

Examining the Impact of the Intelligence Mapping Presentation Strategy on Science Conceptual Understanding and Self-Confidence: A Quasi-Experimental Study

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ARTICLE INFO	ABSTRACT
Keywords: Intelligence Mapping Presentation; Concept Understanding; Self-Confidence; Science Learning	Developing conceptual understanding and self-confidence is essential in elementary science education, as these competencies support meaningful learning and active classroom participation. However, science instruction in many elementary classrooms remains teacher-centered, limiting students' opportunities to construct knowledge and communicate their ideas confidently. This study investigated the effectiveness of the Intelligence Mapping Presentation Strategy (IMPS) in improving fifth-grade students' conceptual understanding and self-confidence in science learning. IMPS integrates visual concept mapping with student presentation activities, enabling learners to organize scientific concepts systematically while communicating their understanding through collaborative discussions and presentations. A quantitative quasi-experimental design with a nonequivalent control group was employed involving 48 fifth-grade students at MIN 7 Ponorogo, Indonesia. The experimental group received instruction using IMPS, while the control group experienced conventional teaching. Data were collected through a conceptual understanding test and a self-confidence questionnaire and analyzed using normality and homogeneity tests, independent-samples t-tests, MANOVA, and Cohen's d effect size analysis. The results revealed significant differences between the experimental and control groups. Students taught using IMPS achieved higher conceptual understanding scores ($M = 87.92$) than those receiving conventional instruction ($M = 79.54$), with a statistically significant difference, $t(46) = 3.475$, $p = .001$, and a large effect size (Cohen's $d = 1.003$). MANOVA analysis further confirmed the significant simultaneous effect of IMPS on conceptual understanding and self-confidence. These findings indicate that IMPS effectively enhances both cognitive and affective learning outcomes. The study provides empirical support for constructivist learning approaches that combine visual knowledge representation and oral communication activities and offers an effective instructional strategy for elementary science teachers seeking to foster deeper conceptual learning while strengthening students' confidence in expressing scientific ideas.

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INTRODUCTION

Basic education plays a crucial role in developing academic abilities and shaping students' character. At the elementary school (SD) or Islamic elementary school (MI) level, the educational process is not solely focused on achieving learning outcomes but also on developing various competencies needed by students to face future challenges. Basic education serves as the foundation for children's intellectual, social, emotional, and moral development, and the quality of education at this level significantly determines their success at subsequent levels ¹. Therefore, learning in elementary schools (SD/MI) needs to be optimally designed to develop all students' potential in a balanced manner.

One of the goals of basic education is to develop students' conceptual understanding and foster self-confidence that supports active engagement in the learning process. Conceptual understanding relates to students' ability to deeply grasp subject matter, while self-confidence relates to students' belief in their own abilities to learn and interact with their environment.

Conceptual understanding is a person's ability to grasp an idea, principle, fact, or information so that they can explain it in their own words, connect one concept to another, and apply it in various relevant situations. According to², conceptual understanding is a student's ability to comprehend the material or information obtained so that it can be used to solve problems in everyday life. Students who have a good conceptual understanding are not only able to remember the information they have learned, but also can explain the meaning of that information and apply it in different contexts.

In science learning, conceptual understanding is one of the key competencies students must possess. This is because science is not just a collection of facts and theories, but also encompasses various interrelated concepts that explain natural phenomena around humans. A good conceptual understanding will help students understand the cause-and-effect relationships of events, explain natural phenomena scientifically, and develop critical thinking and problem-solving skills. Conversely, if students simply memorize information without understanding the underlying concepts, the knowledge gained tends to be temporary and easily forgotten³.

Besides conceptual understanding, another important aspect that needs to be developed in learning is self-confidence. Self-confidence is an individual's belief in their abilities to face various situations and challenges. According to⁴, self-confidence is a person's belief in their own abilities, enabling them to act independently, optimistically, and resist excessive doubt. Self-confidence plays a crucial role in the learning process because it can influence students' courage in expressing opinions, asking questions, answering questions,

¹ Ledy Yanti Lessy et al., *Pendidikan Anak Sekolah Dasar* (Majalengkah: Edupedia Publisher, 2024).

² Fajri Elang Giriensyah, Heni Pujiastuti, and Ihsanudin Ihsanudin, "Kemampuan Pemahaman Matematis Siswa Berdasarkan Teori Skemp Ditinjau Dari Gaya Belajar," *Jurnal Cendekia: Jurnal Pendidikan Matematika* 07, no. 01 (2023): 751–65, <https://doi.org/doi.org/10.31004/cendekia.v6i3.1515>.

³ Yogi Setya Novanto et al., "Kemampuan Pemahaman Konsep IPA Pada Siswa Sekolah Dasar Berdasarkan Gender," *Jurnal Pendidikan Dasar Indonesia* 8, no. 1 (2023): 43–46.

