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The Effectiveness of the Introduction, Connection, Application, Reflection, Extension (ICARE) Learning Model in Improving Higher Order Thinking Skills (HOTS) of Junior High School Students

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ABSTRACT

The importance of higher order thinking skills (HOTS) in the 21st century is undeniable, but the fact is that students HOTS abilities in Indonesia are still low. This study aims to analyze the effectiveness of the Introduction, Connection, Application, Reflection, Extension (ICARE) learning model in enhancing students higher-order thinking skills (HOTS) at the junior high school level. The study adopts a quantitative approach using a quasi experimental method. The design employed is a nonequivalent control group design, involving two classes: an experimental group and a control group. The study was conducted in the seventh grade of SMP N 2 Mertoyudan, using purposive sampling for sample selection. The research instruments consisted of eight essay questions for the pretest and posttest, which had been validated for validity and reliability. Data were analyzed using the Independent Sample t-Test and N-Gain. The results of this study showed a significant difference in higher-order thinking skills between the experimental and control classes. Based on the Independent Sample t-Test, there was a clear difference in the posttest scores of both classes with a significance level of 0.000. Additionally, the average N-Gain score for the experimental class was 0.56, while the control class scored only 0.31. From these findings, it can be concluded that the ICARE model is effective in enhancing higher order thinking skills among junior high school students.

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INTRODUCTION

The development of the industrial revolution has brought significant changes to the world of education, where students are required to develop 21st century skills[1]. In the 21st century, there are four main skills, namely critical thinking, creativity, collaboration, and communication[2]. These four skills can be applied in the learning process that emphasizes higher order thinking skills (HOTS). HOTS is a crucial ability to help students tackle complex problems in the 21st century[3]. HOTS not only encourages students to memorize material, but also trains them to connect concepts, analyze information, and develop new ideas[4].

However, the higher order thinking skills of students in Indonesia are still relatively low. This is in line with the research by Hasanah et al. (2024)[5], which states that students' thinking skills still need to be improved. In addition, Irawati (2018) states that students' abilities in analysis, evaluation, and creation are still very low, with an average of only 30%, 32%, and 23% of the maximum score[6]. Similar issues also arise at SMP Negeri 2 Mertoyudan. Initial test results for students and interviews with science teachers indicate that most students can only master the basic cognitive domains of remembering (C1), understanding (C2), and applying (C3). At higher cognitive levels, such as analyzing (C4), evaluating (C5), and creating (C6), only a few students can reach level C4. However, most students struggle at cognitive levels C5 and C6. This low achievement is due to a teacher centered approach to learning. Additionally, the learning process that does not encourage students to think at a higher level reinforces the tendency for students to remain in a lower level thinking pattern[7].

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[3] Widodo, Suciati, & Hidayat, R. Implementasi Model Pembelajaran RADEC (Read Answer Discuss Explain Create) Serta Dampaknya Pada Kemampuan Berpikir Tingkat Tinggi dan Kemampuan Komunikasi. Jurnal Studi Guru Dan Pembelajaran, 7(1). (2024). https://doi.org/10.30605/jsgp.7.1.2024.9999

[4] Widyastuti, E. Effect Of Authentical Assessment And High Order Thinking Skill (Hots) Against Troubleshooting Physical Problems (An Experiment in The Students of SMA Negeri 2 Depok City). Jurnal Evaluasi Pendidikan, 8(2), 109–116. (2017). https://doi.org/10.21009/jep.082.06

[5] Hasanah, M., Muis, A., & Alim, M. H. (2024). Penerapan Model Discovery Learning berbasis Tarl untuk Meningkatkan Kemampuan Berpikir Tingkat Tinggi Siswa. JURNAL PEMIKIRAN DAN PENGEMBANGAN PEMBELAJARAN, 6(2), 191-199.

