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ORIGINAL RESEARCH

Improving cognitive abilities in static fluid material using a guided inquiry model assisted by simple teaching aids

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Abstract

This research aims to determine the increase in students' cognitive abilities, static fluid material for class VIII SMP Negeri 63 Central Maluku which is taught by applying the guided inquiry learning model. This type of research is one group pretest-posttest, with 15 students as the research sample. This research data was collected through test and non-test instruments, the test instruments were in the form of initial tests and final tests, while the non-test instruments were in the form of Student Worksheets (LKPD). The research results show initial ability, 100% with failed qualifications. Students are in the failing qualification with an average score of 24.85. The results of the analysis during the learning process show that the average student score of 87.50 is a very good qualification. The average student final test achievement score reached 83.55 with good qualifications. For the N-Gain Test results, the average student score was 0.78, which is in the medium qualifications. Thus it can be concluded that the application of the guided inquiry model assisted by simple teaching aids can improve the cognitive abilities of static fluid material in class VIII students at SMP Negeri 63 Central Maluku well.

Keywords: Assisted by Simple Props · Cognitive Abilities · Guided Inquiry Model · Static Fluid

INTRODUCTION

Education is an attempt to enlighten the nation. Education aims to foster a better and more prosperous nation while also improving the quality of human resources to promote national development (Hang, 2021). In a broader sense, education is understood not only as the transfer of knowledge, but also as a process of character formation, the development of individual potential, and the preparation of future generations to face the challenges of an ever-changing world. Law Number 20 of 2003, which governs the National Education System (Republik Indonesia, 2003), states that national education exists to develop capabilities and shape the character and civilisation of a dignified nation in order to enlighten the nation's life. As a result, improving educational quality is a shared responsibility that must be carried out in a systematic and continuous manner.

Scientific and technological advances have had a significant impact on educational quality, particularly in the classroom. The Industrial Revolution 4.0, characterised by advances in information and communication technology, has resulted in a paradigm shift in education (Lian, 2019; Nordin & Norman, 2018; Saleh et al., 2017). Teachers must integrate technology into the

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learning process while upholding pedagogical values that prioritise holistic student development. However, the challenges facing education go beyond technology and include the quality of the learning process within each educational unit.

Learning is the interaction of students, teachers, and learning resources within a learning environment. Learning is the assistance provided by educators to students in acquiring knowledge, mastering skills and habits, and developing attitudes and beliefs (Bintoro et al., 2022; Changwong et al., 2018). In this regard, the quality of interaction between teachers and students determines the success of the learning process. Teachers play a critical role in directing and planning the learning experience (Pritandhari, 2017; Van Wyk, 2019). To begin the learning process, teachers must first understand their students' basic abilities, such as their basic skills, motivation, academic background, socioeconomic background, and so on. The teacher's understanding of these student characteristics serves as the foundation for developing effective, targeted, and meaningful learning strategies for each student.

Physics learning is a process in which students interact with their surroundings to achieve physics learning objectives. The goal of physics education is for students to master physics concepts and principles while also developing the skills necessary to develop knowledge and self-confidence as a foundation for furthering their education. Physics, as a natural science, plays an important role in the advancement of science and technology. Physics education is designed to help students understand natural phenomena scientifically, develop critical thinking skills, and foster a strong curiosity about the natural world around them (Ragustini et al., 2022; Suhendi et al., 2018).

However, in practice, physics education is frequently delivered in a traditional, teacher-centered manner, leaving students with few opportunities to explore and discover concepts independently (Dervić et al., 2018). This situation has an impact on students' cognitive abilities, particularly their understanding of abstract concepts like fluid statics. Fluid statics is a physics topic that requires a thorough conceptual understanding because it is closely related to everyday phenomena like water pressure, Archimedes' law, and Pascal's principle. Students struggle to connect physics concepts to the real world when they are taught solely theoretically without direct experience.

Physics education is currently being developed using a student-centered learning approach, in accordance with the 21st-century learning paradigm, which emphasises students' thinking and learning skills (Bao & Koenig, 2019; Kumaş, 2025). The 4Cs refer to critical thinking, creativity, communication, and collaboration. As a result, the goal of physics education is to help students gain knowledge and self-confidence so they can master concepts meaningfully. To achieve this goal, professional and innovative educators are required to design and implement the learning process.

A professional educator possesses unique abilities and expertise that allow them to fully perform their duties and functions as educators. In this regard, professional educators must be able to choose models or methods that are relevant to the material being taught, as well as be more creative in creating an active, innovative, and enjoyable learning environment (Joyce & Calhoun, 2024). A teacher's ability to select the appropriate learning model has a significant impact on the quality of the learning process and outcomes (Sudargini & Purwanto, 2020). Selecting an inappropriate learning model can make students feel bored, passive, and unmotivated, affecting their cognitive achievement.

