Together diharapkan dapat meningkatkan kemampuan pemecahan matematika siswa, dengan kategori yang relevan dan praktis. Jenis penelitian yang dilakukan adalah Research and Development, dengan subjek penelitian sebanyak 24 orang siswa pada kelas VIII. Teknik analisis data yang digunakan adalah analisis validitas dan analisis kepraktisan. Teknik pengumpulan data adalah wawancara, angket dan tes. Teknik analisis data dalam penelitian ini meliputi analisis data pendahuluan, analisis validitas data oleh ahli, dan analisis kepraktisan data oleh guru dan siswa. Berdasarkan hasil penelitian dapat disimpulkan bahwa pengembangan perangkat pembelajaran LKPD dengan model Numbered Head Together untuk meningkatkan kemampuan pemecahan masalah matematika siswa berdasarkan validator ahli, guru dan siswa yang memenuhi kriteria kevalidan serta kepraktisan.

**Kata kunci:** kemampuan pemecahan masalah; model pembelajaran Numbered Head Together;  
Perangkat pembelajaran LKPD



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## INTRODUCTION

Instruction is an intuitively movement between understudies and instructors in accomplishing comes about agreeing to learning goals (Destania & Riwayati, 2021). One of the goals of learning math is for students to develop expertise in solving a math problem (Siagian, 2016 ; Wirdaningsih et al., 2017; Sumartini, 2018). This is because problem solving is seen as an activity that benefits both students and teachers at all levels of education, from primary school to university.

Mastering math skills can help solve problems both in math lessons or in problems related to students' everyday lives. A student's poor ability to solve math problems can also lead to failure to complete math learning activities that are deemed appropriate for the learning goals. In addition, it is fundamental to create learning devices concurring to the learning model, in order to create conditions for students to develop their competence when learning math, students are guided in a learning model that can improve their thinking ability. Students' thinking, interaction and creativity in a logical and systematic way. The learning model that is expected to be used when learning has to prepare for proper learning is to utilize the Numbered Head Together learning model. (Tinambunan et al., 2020). Utilizing the Numbered Head Together learning demonstrate can offer assistance understudies get it and ace math concepts, increment understudy collaboration, and make strides problem-solving and basic considering abilities (Muliandari, 2019).

Learning apparatuses student worksheet is one of the components that bolster the victory of the educating and learning handle in schools, because

learning tools can help when the process of providing information from both educators to students and vice versa (Ica Novita Sari et al., 2022). The use of learning devices is currently only those purchased from the publisher. In fact, some teachers still think that preparing school supplies is like a barrier to creativity, reducing teachers' interest in teaching because they are forced to write and flow creative ideas of paper (Nikmatin Mabsutsah & Yushardi, 2022).

Previous studies on student worksheet learning tools have been conducted because of their influence in increasing student engagement and activity in improving student academic achievement (Hidayat & Irawan, 2017; C. Budiono & Wardono, 2014; Komarudin & Prisma, 2019; Purwasi & Fitriyana, 2019; Septina et al., 2018). Be that as it may, no investigate has been done on the advancement of student worksheet learning devices that utilize the Numbered Head Together learning show to advance math issue tackling. For this reason, a student student worksheet learning tool product has been developed following the Numbered Head Together learning model to support real-world and usable math problem solving.

However in reality, there are still many students in Indonesia who have not been able to reach the expected standards for indicators of mathematical problem solving ability (Dwita Imannia et al., 2022). This also happened at Swadhipa 1 Natar Middle School, from observation and interviews with the mathematics teacher there, there's information where students' scientific issue fathoming capacities are categorized as low and the devices utilized are still incapable to progress students' mathematical issue tackling capacities. To be able to

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progress the capacity to fathom mathematical issues, it is necessary to develop student worksheet learning tools with a more innovative learning model, specifically the Numbered Head Together demonstrate. It is trusted that with the improvement of student worksheet learning devices helped by the Numbered Head Together learning model, teachers will become motivated, and can open up new insights to develop other learning tools with different learning models.

### RESEARCH METHODS

The sort of investigate utilized was investigate and advancement utilizing the Borg & Gall reference investigate demonstrate. This ponder was conducted to form a item to create student worksheet learning instruments utilizing Numbered Head Together learning demonstrate to make strides students' math issue tackling capacity. This consider was conducted at Swadhipa 1 Natar Middle School, South Lampung Rule, Lampung Area. The subjects of this consider were 24 class VIII students on level sided geometric shapes.

This think about was conducted to form a item to create student worksheet learning devices utilizing Numbered Head Together learning demonstrate to move forward students' math issue tackling capacity. Information collection strategies utilizing math instructor meet methods and educator surveys and understudy surveys. The results of the validation percentage can be aggregated into the score interpretation criteria using the Likert scale, so that conclusions can be drawn about the feasibility of the developed student worksheet learning tools (Febrianti et al., 2022). The criteria for deciphering scores utilizing the Likert scale are appeared in Table 1.

