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KIT IPA THROUGH ICARE MODEL TO IMPROVE LEARNING OUTCOMES OF STUDENTS

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ABSTRACT

Science learning activities are not complete without practical exercises. Through the use of media in experimental activities, such as the use of KIT IPA media, learning content can be directly absorbed. In actuality, KIT IPA is still not commonly utilized. The non-used KIT IPA becomes damaged upon learning about it, rendering it unusable. The purpose of this study is to identify the learning objectives of seventh-grade junior high school students and assess how well KIT IPA works with the ICARE model when applied to motion and force content. One method of gathering data for this study was the test method. A test of cognitive learning outcomes is the instrument provided. Following the introduction of KIT IPA learning using ICARE mode in the experimental class and traditional learning in the control class, this test of cognitive learning outcomes was administered. Twenty multiple-choice questions covering the cognitive domain from C1 to C5 make up this cognitive learning outcomes test. According to the data, the experimental class's good category percentage was 71%, whereas the control class's sufficient category percentage was 49%. Therefore, it can be said that VII SMP cognitive learning outcomes on motion and force material are effectively met by using IPA KIT through the ICARE. From the data that has been obtained shows that the use of KIT IPA through the ICARE model can improve student learning outcomes compared to conventional learning.

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1. INTRODUCTION

The study of the world and its contents, as well as the events that surround it, is known as natural science (IPA). It is created by specialists through the application of a number of rigorously conducted scientific procedures. Physics is a discipline of study that uses a variety of scientific methods to investigate different phenomena related to nature and the events that occur in it. It entails data evaluation based on scientific attitudes as well as observation, hypothesis, experimentation, and testing. It is also crucial to the advancement of science and technology (Anggraini et al., 2017). One of the lessons that students find challenging to learn is physics. This is because there are several formulas, ideas, and principles that students need to comprehend (Anggraini et al., 2017). The teacher might refute the statement by assigning assignments that call

for student participation. so that the learning challenges the students. According to (Purwono, Joni, 2014), the current learning procedure is still not the best for helping students enhance their skills. It is a requirement for teachers to be able to incorporate media into instructional activities. Additionally, incorporating media into instruction will enhance its appeal and enjoyment. in order to enhance student learning outcomes and facilitate the easy delivery of content in line with the learning objectives (Nurrita, 2018)

Students gain firsthand experience when they learn science through laboratory practice um activities. Through the use of media in experimental activities, the process of material absorption during the learning process can be directly received. Kit IPA is one of the media that can be used in experimental activities. Through the use of KIT, IPA hopes to encourage students to study science holistically that is, to understand the what, why, and how of science in addition to rote memorization of its principles. It is still uncommon to employ KIT-IPA in education. The teacher cites a number of reasons why using KIT IPA in the classroom is not optimal. The primary cause of KIT IPA's underutilization is a lack of teacher proficiency with the program's media, which results in broken and unusable KIT IPA.

During PLP, when making observations at SMP Negeri 8 Pekanbaru, teachers rarely conducted experiments and used learning media. Therefore, boredom during the learning process is a common thing for students, which can reduce their motivation to learn and have an impact on poor learning outcomes. Low student learning outcomes are the result of choosing learning models that are inappropriate for the features of the subject matter and the learning materials. Students' learning will be impacted by the learning paradigm that teachers employ (Rosdianto, 2018). During PLP, when making observations at SMP Negeri 8 Pekanbaru, teachers rarely conduct experiments and use learning media. Therefore, boredom during the learning process is a common thing for students that can reduce learning motivation and have an impact on poor learning outcomes. Low student learning outcomes are a result of the selection of learning models that are not in accordance with the characteristics of the subject matter and learning materials. Student learning will be influenced by the learning paradigm used by the teacher (Rosdianto, 2018). At SMP Negeri 8 Pekanbaru, the KKM for science lessons is 75 Based on data on the daily test scores for physics science on the material of motion and force at SMP Negeri 8 Pekanbaru in 2021 and 2022, the average is still relatively low.