[6] Irawati, T. N. (2018). Abalisis Kemampuan Berfikir Tingkat Tinggi Siswa SMP Dalam Menyelesaikan Soal Pemecahan Masalah Matematika Pada Materi Bilangan Bulat. Jurnal Gammath, 03, 1–7.

[7] Rochman, S., & Hartoyo, Z. Analisis High Order Thinking Skill (Hots) Taksonomi Menganalisis Permasalahan Fisika. Science and Physics Education Journal (SPEJ), 1(2). (2018).

Efforts to improve HOTS can be done through the ICARE model. This model is a learning model that has a constructivist approach, where teachers act as facilitators so that the learning process will be more oriented towards students[8]. The ICARE model is designed to encourage active student engagement through five stages: introduction, connection, application, reflection, and extension. In the introduction stage, teachers convey the learning objectives and outcomes[9]. The connection stage aims to link new material with students prior experiences or knowledge[10]. Next, the application stage provides students with the opportunity to apply the knowledge they have acquired in a real world context[11].

The reflection stage aims to evaluate and summarize students understanding through discussions, presentations, or quizzes[9]. Finally, the extension stage is designed to broaden students understanding by providing practice questions, reading materials, or assignments[9]. The five stages of the ICARE model are used collectively to encourage active student engagement in building independent understanding and applying that knowledge to solve various problems, both in the context of learning and daily life[12]. The ICARE model also emphasizes the development of psychomotor, cognitive, and affective aspects[13].

Several studies that have applied the ICARE model show that this model has a positive impact on improving student abilities. Nasution et al. found that the application of the ICARE model is effective in developing critical thinking and problem solving skills in junior high school students[14]. Meanwhile, a study conducted by Destari et al. shows that this model is also effective in improving

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[13] Azizah, N., Huwaida, J., & Khadafi, K. Penerapan Model Pembelajaran ICARE (Introduction, Connection, Applycation, Reflection & Extendsion) untuk Meningkatkan Ranah Psikomotorik Siswa Pada Materi Fikih di Pondok Pesantren Darul Fikri, Ponorogo. Fordetak: Seminar Nasional Pendidikan: Inovasi Pendidikan Di Era Society 5.0, 186–190. (2022).

[14] Nasution, Y., Susanta, A., Zamzaili, & Haji Saleh. Pengaruh Model Pembelajaran Introduction, Connection, Application, Reflection, and Extension (ICARE) Terhadap Kemampuan Pemecahan Masalah dan Kemampuan Berpikir Kritis Siswa pada Materi Aritmetika Sosial di Kelas VII SMP IT Darul Fikri Bengkulu Utara. Lebesgue: Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika, 4(2). (2023).

students creative thinking skills[15]. The relationship between HOTS and critical, creative, and problem solving thinking lies in the role of HOTS in integrating, utilizing, and developing existing knowledge and experience, then managing them critically and creatively to make decisions and solve problems in new situations[16]. Hadzhikoleva et al. (2019) revealed that HOTS is formed through critical and creative thinking skills[17].

In the context of science education, particularly in the study of ecosystems, which are abstract, complex, and interrelated with other concepts[18], the application of the ICARE model has the potential to improve students conceptual understanding and higher order thinking skills. Through ecosystem material, students have the opportunity to interact directly with their surroundings and identify and find solutions to various problems they encounter[19]. The results of research conducted by Rosidah & Sabtiawan (2024) show that junior high school students HOTS in understanding ecosystem material is in the adequate category[17].

This study aims to analyze the effectiveness of the introduction, connection, application, reflection, extension (ICARE) learning model in improving the higher order thinking skills (HOTS) of junior high school students. The results of this study are expected to contribute to the development of scientific studies on the influence of the ICARE model on improving higher order thinking skills (HOTS) in junior high school students.

Methods

This study is a quantitative study using a quasi-experimental method and a nonequivalent control group design. This method was chosen because it allows researchers to compare the results of the treatment between the experimental class using the ICARE model and the control class using the direct instruction model. The following is the research design.