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Several issues with the physics learning process, particularly in static fluids, were identified based on preliminary observations in schools. First, teachers' teaching methods are still dominated by lectures and note-taking, which leads to students becoming passive during the learning process (Yıldırım, 2025). Second, the lack of concrete learning materials makes it difficult for students to visualise abstract static fluid concepts (Irawan et al., 2026). Third, low student participation in the concept discovery process leads to rote learning rather than in-depth comprehension (Ardiyani & Puspitaloka, 2025). These conditions have a direct impact on students' limited cognitive abilities in static fluid material.

To address the identified issues, an appropriate learning model is required that can accommodate students' cognitive abilities while also engaging them in understanding the material being taught. The guided inquiry learning model is one that is thought to promote meaningful learning. According to Arifin & Sunarti (2017) and Nasir et al. (2019), the guided inquiry learning model is a teaching method in which the teacher gives students examples of specific topics and guides them through understanding them. The guided inquiry model is a type of inquiry in which students can work independently to develop procedures, analyse results, and draw conclusions. The teacher only serves as a facilitator in determining the topic of questions and supporting materials (Rahmatullah et al., 2021).

The guided inquiry model offers several advantages over traditional learning models. Students are encouraged to actively participate in every stage of the learning process by going through systematic inquiry stages such as orientation, problem formulation, hypothesis formulation, data collection, hypothesis testing, and conclusion formulation. This active participation promotes the development of higher-order thinking skills such as analysis, evaluation, and creativity, as specified by the revised Bloom's Taxonomy. As a result, the guided inquiry model not only improves students' cognitive abilities in terms of comprehension, but also encourages them to apply, analyse, evaluate, and even create new knowledge based on their learning experiences (Adauyah & Aznam, 2024; Solikah & Novita, 2022).

In line with this, the guided inquiry learning model emphasises the process of discovering a concept, which fosters a scientific mindset in students (Mubarok et al., 2018; Yasin et al., 2019). Teachers can use it based on students' intellectual development. The use of learning media, both simple and technologically based, will improve the effectiveness of guided inquiry learning. The presence of learning media acts as a link between the abstract concepts under study and the concrete reality that students can directly observe and comprehend. This is consistent with Piaget's theory of cognitive development, which holds that meaningful understanding is acquired through direct experience and active interaction with the environment.

The media used in this study were simple teaching tools. Simple teaching aids can be made from objects found around the school, including used items, requiring little money or time. Using simple teaching aids in physics learning has a variety of advantages, including increasing student motivation and interest in learning, assisting students in understanding abstract concepts through concrete experiences, and encouraging students to actively experiment and discover the concepts they are studying. Furthermore, student participation in the creation or use of simple teaching aids can encourage creativity and a sense of responsibility for their own learning.

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The combination of a guided inquiry learning model and simple teaching aids is expected to be a successful solution for improving students' cognitive abilities in static fluids. Several previous studies have shown that using a guided inquiry model can significantly improve students' learning outcomes and critical thinking skills in science subjects like physics. Similarly, the use of teaching aids in physics education has been shown to improve students' conceptual understanding more effectively than learning solely through lectures.

According to the background description, the researcher is interested in conducting a study called "improving cognitive abilities of static fluid material with a guided inquiry model assisted by simple teaching aids." This study is expected to make a significant contribution to the development of more innovative, effective, and meaningful physics learning practices for students, as well as serve as a resource for educators in selecting and implementing learning models and media that are appropriate to the needs and characteristics of students in the twenty-first century learning era.

METHODS

This study took a quantitative approach with a one-group pretest-posttest design. This design was chosen because the study sought to assess the improvement in students' cognitive abilities in static fluids by comparing the results of the initial and final tests after implementing a guided inquiry model with simple teaching aids. This design involved taking measurements twice: before the treatment was administered (pretest) and after the treatment was completed (posttest). As a result, the difference between the two measurement results can indicate the extent to which students' cognitive abilities improved as a result of the implementation of the learning model and media.

This research was carried out at SMP Negeri 63 in Central Maluku. The study was conducted during the even semester of the 2024/2025 academic year, in accordance with the school's established learning schedule. The even semester was chosen to align with the learning syllabus because static fluids are among the core competencies taught that semester.