The average score in 2021 is 52.17 with 30 out of 177 students achieving completeness. Meanwhile, in 2022 the average score was 56.14 with 25 out of 175 students achieving mastery. This shows that there are still many students who have not reached the KKM. To achieve the KKM, of course, teachers must make innovations in carrying out learning in the classroom. The innovation can be in the form of using learning models and media in classroom learning activities. In line with research conducted by (Payu et al., 2023). KIT tools with the application of experimental methods are still rarely used due to the lack of teacher skills in using KIT tools. Referring to the issues mentioned above, the use of creative media is needed to increase student motivation and engagement and improve their learning outcomes (Fitriati et al., 2021). In addition, learning with ICARE (introduce, connect, apply, reflect, and extend) is one of the learning approaches that can help students to grow as active participants and thinkers.

It is believed that the ICARE learning paradigm gives students the chance to put what they have learned into practice. ICARE is a learning methodology that consists of three stages: planning, implementing, and evaluating. ICARE can be applied to learners and consists of five

essential components of a introduction: At this point, the learning objectives and the outcomes of the learning are explained in the introduction. This phase needs to be brief and straightforward (Yasa et al., 2019). Relationship: At this point, the instructor will make connections between the material and past knowledge. And at this point, the instructor can use the media to deliver the content in a more engaging manner (Phonna, 2017).

The application stage is when learning really happens. Here, students work in groups to solve problems by applying the knowledge and abilities they have gained (Arianti et al., 2021). Students will now start conducting experiments, analyzing data, and responding to LKPD questions using KIT IPA. In this phase, the learning is summarized through reflection, where students are given the chance to consider what they have learned. It is the teacher's responsibility to evaluate the level of learning success. When doing reflection exercises, teachers can ask students to present during class discussions (Sunuraya et al., 2019). Expansion, undertakings At this point, the facilitator offers follow-up tasks that can be completed to further or reinforce the lessons learned. These tasks may involve giving out more reading material, homework, or workouts. In this study, however, the extension takes the shape of extra questions on the LKPD, thus students will respond to the questions on the LKPD once they have completed assessing the data from their experiments (Siahaan et al., 2020). Learning by using KIT IPA through the ICARE model will give students firsthand experience and aid in their development of scientific understanding. Students will greatly benefit from learning by completing experiments in order to comprehend the subject matter. Thus, in order to attain effective learning outcomes, KIT IPA using the ICARE model is employed in this study. Finding out how well KIT IPA effectiveness works to enhance student learning outcomes through the ICARE paradigm is the aim of this study.

2. METHOD

This kind of study uses a non-equivalent posttest-only control group design, making it a quasi-experiment. The experimental group and the control group were the two samples that were used in the investigation (Matthew leonard maciejewski, 2020). Using KIT IPA and the ICARE model, the experimental group received a physics scientific learning treatment. While the control group was not given treatment, learning was done conventionally. This study was carried out during the first semester of the 2023–2024 academic year at SMP Negeri 8 Pekanbaru. The study ran from January through March of 2024. The 173 pupils in class VII phase D of SMP Negeri 8 Pekanbaru served as the study's population. Class VII.C served as the experimental class, and class VII.E served as the control class for this study; a total of 34 students participated in each class.

Data collection in this study used primary and secondary data. Secondary data was obtained from the test scores of the previous material, namely temperature, heat, and expansion material, as a reference for determining the experimental group and control group. Primary data was obtained through posttest scores. The instrument given is in the form of a cognitive learning outcomes test. This cognitive learning outcomes test consists of 20 multiple-choice questions that cover the cognitive domain, according to Anderson, starting from C1 to C5. Table 1 shows the number of grids for each cognitive domain of research:

Tabel 1. Lattice of the number of questions for each research domain

No.	Cognitive Domain	Number of Questions
1	C1 (knowledge)	1
2	C2 (comprehension)	7
3	C3 (application)	8
4	C4 (Analysis)	3
5	C5 (Evaluation)	1
	Total	20

Descriptive and inferential analysis are the methods of analysis that are employed. In order to describe students' cognitive development through their learning outcomes, researchers employ descriptive analysis (Sugiyono, 2013). This study employs inferential analysis to determine the extent to which students' cognitive learning outcomes change between classrooms that use conventional learning methods and those that use the ICARE learning model with KIT IPA support. Three tests are utilized in this technique: the normality test, the homogeneity test, and the hypothesis test. The SPSS software, version 27, was used to analyze the data. Following the acquisition of the information needed to calculate the students' cognitive ability scores, Table 2 was used to categorize the results :

Table 2.Category of student learning outcomes

Interval (%)	Category
$85 \leq x < 100$	Excelent
$70 \leq x < 85$	Good
$50 \leq x < 70$	Good Enough
$0 \leq x < 50$	Not Good

(Elyana et al., 2017)

3. RESULTS AND DISCUSSION

Based on information on the motion and force content learning results for students. Table 3 then shows the attainment of student learning outcomes for each category on motion and force content in control classrooms using traditional learning and experimental classes using IPA KIT through the ICARE model.