Table 1. Research Design[20]

Class	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2
Control	O_3	-	O_4

[15] Destari, R., Siahaan, P., & Efendi, R. (2021). Efektivitas Model ICARE untuk Meningkatkan Keterampilan Berpikir Kreatif Alat Optik. Orbita: Jurnal Hasil Kajian, Inovasi, dan Aplikasi Pendidikan Fisika, 7(1).

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This study was conducted from April 16, 2025, to April 30, 2025, at SMP Negeri 2 Mertoyudan, Magelang Regency. The population used in this study was all seventh grade students at SMP N 2 Mertoyudan, with a sample selected using purposive sampling based on specific criteria: being taught by the same teacher, having the same number of students, not having received material on ecosystems, and having similar average scores on the Final Semester Summative Assessment (ASAS) for the first semester. The sample classes used were Class VII A as the control class and Class VII D as the experimental class. The research stages can be seen in the following figure.

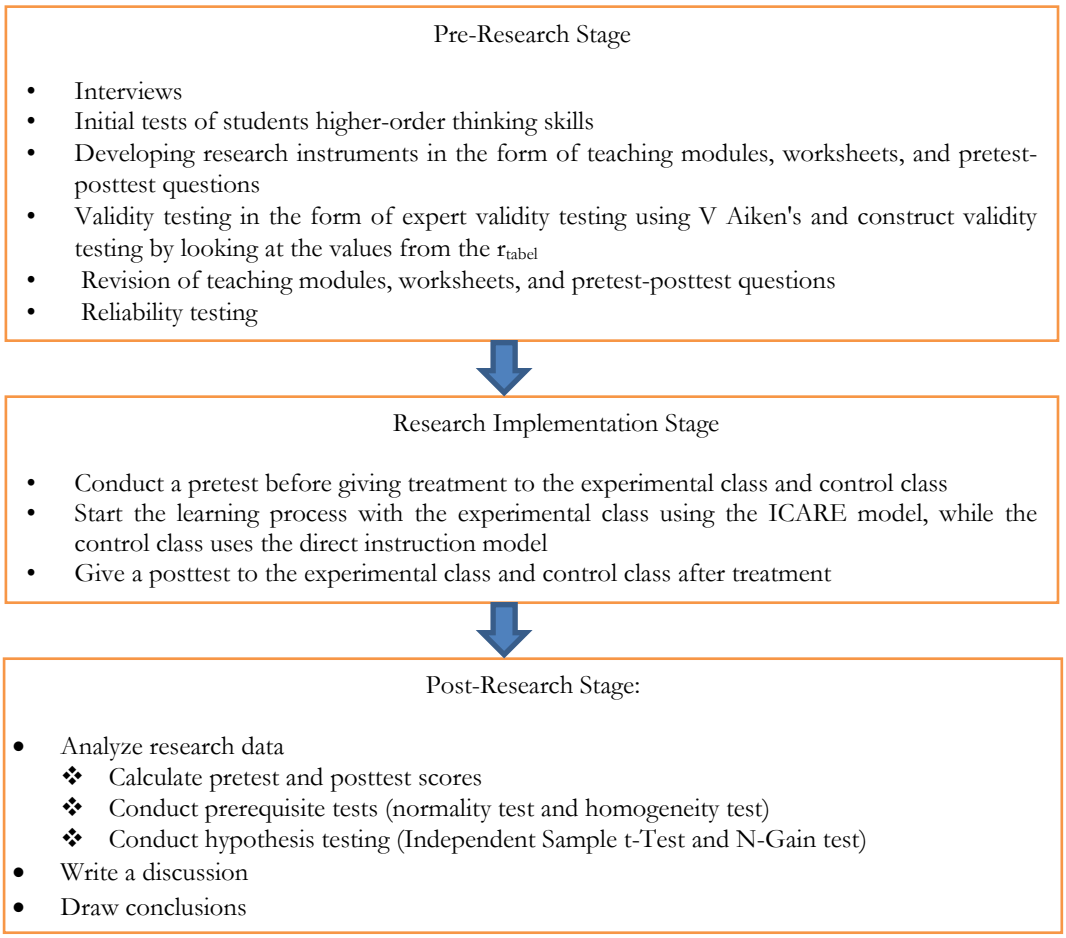

Figure 1. Research Steps

The research instrument was developed by adapting the ICARE model syntax and referring to higher order thinking skills indicators. The questions in this instrument were developed based on HOTS indicators according to the revised Bloom Taxonomy by Krathwohl and Anderson. In the pretest-posttest instrument, the questions used were in the form of essays consisting of eight questions, with each question representing each sub-indicator of higher order thinking skills. The following are the HOTS indicators used.

Table 2. HOTS Indicators According to Krathwohl and Anderson[21]

HOTS Indicators	HOTS Sub-Indicators	Description
Analyzing	Distinguish	The ability to accurately identify parts of a structure by sorting and focusing on crucial information.
	Organize	The ability to integrate components into a cohesive and interconnected whole.
	Attribute	The ability to identify perspectives, biases, values, or objectives in the material provided.
Evaluating	Examine	The ability to find inconsistencies or errors in a process or result.
	Critique	The ability to evaluate results or processes based on specific criteria by identifying strengths and weaknesses to make decisions.
Creating	Formulate	The ability to identify problems, formulate hypotheses, and develop solutions according to specific criteria, including reframing problems to find alternative solutions.
	Plan	The ability to design appropriate methods or plans to solve a problem.
	Produce	The ability to implement plans to address problems according to specified criteria.