The participants in this study were eighth-grade students from SMP Negeri 63, Central Maluku, during the even semester of the 2024/2025 academic year. The total number of research subjects was 15, which included all students in the class chosen for the study. The selection of these 15 students was based on actual field conditions, with all eighth-grade students taking part in the study to ensure that the data obtained reflected the students' overall cognitive abilities.

The instruments used in this study were divided into two types: tests and non-tests, each of which measured a different aspect of the learning process. Multiple-choice and essay questions were used in both the pretest and posttest stages. These instruments consisted of ten multiple-choice questions and five essay questions, for a total of fifteen questions on static fluids. The use of these two types of questions was meant to provide a more complete assessment of students' cognitive abilities. Multiple-choice questions were used to assess general conceptual mastery, whereas essay questions were used to assess students' ability to elaborate and explain concepts in greater depth. This test instrument was used for two stages of measurement: a pretest before treatment and a posttest after treatment. The results of both could be compared to see if there was any improvement in students' cognitive abilities.

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The non-test instrument, a Student Worksheet (LKPD), was used to assess students' process abilities while learning with the guided inquiry model. This LKPD was designed based on the stages of the guided inquiry model used during the learning process, allowing the LKPD to determine the extent of students' active participation in each stage of the learning process.

The data from the pretest and posttest results, as well as the LKPD, were analysed using the following analytical techniques. The scores obtained from both the initial and final test data were calculated using Arikunto's proposed formula (Rahawarin et al., 2024). The calculated values were adjusted to meet the Minimum Completion Criteria (KKM) at SMP Negeri 63 Central Maluku, determining each student's achievement classification. The KKM classification used is shown in Table 1.

Table 1. Minimum Completeness Criteria

Interval	Classification
90 – 100	Very Good
79-89	Good
68-78	Fair
<68	Poor

According to the table above, students who receive scores in the 90-100 range are classified as excellent, those in the 79-89 range as good, those in the 68-78 range as adequate, and scores below 68 as poor. The Minimum Competency (KKM) aims to provide a clear picture of the level of achievement of students' cognitive abilities both before and after the guided inquiry model is implemented using simple teaching aids.

Data on students' processing abilities obtained from the Student Worksheet (LKPD) were analysed using a predetermined calculation formula. The findings of this LKPD analysis were used to describe the level of student engagement and process abilities at each stage of learning using the guided inquiry model, from the first to the final stage. This allows us to assess students' ability to follow the designed learning process.

$$Rr.SP = \frac{SP\,\text{Worksheet 1} + SP\,\text{Worksheet 1}}{2} \tag{1}$$

The Normalised Gain (N-Gain) test was used to assess cognitive improvement in static fluid material by comparing initial and final results. N-Gain was calculated using Ratnaningtyas' (2017) equation. Table 2 shows the criteria used to categorise the obtained N-Gain values.

Table 2. Gain Score Criteria

Gain Score	Criteria
$g \geq 0,7$	High
$0,3 < g < 0,7$	Moderate
$g \leq 0,3$	Low

Table 1 shows that high qualification (g > 0.7) indicates a significant increase in students' cognitive abilities after treatment, while medium qualification (0.3 < g < 0.7) indicates a significant increase. Low qualification (g < 0.3) indicates that the increase is still not optimal. Thus, the N-Gain test is used as the primary measuring tool to answer research questions about

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the magnitude of the increase in students' cognitive abilities achieved through the use of a guided inquiry model supplemented by simple teaching aids on static fluid material.

RESULTS

Initial students abilities

The results of the students' initial test indicate their level of mastery of the static fluid material before the learning process began using a guided inquiry model assisted by simple teaching aids. The overall results of the initial test can be seen in Table 3.

Table 3. Initial Student Abilty Criteria

Competency Mastery Level	Freq.	Percentages (%)	Classification
90 – 100	-	-	Very Good
78 – 89	-	-	Good
68 – 78	-	-	Fair
< 68	15	100	Poor

(Source: 2025 Research Data Results)

The data in Table 3 show that all 15 eighth-grade students at SMP Negeri 63, Central Maluku, had an initial proficiency level that fell below the "poor" qualification or had not yet met the required Minimum Completion Criteria (KKM), which is 67. At this point, no student had received a "fair," "good," or "very good" qualification. The average score obtained by all students on the initial test was 24.85, indicating that students' initial understanding of the static fluid material remained limited and far from the established completion standard.

Individually, the students' initial proficiency level revealed that the highest score was 40, achieved by five students, and the lowest score was 26, obtained by two students. This relatively narrow range of scores suggests that almost all students started at the same level of mastery and did not yet have a thorough understanding of the static fluid material. Figure 1 depicts the level of achievement for individual students' initial abilities.