Tabel 3. Interpretation of students cognitive learning outcomes

Interval (%)	Category	Experimental Class		Control Class	
		%	Numbers of students	%	Numbers of students
$85 \leq x < 100$	Excelent	38,24	13	0	-
$70 \leq x < 85$	Good	55,88	19	5	14,7
$50 \leq x < 70$	Good Enough	5,88	2	20	58,8
$0 \leq x < 50$	Not Good	0	-	9	26.47
average cognitive learning outcome		71		49	
Category		Good		Enough	

Table 3's data indicates that, when comparing the experimental class whose learning employs KIT IPA through the ICARE model to the control class, which receives conventional learning, there is an average difference in cognitive learning outcomes (the achievement of learning outcomes). In the experimental class, the average accomplishment of learning outcomes falls into the good group at 71%, but in the control class, it falls into the sufficient category at 49%. This study demonstrates that there are variations in the average cognitive components of acquiring the concepts of motion and force in class VII SMP. The experimental class is higher than the control class.

Employing the normalcy, homogeneity and hypothesis tests in an inferential analysis based on the data. The significant result of the normality test is less than 0.001, indicating that the normality of the data cannot be established. Next, carry out the homogeneity test. The results of the homogeneity test show a significant value of 0.152, indicating the homogeneity of the data for the experimental and control classes. It is discovered that the data for the learning outcomes of motion and force material in the control class and the experimental class are abnormal and homogenous through the use of both precondition tests, namely homogeneity tests and normality tests. The Mann-Whitney test is used in the hypothesis test based on these findings. The hypothesis test's outcomes are displayed in table 4 :

Table 4. Inferential analysis results

Learning Outcomes	
Mann-whittney U	5.500
Wilcoxon W	600.500
Z	-7.070
Asymp.sig(2-tailed)	<,001

The asymp.sig can be seen in the Mann-Whitney test findings by using independent sample analysis on nonparametric tests. There is a substantial difference in the learning outcomes of students whose learning uses the ICARE model compared to convensional learning on motion and force content, which is indicated by the rejection of H0 when the Sig (2-tailed) or p value is 0.001 with the following requirements. The results of the hypothesis test support the idea that students' cognitive effective can be enhanced by KIT IPA through the ICARE approach. Figure 2 displays a comparison diagram of the analysis of cognitive learning results.