Data analysis in this study began with calculating pretest and posttest scores to assess students higher order thinking skills (HOTS). Next, before conducting hypothesis testing, prerequisite tests were carried out, including normality and homogeneity tests with a significance level of 5%. The normality test aims to ensure that the distribution of data for each variable is normal or not. Then, the homogeneity test is conducted to determine the similarity of variance between classes. After the data meets the assumptions of normality and has homogeneous variance, the next step is to perform a prerequisite test using the Independent Sample t-Test and the N-Gain test.

RESULTS

Data analysis was conducted to determine the effectiveness of the ICARE learning model in improving the higher order thinking skills (HOTS) of junior high school students. The pretest and posttest data were first converted to a scale of 0-100, then analyzed to obtain the average score. The results showed that before the intervention was implemented, the average pretest score in the experimental class was 29.637, slightly lower than the control class, which scored 30.847. However, after the learning process, the average posttest score in the experimental class increased significantly to 70.161, while the control class only reached 53.427. The above results indicate that the ICARE learning model is more

[21] Pratama, G. S. Analisis Muatan Higher Order Thinking Skills (HOTS) pada Buku Teks Matematika SMP (Komparasi Buku Indonesia dan Malaysia). Universitas Negeri Yogyakarta. (2019).

effective in improving student learning outcomes than the direct instruction model.

Next, prerequisite tests were conducted in the form of normality and homogeneity tests. The results of the normality test using the Kolmogorov-Smirnov test showed that all pretest and posttest data had significance values greater than 0.05, with the following details: pretest for the experimental class 0.107; posttest for the experimental class 0.089; pretest for the control class 0.057; and posttest for the control class 0.083, indicating that the data were normally distributed. The results of the homogeneity test using Levene's Test showed a significance value of 0.188 for the pretest and 0.193 for the posttest, both of which were greater than 0.05, indicating that the data had homogeneous variance. Thus, the data met the requirements for hypothesis testing using the Independent Sample t-Test and N-Gain test.

Independent Sample t-Test

The t-test was used to determine whether there was a significant difference between the two classes by conducting an Independent Sample t-Test. This test used the pretest and posttest scores from each class. The difference between the two groups was considered significant if the significance value (2-tailed) was less than 0.05. The analysis was conducted using SPSS.