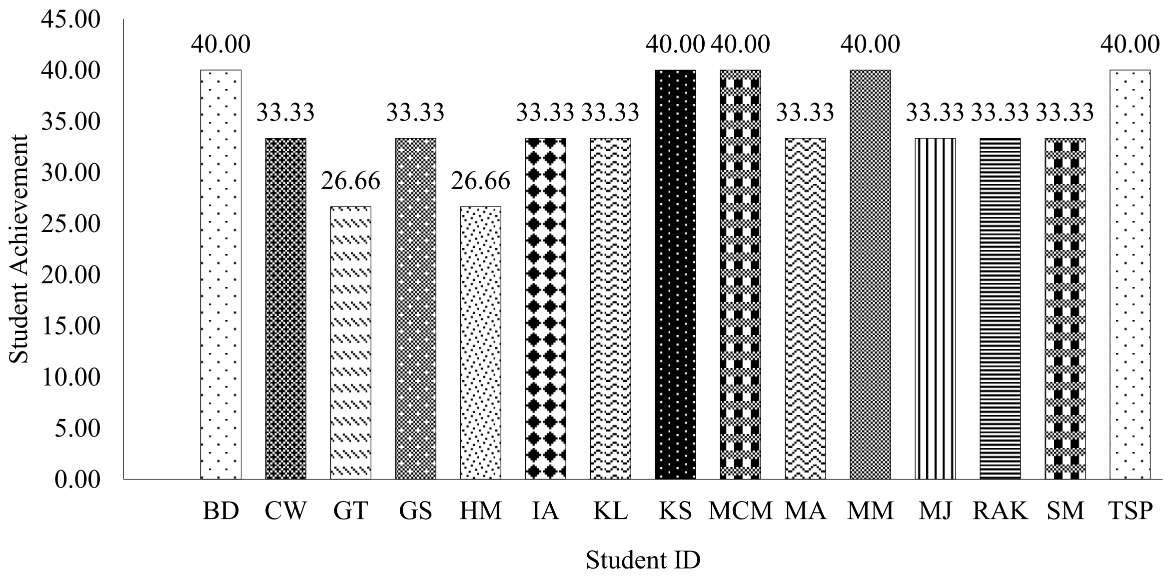

Figure 1. Individual Students' Initial Abilty

The low results of this initial test were caused by a number of factors. First, most students still had a basic understanding of static fluids. Second, static fluids had never been thoroughly

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taught, so they relied solely on general knowledge and intuitive everyday experiences, rather than structured conceptual understanding. This was also evident in the pattern of student responses to the initial test questions. The majority of correctly answered questions were about applying theory to real-life situations, which are intuitively easier to understand, whereas questions requiring conceptual analysis were answered less accurately. This poor initial understanding and inability to analyse problems are a reflection of the students' cognitive state prior to the treatment, so a more effective learning process is required to improve these skills.

Student Abilities During the Learning Process

The results of students' process abilities indicate the extent to which they understand the static fluid material in the learning process with the help of simple teaching aids through the application of a guided inquiry model. This process assessment was carried out in two meetings using Student Worksheets (LKPD). The results of students' process abilities at each meeting can be seen in Table 4.

Table 4. Criteria Student Process Abilities during the Learning Process

Competency Mastery Level	Lesson I		Lesson II		Classification
	F	%	F	%	
90 – 100	6	40	7	46,66	Very Good
79 – 89	1	6,67	5	33,34	Good
68 – 78	8	53,33	3	20	Fair
< 68	-	-	-	-	Poor
Total	15 students		15 students		

(Source: 2025 Research Data Results)

According to Table 4, the F variable represents the frequency or number of students in each category, whereas (%) denotes the percentage of the frequency. At the first meeting, six students (40%) were rated as very good, one (6.67%) as good, and eight (53.33%) as fair. No student was classified as failing. This indicates that, since the first meeting, all students have been able to complete the learning process with results that exceed the minimum completion requirement.

The second meeting saw a significant increase over the first. Seven students (46.66%) were rated as very good, five (33.33%) as good, and three (20%) as fair. This shift in distribution indicates that students who were previously classified as fair have moved up to good or very good. This pattern of improvement indicates that students' understanding gradually improves from the first to the second meeting, as they become more familiar with the stages of the guided inquiry model used in the lesson.