Table 1. Feasibility interpretation scale

<b>Evaluation</b>	<b>Validation Criteria</b>
$81\% \leq P \leq 100\%$	Very Worth it
$61\% \leq P < 81\%$	Worthy
$41\% \leq P < 61\%$	Pretty Worth it
$21\% \leq P < 41\%$	Less Worth it
$0\% \leq P < 21\%$	Very Unworthy

Based on Table 1 above, the student worksheet tested on students is expected to get an assessment scale with the minimum criterion that is worthy, which suggests that the student worksheet based on Numbered Head Together learning apparatuses is worthy to be connected within the learning prepare.

The formula used in calculating the results of the questionnaire is as follows:

$$(1) P = \frac{f}{N} \times 100\%$$

Information:

- N = Maximum total score
- f = Total score obtained
- P = Percentage number on the questionnaire

After knowing the validity of the development product, then it is tested for practicality on learning tools that have been developed using the criteria presented in Table 2.

Table 2. Average Practicality Analysis Criteria

<b>Evaluation</b>	<b>Validation Criteria</b>
$81\% \leq P \leq 100\%$	Very Practical
$61\% \leq P < 81\%$	Practical
$41\% \leq P < 61\%$	Pretty Practical
$21\% \leq P < 41\%$	Less Practical
$0\% \leq P < 21\%$	Impractical

Based on Table 2, the student worksheet tested on students is expected to get an assessment scale with a

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minimum criterion that is practical, which implies that the student worksheet based on Numbered Head Together learning instruments is easy for understudies to get it within the learning prepare.

Based on the computational analysis performed, if it does not meet the predefined criteria, a revision will be made to the developed product according to the recommendations made by each validator.

## RESULTS AND DISCUSSION

This investigate brought about in a item that's an student worksheet learning instrument bolstered by a Numbered Head Together learning demonstrate including students' problem-solving capacities, in a improvement prepare that incorporates gathering steps. data is used to detect problems faced by students and teachers (Yokri & Saltifa, 2020). At this stage, the problem that arises can be seen that the use of interactive learning materials that teachers use in the teaching and learning process has not been helpful to students, understudies still have trouble in understanding and learning. has been granted. Usually since instructors don't utilize student worksheet learning apparatuses and as it were utilize transitory learning helps, such as stay rulers, bows, and other composing apparatuses.

Ensuing examination based on the comes about of the interviews with the arithmetic educator, the comes about of the meet uncovered that the educator when educating arithmetic had never utilized the Numbered Head Together learning show , the educator as it were clarified utilizing the address strategy and as it were doing more hone questions. The next stage is the planning phase, which includes the preparation of building the product, the planning is

done including the preparation of student worksheet learning tools, student worksheet learning tools and questions assess students' ability to solve math problems as facilitators in the learning process, and then identify expert designers student worksheet, materials experts, to evaluate the learning tools student worksheet has developed.

The another step is the introductory item plan counting 1) the plan of the item to be created; 2) decide the vital foundation and offices amid the inquire about; 3) characterize the stages of field testing (Tjiptiany et al., 2016). The design for the development of student worksheet learning tools in this study is shown in Figure 1 and figure 2.

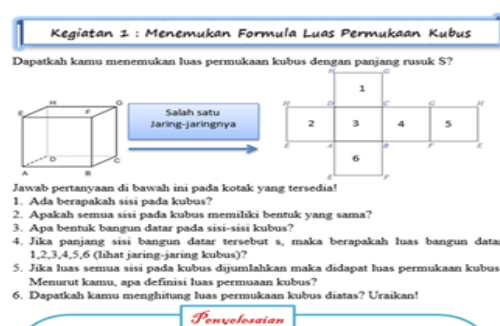


Figure 1. Student worksheet

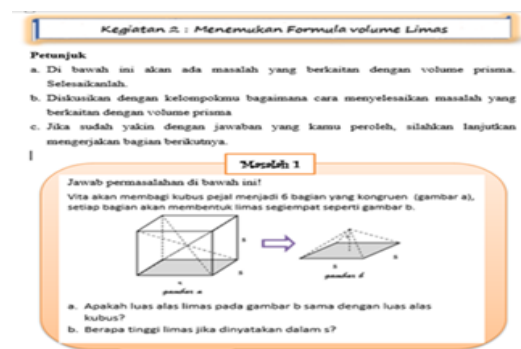


Figure 2. Student worksheet

Figure 1 and figure 2 clarifying that the plan for creating student worksheet learning apparatuses in this consider contains a numbering framework in Student worksheet that

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underpins the Numbered Head Together learning model.

After completing the product development of the student worksheet learning device, conduct validation with student worksheet's design experts so that the developed product is considered

valid to support math problem solving. The learning tools developed have undergone improvements according to the input/suggestions from each expert validator, the comes about of the expert evaluation are appeared in Table 3.