Table 3. Results of the Independent Sample T-Test

Test Data	Sig. value (2-tailed)	Description
Pretest	0,288	No significant difference
Posttest	0,000	Significant difference

Table 3 shows that the significance value in the pretest data is 0.288 > 0.05, indicating that there is no significant difference in the higher order thinking skills of students between the two classes before the treatment was given. This confirms that the initial skill levels of students in the experimental and control classes were the same. Therefore, H_0 is accepted. Conversely, the posttest results show a significance value of 0.000 < 0.05, which means that there is a significant difference between the two classes after the treatment was given. Thus, the difference in learning outcomes that emerged can be concluded as a result of the learning model treatment given, not caused by differences in the initial abilities of the students.

N-Gain Test

The N-Gain test analysis in this study was conducted using SPSS. The complete average N-Gain test scores are presented in Table 5.

Table 4. Results of N-Gain Average Value Analysis

Class	Average N-Gain value	Category
Experimental	0,56	Moderate
Control	0,31	Moderate

Table 4 presents the average N-Gain test scores for each class. The experimental class achieved an average of 0.56, while the control class achieved an average of 0.31. Although both values fall within the moderate category, the

higher score in the experimental class indicates that the implementation of the ICARE model is more effective in improving students understanding compared to the direct instruction model. The detailed results of the N-Gain test based on each indicator are presented in the following figure.

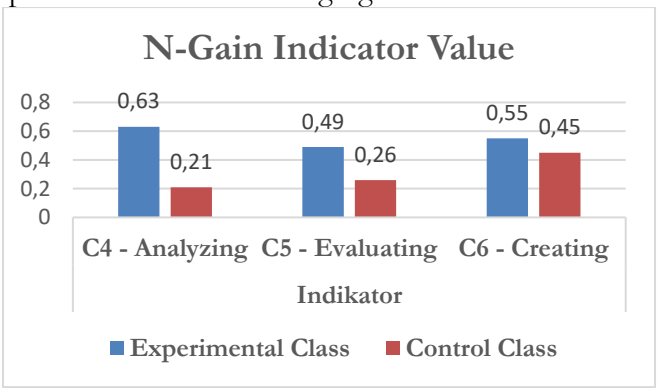

Figure 2. Average Results of the N-Gain Test Indicator

DISCUSSION

The effectiveness of the ICARE learning model in improving students thinking skills is reflected in its learning characteristics, which emphasize active student involvement through five stages. These stages include introduction, connection, application, reflection, and extension. Through these stages, students are guided to build their understanding through direct learning experiences, connect the material to real-life contexts, and apply and reflect on the knowledge they have acquired.

The ICARE learning model provides a more meaningful learning experience because it does not merely focus on memorizing concepts but also on understanding and applying the material[22]. This is in line with Manopo & Gugule (2022) research, which shows that the application of the ICARE model makes it easier for students to master the learning material[23]. This ease contributes positively to the learning process and has an impact on improving student learning outcomes.

The first indicator of higher-order thinking is analyzing (C4), which has three sub-indicators: distinguishing, organizing, and attributing. In this indicator, the average N-Gain score for the experimental class reached 0.63, while the control class only reached 0.21. The analyzing indicator is the indicator with the highest increase. This improvement is supported by the connection and extension stages in the ICARE model. In the connection stage, students are given questions

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[23] Manopo, D. D. D., & Gugule, S. Pengaruh Model Pembelajaran Icare Terhadap Hasil Belajar Kimia Siswa Pada Materi Hidrokarbon Kelas Xi Mia Di Sma Negeri 1 Tombatu. (2022).

designed to connect their prior knowledge with the new concepts to be learned. These questions are worked on in groups. Subsequently, in the extension stage, students work on questions individually as a form of deepening and expanding the concepts previously learned.