The average achievement score during the learning process for both meetings was 87.50, which is considered good, indicating that students were able to follow and understand the learning process well. Figure 2 shows the individual achievement scores for LKPD 1 and 2. Figure 2 shows that in the first meeting (Worksheet 1), the highest score was 100.00, earned by six students. These students achieved the highest score because they understood the concept of hydrostatic pressure, analyzed the factors influencing it, and correctly solved the hydrostatic pressure problems. Meanwhile, the lowest score in Worksheet 1 was 77.78, earned by eight students. This was due to the students' inability to accurately calculate hydrostatic pressure and analyze the factors that influence it.

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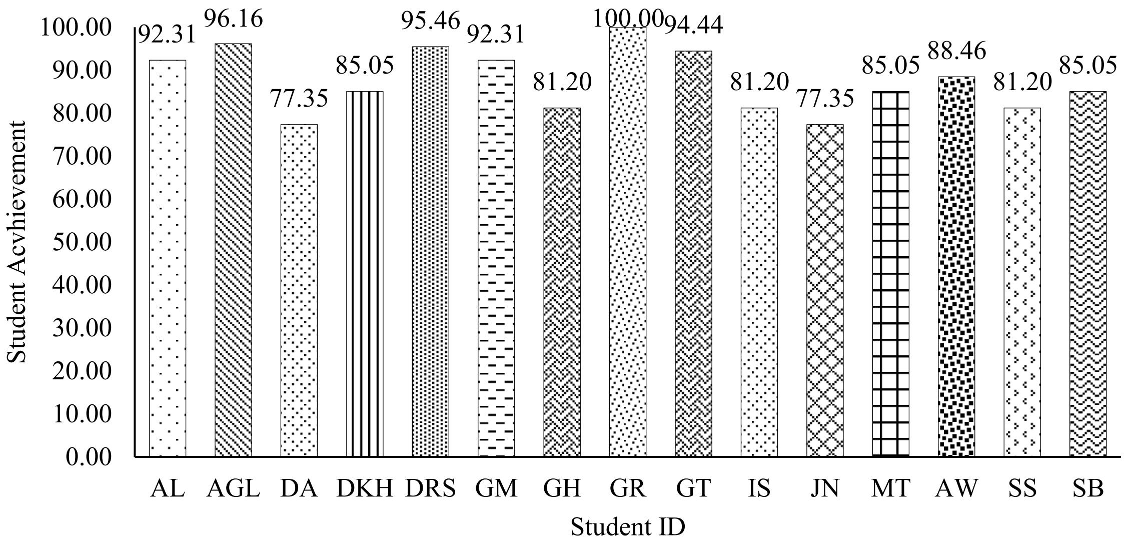

Figure 2. Individual Student Ability for Student Worksheets

In the second meeting (Worksheet 2), the highest score was 100, earned by two students. This achievement reflects the students' ability to identify and explain the concept of Archimedes' Law, analyze the factors that influence it, and correctly solve the problems related to Archimedes' Law. The lowest score on LKPD 2 was 76.92, obtained by 3 students, which was caused by the students' inability to solve questions related to Archimedes' Law. However, all students in both meetings remained above the failing qualification limit, which shows that the guided inquiry model assisted by simple teaching aids is effectively able to encourage active student involvement during the learning process.

Final Student Abilities

The final test was conducted to measure the level of student success after the entire learning process using the guided inquiry model assisted by simple teaching aids was completed. The final test calculation results showed varied results with an average score of 83.33. Overall, there were 3 students (20%) who were in very good qualifications, 10 students (66.67%) were in good qualifications, and 2 students (13.33%) were in sufficient qualifications. Not a single student was in the failing qualification. The complete final test results data can be seen in Table 5.

Table 5. Final Student Ability Criteria

Competency Mastery Level	Freq.	Percentages (%)	Classification
90 -100	3	20	Very Good
79 - 89	10	66,67	Good
68– 78	2	13,33	Fair
< 68	-	-	Poor

(Source: 2025 Research Data Results)

According to Table 5, there was a significant change from the initial test results. While all students (100%) failed the initial test with an average score of 24.85, the final test saw all students successfully exceed the Minimum Competency (KKM) and none fail, with an average score of 83.33, which is considered good. This improvement shows that using the guided inquiry model with simple teaching aids had a significant impact on students' cognitive abilities in the static fluid material.

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The highest final test score was 100, achieved by one student, indicating that the student had a very good understanding of the fundamental concepts of the static fluid material after participating in the in-depth learning process. Meanwhile, the lowest score was 73.33, achieved by one student. Although this was the lowest score on the final test, it was still above the Minimum Competency (KKM) and deemed adequate, indicating that the student had a less-than-optimal understanding of some fundamental concepts of static fluid material. Figure 3 shows the level of achievement for individual students' final abilities.