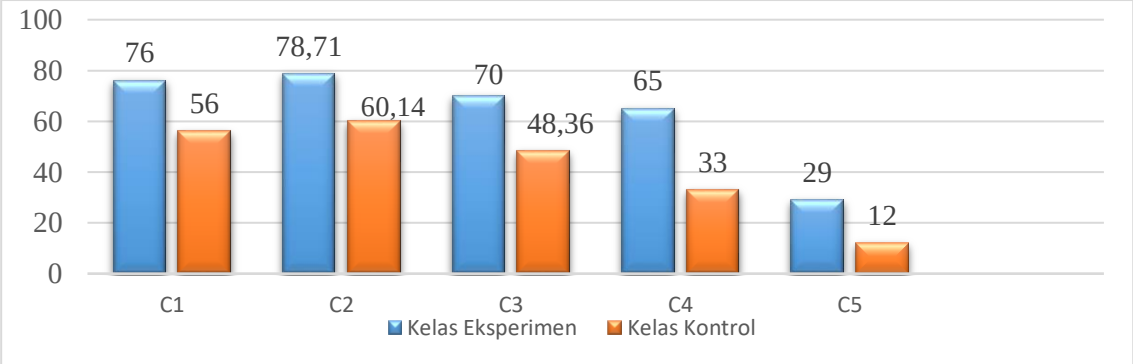

Figure 2. comparison chart of experimental and control class learning outcomes

This data is consistent with studies by (Salirawati dkk., 2021), which found that employing KIT IPA as a learning medium differed in the learning outcomes of students. This level in the C1 cognitive area (knowledge) focuses on the ability to remember the information that has been examined, including terminology, particular facts, patterns, and sequences. The control group's percentage was 56, but the experimental group's was 76. Because utilizing KIT IPA can motivate students to identify their own issues with the assigned material and, concurrently, enable them to solve those issues through a sequence of experiments. Understanding is the C2 cognitive domain, with 78.71 of students in the experimental class and 60.14 in the control class. KIT IPA can be used to help pupils grasp what they are learning more. This is consistent with research (Rifai et al., 2015) showing that student participation in the practicum has a significant role in enhancing science process skills and knowledge. The more students participate in the practicum, the more their comprehension and processing abilities improve.

C3 Cognitive Domain (Usage) Students are urged to comprehend and apply the material at this level. The experimental class's level of cognitive domain C3 achieved a percentage of 70, whereas the control class's level was 48.63. Students' excitement for using KIT IPA during the learning process demonstrates how important it is to have students actively involved in creating their own knowledge. Students will put together, test, and evaluate results from experiments when utilizing KIT IPA. With KIT, IPA can help students identify their own issues with the assigned material while also enabling them to solve those issues through a sequence of experiments. According to research by (Adyan et al., 2019), the experimental class's superiority over the control class is really attributable to its higher level of learning motivation. In addition to external and internal influences, students in the experimental class have better learning motivation because they are more excited about learning with experimental instruments.

C4 domain of cognition (analysis) Analytical categories involve breaking down an issue or thing into its component parts. The experimental class's level in the C4 cognitive domain yielded a percentage of 65, but the control class's level was only 33. Because students will actively participate in analyzing the experiment outcomes to find the answers to the LKPD questions when utilizing this IPA KIT. As a result, the experimental class outperforms the control class while completing daily exam questions. This is consistent with the findings of (Rifai et al., 2015) The use of experimental techniques based on KIT IPA results in an improvement in student learning outcomes. C5 Cognitive Domain: Assessment According to the study, the assessment cognitive level had the lowest average score that students could master, with 29 of the experimental class and 12 of the control class having this level of proficiency. This occurs because, in this study, the use of KIT IPA is only conceptualized. Typically, in LKPD, it only reaches the conclusion and does not proceed to the extend stage, which consists of LKPD-formatted questions. As a result, future training in this extended stage will be necessary.

Based on the results of hypothesis testing assisted by SPSS 27 with the test using a non-parametric test using the Mann Whitney test, from the data obtained it can be concluded that H0 is rejected and H1 is accepted. data obtained can be concluded that H0 is rejected and H1 is accepted. This shows that there is a significant difference in the cognitive learning outcomes of students between the experimental class that uses the mann Whitney test. cognitive learning outcomes of students between experimental classes that use IPA KIT through the ICARE model with control class learning. through the ICARE model with control class learning that applies

conventional learning on the subject of Motion and Force in class VII SMP Negeri 8 Pekanbaru. The difference between the 2 classes can be caused by several factors.

In the experimental class that uses the Science KIT through the ICARE learning model, can provide opportunities for students to construct knowledge and apply concepts obtained through the problem-solving process. Based on descriptive and inferential data analysis, the average cognitive learning outcomes of experimental class students are higher than the control class and there is a significant difference in learning outcomes between the experimental and control classes. between the experimental class and the control class. Thus, the use of KIT IPA through the ICARE model is effective for use in learning physics science.

4. CONCLUSION

Based on the findings of a study conducted using Science KIT and the ICARE model to teach motion and force material to students in class VII of SMP Negeri 8 Pekanbaru, it can be concluded that students' learning outcomes in this area are good, with a 65% percentage for the experimental class. With a proportion of 49%, the control class falls into the good enough group. Examining the data from both classes, it is evident that learning outcomes for students utilizing the ICARE model and IPA KIT differ significantly from those of classes using traditional learning methods. As a result, KIT IPA instruction delivered via the ICARE model effective significantly enhances students' learning results for motion and force content at SMP Negeri 8 Pekanbaru.

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