The questions that students work on in the connection and extension stages are analytical in nature, where students are asked to identify, categorize, and connect concepts based on the available information. These questions facilitate students in discovering the facts, concepts, and principles underlying the learning material[24]. In addition, students are also encouraged to develop critical thinking skills, which are an important part of higher order thinking. Critical thinking skills involve the activity of collecting and analyzing various information in depth, utilizing existing knowledge[25]. These skills are essential for students to solve problems related to the learning material based on facts and concepts they have previously mastered[26].

During the problem solving process at the connection stage, the researcher actively monitored and directly asked students about how they analyzed the information provided. This guidance and attention to the thinking process encouraged students to be more thorough and focused in their analysis, resulting in the highest improvement compared to other indicators[27].

In the control class, the increase in the average N-Gain value for the analysis indicator was the lowest compared to other indicators. This was due to the characteristics of the Direct Instruction model, which tends to be teacher centered in delivering material directly. In this type of learning, students are more passive and only receive information without being actively involved in the process of deep thinking. Although this model is not limited to delivering material, but also includes providing practice questions both individually and in groups, these activities are routine and do not challenge students to process information, explore concepts, or perform analysis. The questions provided focus more on achieving final results than on encouraging the reasoning process that supports the development of analytical skills.

The Direct Instruction model, which focuses on lectures and one-way delivery of material, is considered ineffective in encouraging the development of

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critical thinking skills in students[28]. Teacher-centered learning tends to limit students active participation in expressing their opinions, making them passive, merely taking notes, completing tasks, and memorizing material without truly delving into the material presented by the teacher[29]. As a result, higher order thinking skills such as analysis do not develop optimally.

The second indicator of higher-order thinking is evaluation (C5). In the experimental class, the N-Gain score for this indicator reached 0.49, while in the control class it was only 0.26. This difference indicates that the evaluation skills of students who participated in learning using the ICARE model improved more. This improvement was supported by the application and reflection stages.

At the application stage, students are asked to apply the concepts they have learned to real life situations or contextual problems, which are then presented in the form of questions[30]. At this stage, students work on questions that require them to examine, critique, and evaluate information based on scientific criteria, working in groups. Through these activities, students not only complete tasks but also develop their critical thinking and analytical skills. This directly trains students evaluation skills, including identifying information, assessing thinking processes, and evaluating the decisions they make.

The ability to evaluate is one of the important aspects of higher order thinking, which includes logical thinking, reasoning, analysis, evaluation, and creativity[31]. Evaluation activities can be realized through checking and critiquing. In the context of the thinking process, checking aims to ensure that a plan is proceeding as expected, while critiquing emphasizes the use of critical thinking skills[32]. Through the development of critical thinking, students will be encouraged to process information objectively, develop various data, and conduct evaluations and draw conclusions[33]. This aligns with research findings that students who experience improved evaluation skills have better abilities in analyzing and

[28] Labibah, R. M., & Ernawati, T. Pengaruh penggunaan peta konsep terhadap hasil belajar ipa ditinjau dari kemampuan berpikir kritis. NATURAL: Jurnal Ilmiah Pendidikan IPA, 4(2), 19-25. (2017).

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[31] Kurniati, D., Harimukti, R., & Jamil, N. A. Kemampuan berpikir tingkat tinggi siswa SMP di Kabupaten Jember dalam menyelesaikan soal berstandar PISA. Jurnal penelitian dan evaluasi pendidikan, 20(2), 142-155. (2016).

[32] Gunawan, I., & Palupi, A. R. Taksonomi Bloom–revisi ranah kognitif: kerangka landasan untuk pembelajaran, pengajaran, dan penilaian. Premiere educandum: jurnal pendidikan dasar dan pembelajaran, 2(02). (2016).

[33] Gustianingrum, R. A., Murni, A., & Maimunah, M. Analisis Kemampuan Berpikir Kritis Peserta Didik dalam Menunjang Penguatan Profil Pelajar Pancasila. In PRISMA, Prosiding Seminar Nasional Matematika (Vol. 6, pp. 465-470). (2023).

assessing information based on specific criteria, thereby enhancing their higher order thinking skills.