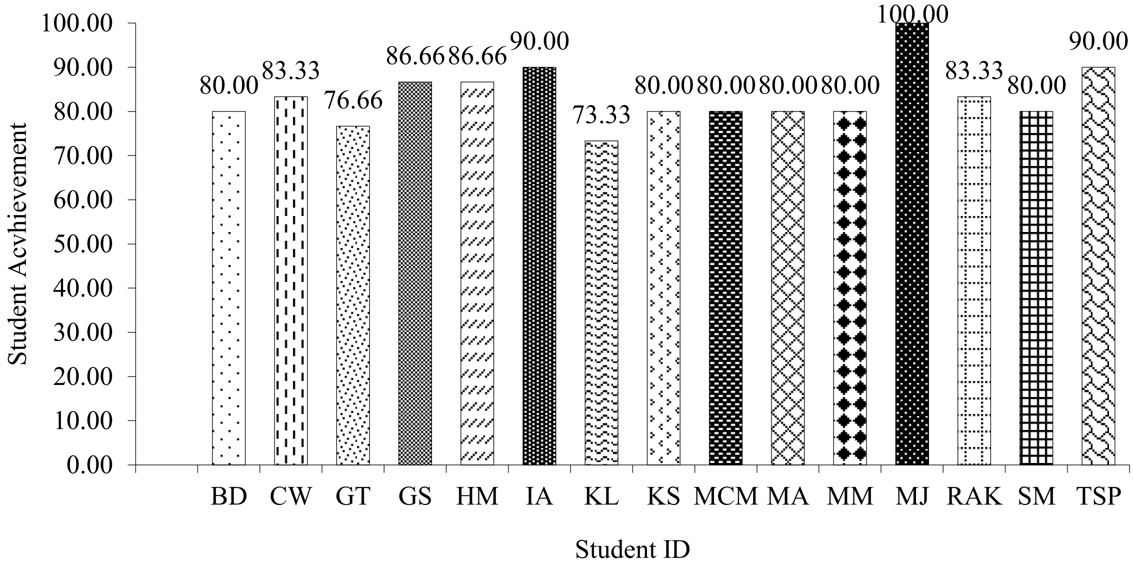

Figure 3. Individual Students' Final Abilty

The increase in the average score from 24.85 in the initial test to 83.33 in the final test indicates that the learning process has successfully strengthened students' conceptual understanding of static fluid material. This success is inseparable from the reinforcement of the material provided during the learning through the stages of the guided inquiry model and the use of simple teaching aids that help students understand static fluid concepts in a more concrete and meaningful way.

Increasing Student Ability (N-Gain)

The Normalized Gain (N-Gain) test was conducted to determine the level of improvement in students' cognitive abilities in static fluid material after the learning process using a guided inquiry model assisted by simple teaching aids. This measurement was carried out by comparing the results of the pretest (initial test) and posttest (final test) obtained by students before and after the learning treatment. The N-Gain analysis was used because it is able to describe the effectiveness of learning more objectively through the magnitude of the increase in scores normalized to the maximum possible score. The higher the N-Gain value obtained, the greater the increase in students' cognitive abilities after participating in the learning process.

Based on the calculation results, the average N-Gain value was 0.78, which according to Richard R. Hake's criteria is included in the high category. These results indicate that the application of the guided inquiry learning model assisted by simple teaching aids has a positive and effective influence in improving students' cognitive abilities in static fluid material. The complete distribution of students' N-Gain test results can be seen in Table 6.

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Table 6. N-Gain Test Results of Wave Material

Achievement Score Interval	Freq.	Percentages (%)	Criteria
$g \geq 0{,}7$	7	46,67	High
$0{,}3 \leq g < 0{,}7$	5	33,33	Moderate
$g < 0{,}3$	3	20	Low

(Source: 2025 Research Data Results)

Based on Table 6, 7 students (46.67%) fell into the high improvement category, indicating that nearly half of the students saw significant improvement in their cognitive abilities after participating in the learning process. Furthermore, 5 students (33.33%) were in the moderate category, indicating that some students made significant progress but did not yet reach the optimal level. Meanwhile, three students (20%) remained in the low category, indicating that some students had not yet made full progress.

Although some students remained in the low category, the overall average N-Gain score of 0.78 indicated that the learning implemented significantly improved students' cognitive abilities. This demonstrates how the guided inquiry model was able to assist students in developing a deeper understanding of concepts through active participation during the learning process.