Table 3. Student worksheet Designer Expert Validation Assessment

No	Aspect	Student worksheet Designer Expert Validation			Average Score
		I	II	III	
1.	Quality of content and purpose	92%	95%	90%	92%
2.	Instructional quality	88%	96%	86%	90%
3.	NHT-assisted quality	95%	95%	95%	95%
<b>Total Average</b>		92%	95%	90%	92%
<b>Criteria</b>					<b>Very Valid</b>

Based on Table 3, it can be concluded that the learning tools that have been developed meet the very valid criteria based on the assessment of the validator student worksheet Designer. After the student worksheet designer evaluator met the eligibility criteria, a fourth phase was implemented, which was initial field testing, conducted to check the development of the learning tools. practice student worksheet for students. The researchers distributed the questionnaire containing the answers related to the student worksheet learning tool to students and teachers to view their responses and responses, the questionnaire was then analyzed and then analyzed. that is used as a reference to improve or modify the developed student worksheet learning tool. The results of teacher feedback on learning materials scored an average of 89% with very practical criteria. Understudy assessments of the student worksheet learning device are backed by the Numbered Head Together learning show that has been created covering four measurements, namely the quality of the

content and goals, the instruction and the quality of the devices. Learning equipment is supported learning Numbered Head Together. The analysis of student responses was also taken from a questionnaire that was tested on students. The number of understudies within the trial of this ponder was 24 understudies. Understudy reaction to the student worksheet learning instrument upheld by the Numbered Head Together learning demonstrate accomplished an normal rate of 87.5% classified as exceptionally commonsense.

Inquire about into the advancement of student worksheet learning apparatuses bolstered by the Numbered Head Together learning demonstrate was conducted based on wants of the student worksheet learning apparatuses created. After that, the main steps taken are the development step, namely the manufacturing step of the student worksheet learning tool and also the evaluation step by the student worksheet expert designers. The purpose of this review is to obtain criticism, suggestions, and feedback to improve the

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validity of the student worksheet learning tools to be developed. The results of these inputs become the reference for modifying student worksheet learning tools. In addition to expert input, student worksheet learning tools are also provided for educators and students to experience the answers to student worksheet learning tools supported by the Numbered Head Together learning model.

Assessment by material experts on student worksheet learning tools in the quality aspects of objectives and content obtained very valid results, namely obtaining an average value of 92%. This shows that the student worksheet learning tools that have been developed already meet the quality of the content and objectives. This student worksheet learning instrument is exceptionally substantial since the substance of the fabric displayed in it is in agreement with the markers, basic competencies, core competencies, and learning objectives. This student worksheet learning tool also uses the right language according to the correct Indonesian grammar rules, so that students understand the language used in it. The instructional quality of student worksheet learning tools gets very decent results, namely getting an average score of 90%. The instructional quality of this media is stated to be very valid, among others, because the material presented is in accordance with a contextual approach, to be specific passing on an issue concurring to the day by day lives of understudies. The arrangement of fabric is participatory and intelligently so that understudies feel specifically included within the issue being presented. The quality of the assistance of the Numbered Head Together learning show in this student worksheet learning tool gets a score of

90% which is within the exceptionally substantial category. The fabric in this student worksheet learning apparatus gives a jolt for students' interest in learning. The provision of student worksheet learning tools also fills the personal needs of students in positive behavior. As well as this student worksheet learning tool makes students have self-confidence and strengthens achievement using rewards that are very liked by students.

Based on the comes about of this consider, it is trusted that the student worksheet learning toolkit that has been created can be utilized as a arrangement for teachers in improving and reinforcing math problem-solving skills and becoming a teacher. become the inspiration for student worksheet learning tools in today's learning conditions and can improve student learning outcomes. This is consistent with previous research showing that engaging student worksheet learning tools can improve student outcomes in math learning (Novitasari et al., 2021; Iryanto, 2021; Dinda et al., 2021).

This research resulted in the development of a number heads together student worksheet based on students' mathematical problem solving abilities that met valid and practical criteria. The factors that make the number heads together based student worksheet meet valid and practical criteria are because the student worksheet has gone through expert validators who are above average, and student responses to questionnaires are good.

The advantage of this research is that this approach encourages the participation of all students in learning, because each student has a number that they must use. In addition, by working together, students can learn from each other and build collective understanding,

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and involving this model can help students develop their mathematical problem solving abilities.

## CONCLUSION AND SUGGESTION

From the comes about of advancement and investigate, it can be concluded that the advancement of student worksheet learning apparatuses helped by the Numbered Head Together learning show to make strides numerical issue tackling capacities based on evaluations by validators, teachers and students, meets practical and valid criteria. Suggestions for future researchers, namely, it is necessary to conduct effectiveness trials in larger groups, so that the developed learning worksheet learning tools can be utilized on a much wider and more complex scale.

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