The reflection stage also plays an important role in improving students evaluation skills. At this stage, students are asked to reflect on the understanding they have gained during the learning process through activities such as evaluating their classmates answers, providing criticism and counterarguments, adding information to the answers of the group giving the presentation, and reflecting by writing down what they have learned during the learning process. These activities enable students to review their knowledge comprehensively.

Luthfianisah states that the reflection stage provides an opportunity for students to evaluate their understanding and identify aspects that need improvement[34]. This reflection process encourages active student involvement in learning activities, making them not just passive recipients of information but active thinkers who can question and connect concepts to their personal experiences[35]. In addition, the ability to identify errors used in providing criticism and rebuttals is also honed through the reflection stage, thereby playing a role in improving students evaluation skills[36].

In the control class, the ability to evaluate students was lower than in the experimental class. This was due to limited interaction and reflection activities among students during the learning process. Although this model included stages of checking and providing feedback through presentations and evaluations of other groups answers, these activities were not implemented optimally. Students mostly exhibit passive attitudes, and their involvement in these activities remains low. This low level of active participation indicates that their readiness to learn is not yet optimal, which will have a negative impact on their evaluation abilities[37].

Teacher centered feedback limits students roles to passive listeners. In the learning process, students tend to merely follow the teacher's explanations and mimic the demonstrated steps without independently exploring ideas, resulting in a lack of creativity and low evaluation skills[38]. As listeners, they are only focused on remembering information, while evaluation skills require a deeper understanding in observing and processing information[39].

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[34] Luthfianisah, Jihan. Pengaruh Model Pembelajaran Introduction, Connection, Application, Reflection, Extension (Icare) Terhadap Hots Peserta Didik Kelas Ix Pada Mata Pelajaran Biologi (Doctoral dissertation, UIN Raden Intan Lampung). (2025).

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[39] Pasha, S. N. R. Analisis Higher Order Thinking Skill Dalam Buku Siswa Kelas IV MIN 20 Aceh Besar (Doctoral dissertation, UIN Ar-Raniry Fakultas Tarbiyah dan Keguruan). (2022).

The third indicator of higher-order thinking is producing (C6). The average N-Gain score in the experimental class was 0.55, while in the control class it was 0.45. Although the difference in improvement was not as significant as in the previous indicator, this result still shows that the experimental class experienced a more significant improvement. This improvement was supported by the ICARE learning model at the application stage.

In the application stage, students are given the opportunity to apply concepts in real contexts or situations. At this stage, students work on problems that require them to identify the impact of a problem, create something based on the information presented, and plan strategies to solve a problem. These problems play a role in encouraging student creativity. In the learning process, creative thinking skills are essential as they reflect an individual's ability to generate new ideas to solve a problem[40].

Creative thinking involves the process of connecting, transforming, and manipulating knowledge and experience, all of which are important in improving creative abilities[41]. In the context of learning, this ability emphasizes the process rather than the end result. A process focused approach enables learners to develop the ability to systematically analyze problems, face challenges in an orderly manner, ask innovative questions, and create unique solutions[42].

In the control class, indicator C6 (producing) was in the moderate category, supported by guided practice and independent practice. At this stage, students were given guidance to identify the causes of a problem, develop strategies or solutions to solve a problem, and create something based on the available information. These questions encourage the systematic and structured application of knowledge, enabling students to generate ideas or create something based on the information presented. Although the approach is more procedural in nature, the structured learning process and consistent practice can serve as a foundation for students to develop a strong knowledge base, which can then be used to generate creative solutions. This aligns with Pritandhari, who concluded that the Direct Instruction model can enhance creative thinking skills[43]. Similar support is also highlighted by Wardani et al., who noted that Direct Instruction

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[42] Devi, S. S., Munawaroh, F., Hadi, W. P., & Muharrami, L. K. Profil Kemampuan Berpikir Kretif Siswa Setelah Pembelajaran Guided Inquiry dengan Metode Pictorial Riddle. Natural Science Education Research (NSER), 2(1), 40-47. (2019).