Figure 4, depicts the improvement in individual students' cognitive abilities, with a trend of increasing posttest scores compared to pretest scores for nearly all students. This condition indicates that most students can better understand the material after engaging in learning experiences that require direct participation in the process of investigation and concept discovery.

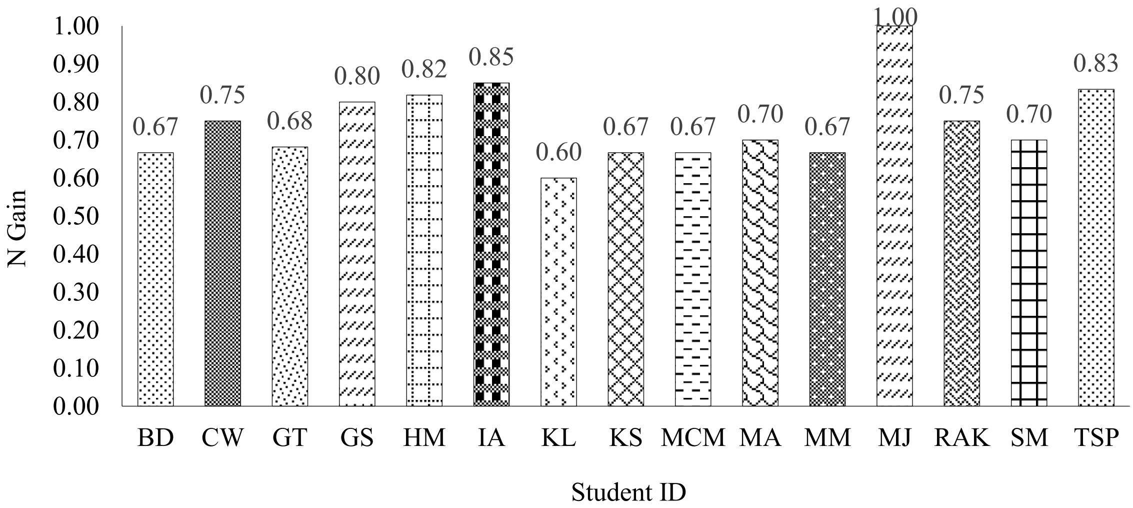

Figure 4. Individual N Gain Score

The improvement in cognitive abilities that occurs is inseparable from the characteristics of the guided inquiry model, which places students at the center of learning (student-centered learning). Through stages such as problem orientation, hypothesis formulation, conducting experiments using simple teaching aids, data analysis, and drawing conclusions, students are trained to think critically, systematically, and analytically. Furthermore, the use of simple teaching aids helps students visualize abstract concepts in static fluids, making them more concrete and easier to understand.

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Student engagement during the learning process is also a key factor supporting this improvement. Students do not simply passively receive information from the teacher, but are directly involved in observation, discussion, hypothesis testing, and problem-solving. This active involvement fosters meaningful learning experiences, making the acquired knowledge more durable and optimally enhancing cognitive learning outcomes.

Discussion

Based on the data analysis presented in the previous section, it is clear that students' cognitive abilities improved significantly and gradually, beginning with the initial condition before treatment (pretest), progressing through the learning process, and concluding with treatment (posttest). These changes show how the guided inquiry learning model, when combined with simple teaching aids, improves student learning outcomes, particularly in the topic of static fluids.

All students failed the initial test (pretest), scoring an average of 24.85. These findings indicate that students' initial understanding of static fluid concepts remained low. This low initial ability indicates that prior to treatment, most students lacked an adequate conceptual understanding of the material being studied. Students tended to answer questions based on empirical experience and intuitive everyday knowledge, rather than a structured scientific understanding. This condition is evident in the students' response patterns on the initial test, where the majority of them could only correctly answer questions about everyday phenomena, while many errors were found on questions requiring conceptual analysis, scientific reasoning, and systematic application of formulas.

This finding supports by prior knowledge has a significant influence on students' learning processes. If students lack prior knowledge, they will struggle to connect new information to their existing cognitive structures (Lakkala et al., 2021). As a result, a learning model is required that can bridge the gap between students' prior experiences and the scientific concepts they must understand, thereby making learning more meaningful.

During the learning process, an average learning implementation score of 87.50 was obtained, which is considered good. These findings suggest that the guided inquiry model, aided by simple teaching aids, was optimal, allowing students to actively participate in each stage of learning (Ningsih et al., 2012; Seranica et al., 2018). Students are the primary subjects in the guided inquiry model's learning activities, which include observing, formulating problems, developing hypotheses, conducting experiments, analysing data, and drawing conclusions. These stages directly teach higher-order thinking skills like analysis, evaluation, and problem solving.

In this study, the guided inquiry model was found to be effective because it increased student engagement during the learning process. Students no longer passively receive information from their teachers, but rather actively construct their own knowledge through a process of discovery. This is consistent with Jean Piaget's constructivism theory, which emphasises that knowledge is gained through direct experience and active participation in the learning environment. In the context of this study, simple teaching aids are an extremely beneficial medium for this knowledge construction process because they convert abstract concepts in static fluids into more concrete and easily observable concepts.

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The use of simple teaching aids derived from objects found in the school environment enhances learning. Aside from being readily available and inexpensive, these teaching aids enable students to conduct direct observations and experiments. Students can understand the relationship between theory and real-world phenomena through these hands-on experiences, such as the concepts of hydrostatic pressure, Pascal's law, and Archimedes' law. This type of learning process facilitates students' understanding of concepts because it is not only verbal but also visual and kinaesthetic. Thus, simple teaching aids act as a link between theory and practice in science education.

The final test (posttest) yielded an average score of 83.33, which is considered good. This result represents a significant improvement over the initial test's average score of 24.85. All students met or exceeded the Minimum Completion Criteria (KKM), and none failed. This improvement indicates that after participating in the guided inquiry learning model with simple teaching aids, students had a significant increase in their understanding of static fluids.

The improved final test results indicate that students were able to not only memorise concepts, but also apply, analyse, and solve static fluid problems more effectively. This demonstrates that the learning process was successful in meeting its learning objective of comprehensively improving students' cognitive abilities.

Furthermore, the Normalised Gain (N-Gain) test results yielded an average score of 0.78, which is classified as high (Hake, 1999). This score confirms that students' cognitive abilities improved not only quantitatively through higher test scores, but also qualitatively, indicating high learning effectiveness. In other words, the applied learning model was able to significantly improve students' conceptual mastery.

Several factors contributed to this high N-Gain score, including student engagement during the lesson, intensive teacher-student interaction, and opportunities for students to learn through direct experience. In the guided inquiry model, teacher guidance is also critical in assisting students who are struggling at certain stages, ensuring that the learning process remains focused while allowing students to discover concepts independently.

The findings of this study also support previous research findings that the guided inquiry model improves students' learning outcomes and critical thinking skills, particularly in science lessons that require conceptual understanding and scientific process skills. As a result, the guided inquiry model, when combined with simple teaching aids, can be used as an effective alternative learning strategy to improve the quality of science education in schools.

Overall, based on the results of the initial test, learning process, final test, and N-Gain test, it is possible to conclude that the guided inquiry learning model, supported by simple teaching aids, has proven effective in improving eighth-grade students' cognitive abilities in static fluids at SMP Negeri 63 in Central Maluku. This model not only improves learning outcomes, but it also encourages students to be more active, critical, and self-directed in developing their understanding of scientific concepts.

CONCLUSION

Based on the research results and discussions that have been described, the following conclusions can be drawn. First, the cognitive abilities of class VIII students of SMP Negeri 63 Central Maluku before the implementation of the guided inquiry model assisted by simple teaching aids were still below the Minimum Completion Criteria (KKM) that had been set. This

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was indicated by the average score of the initial test of 24.85 with a qualification of failure, where all 15 students (100%) had not been able to achieve the expected completion standard. This condition reflects that students' initial understanding of the basic concepts of static fluid material was still very limited, which was caused by never having been taught the material in depth before so that students only relied on general knowledge and everyday experiences that were intuitive. Second, during the learning process by implementing the guided inquiry model assisted by simple teaching aids, students' process abilities experienced positive development. The average learning process achievement score from the two meetings held reached 87.50 with a good qualification. This development can be seen from the increasing number of students who are in very good qualifications from the first meeting to the second meeting, which indicates that students are increasingly able to understand and follow the stages of the guided inquiry model as the learning process progresses. This proves that the guided inquiry model assisted by simple teaching aids is effective in encouraging active student involvement during the learning process. Third, students' cognitive abilities after the implementation of the guided inquiry model assisted by simple teaching aids experienced a significant increase. The average score of the final test reached 83.33 with good qualifications, where all students have successfully exceeded the KKM limit and none are in the failing qualification. The results of the N-Gain test showed an average score of 0.78 which is in high qualifications, which confirms that the increase in students' cognitive abilities in the static fluid material after the treatment is large and significant. Thus, it can be concluded that the implementation of the guided inquiry model assisted by simple teaching aids has proven effective in improving the cognitive abilities of class VIII students of SMP Negeri 63 Central Maluku in the static fluid material.

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