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encourages students to learn directly from theory or contextual problems, thereby helping to cultivate creative thinking skills[44].

Although the ICARE learning model has been proven effective in improving students higher order thinking skills, as indicated by the results of the Independent Sample t-Test, which showed significant differences, and the results of the N-Gain mean test, which showed higher scores in the experimental class than in the control class, the improvement was still moderate in both classes. This condition indicates that the effectiveness of the ICARE learning model has not yet been fully optimized. This is due to several challenges faced by the researcher during the learning process.

The ICARE learning model adopts a constructivist approach, which emphasizes that learning will be more meaningful if students actively construct their knowledge through direct experience. However, in practice, not all students showed active involvement during the learning process. There were still students who tended to be passive, especially during the reflection stage, which required active participation in evaluating and responding to other groups answers during the presentation session.

In addition, the developmental stage of students is also a factor that needs to be considered. Based on Piaget's cognitive development theory, students aged 13-15 years are in the formal operational stage, where logical and abstract thinking abilities begin to develop. However, the transition from the concrete operational stage to the formal operational stage does not occur simultaneously in all students[45]. This situation may explain why the achievement of HOTS indicators requiring metacognitive skills, such as analyzing, evaluating, and creating, has not been optimized. Even in practice, there are still students who do not understand the meaning of evaluation activities, necessitating prior explanation before beginning the activity.

Although this study shows that the ICARE model is effective in improving higher-order thinking skills, several other studies have found different results. For example, a study by Sandika et al., reported that the application of activity-based learning models does not always provide significant improvements when the duration of the intervention is too short[46]. Research by Shidik also shows that teachers' readiness in mastering learning steps has a major influence

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44 Wardani, T. T., Suparji, S., & Wiyono, A. Pengaruh Model Pembelajaran Direct Instruction Berbantuan Multimedia Interaktif Terhadap Pemahaman Konsep Siswa Pada Elemen Gambar Teknik Siswa Kelas X Dpib Smk 3 Surabaya. Learning: Jurnal Inovasi Penelitian Pendidikan Dan Pembelajaran, 4(4), 1301-1312. (2024).

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46 Sandika Harya, Josephirra, & Heryadi Yadi. (2025). Interaktivitas Pembelajaran untuk Meningkatkan Hasil Belajar IPA Kelas IV Sekolah Dasar. Jurnal Nakula : Pusat Ilmu Pendidikan, Bahasa Dan Ilmu Sosial, 3(5), 77–89.

on the successful implementation of models that focus on higher-order thinking processes[47]. In addition, students' initial abilities can hinder their active involvement in the learning process, thereby reducing the effectiveness of the model[48].

CONCLUSION

Based on the research findings, it shows that the ICARE model is effective in improving students HOTS. This statement is supported by the results of the Independent Sample T-Test, which shows a significant difference between the two classes. The sig. value (2-tailed) for the pretest was 0.159, while for the posttest it was 0.000. This test was reinforced by the N-Gain test, which showed a more significant increase in the experimental class (0.57) compared to the control class (0.32).

Based on the results of this study, the researcher provides several suggestions for future learning. During the learning process using the ICARE model, the researcher encountered obstacles in the form of a lack of activity from some students in learning, which had an impact on the effectiveness of the ICARE model. Therefore, the researcher suggests that in future learning, additional learning media be provided to increase student activity. Additionally, during the study, the researchers identified that some students still did not understand the term "evaluate," which is one of the HOTS indicators. Therefore, the researchers suggest providing a clear explanation of the HOTS indicators at the beginning of the session.

The researchers also recommend that future studies be conducted with a broader scope, both in terms of sample size and educational level, so that the results can be more generally applicable. In addition, future researchers can combine the ICARE learning model with other learning strategies to see its comprehensive effectiveness.

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