⁴ Dendi Indra Rosidin, Mamat Supriatna, and Nandang Budiman, "Pengembangan Self Confidence Pada Siswa SD," *JPD: Jurnal Pendidikan Dasar P-ISSN 10*, no. 1 (2019), <https://doi.org/doi.org/10.21009/JPD.010.14>.

and participating in various learning activities.

Students with high self-confidence tend to be more active in the learning process. They are less afraid of making mistakes and are more willing to try new things. Conversely, students with low self-confidence often doubt their abilities, leading them to be passive, reluctant to ask questions, and less likely to participate in learning activities⁵. This condition can result in poor learning outcomes because students do not receive sufficient opportunities to develop their knowledge and skills through active interaction in learning.

Conceptual understanding and self-confidence are two interrelated aspects. Students who understand the material well will generally have greater confidence in explaining or discussing it. Conversely, students with high self-confidence will be more willing to ask questions, discuss, and seek information, thereby optimally developing their conceptual understanding. Therefore, effective learning should foster both aspects simultaneously.

Science learning in elementary schools is characterized by requiring active student involvement in the process of discovering and understanding concepts. Science is the study of various natural phenomena through observation, investigation, experimentation, and scientific reasoning. In the Independent Curriculum, science learning aims not only to improve knowledge mastery but also to develop critical thinking skills, creativity, communication, collaboration, and character⁶. Therefore, the science learning process should provide opportunities for students to actively participate in constructing their own knowledge.

However, this ideal situation has not yet been fully realized in many schools. Based on initial observations conducted at MIN 7 Ponorogo in the 2025/2026 academic year, it was found that fifth-grade students still experience difficulties in understanding science concepts. Some students are only able to memorize information presented by the teacher without understanding the relationships between concepts in depth. When given questions that require reasoning or the application of concepts to new situations, many students struggle to provide correct answers. This condition indicates that students' conceptual understanding still needs to be improved.

Furthermore, observations also show that students' self-confidence in science learning remains relatively low. Many students feel shy and hesitant when asked to answer questions, express their opinions, or explain discussion results in front of the class. Some students choose to remain silent even though they understand the material being studied. They tend to be afraid of making mistakes or receiving negative feedback from their peers. As a result, the learning process becomes less interactive, and students do not receive optimal opportunities to develop their communication skills and conceptual understanding.

Students' low conceptual understanding and self-confidence are also evident in the learning evaluation results. Based on daily grade data for fifth-grade students at MIN 7 Ponorogo, most students have not yet achieved the Learning Objective Achievement Criteria

⁵ Muhammad Riswan Rais, "Kepercayaan Diri (Self Confidence) Dan Perkembangannya Pada Remaja," *Al Irsyad: Jurnal Pendidikan Dan Konseling* 12, no. 1 (2022), <https://doi.org/10.30829/alirsyad.v12i1.11935>.

⁶ Muhammad Amran, "Penerapan Keterampilan 4C Dalam Pembelajaran IPA Oleh Guru Sekolah Dasar," *Seminar Nasional Hasil Penelitian 2025*, 2025, 1223–33.

(KKTP) or KKM, which has been set at 75. These results indicate that there is still a gap between expected competencies and students' actual abilities. This condition is one indicator of the need for improvement in the science learning process.

One factor suspected of influencing students' low conceptual understanding is the use of learning methods that are still dominated by conventional approaches. According to⁷ the overly dominant lecture method causes students to be passive, simply receiving information from the teacher without actively engaging in the learning process. Teacher-centered learning reduces students' opportunities to explore concepts, discuss concepts, or develop critical thinking skills.

In addition to a lack of varied learning methods, the use of learning strategies that fail to integrate cognitive and affective aspects is also a contributing factor to students' low conceptual understanding and low self-confidence. In practice, learning often places more emphasis on achieving academic results than on developing student self-confidence. As a result, students may achieve good grades but lack confidence in expressing their ideas or thoughts.

Various learning theories emphasize the importance of active student involvement in constructing knowledge. Constructivism theory states that knowledge cannot be transferred directly from teacher to student but must be constructed independently through experience and interaction with their environment. Therefore, the learning process needs to be designed to encourage students to actively observe, ask questions, discuss, and communicate their learning outcomes⁸.

In line with constructivism theory, David Ausubel's theory of meaningful learning emphasizes that learning is more effective when new information is connected to prior knowledge. Through this process, students can understand concepts more deeply and retain them longer in their memory⁹. One strategy consistent with this theory is the use of concept mapping.

Concept mapping is a visual technique used to illustrate the relationships between concepts in learning materials. By creating concept maps, students can organize information, identify relationships between ideas, and understand the material more systematically. Concept mapping also helps students develop higher-order thinking skills because they must analyze, categorize, and connect various pieces of information obtained. In addition to concept mapping, presentation activities also play a crucial role in improving the quality of learning. Presentations provide students with the opportunity to communicate their thoughts to others. Through presentations, students learn to convey ideas clearly, answer questions,

⁷ Loriska Meliana Br Sinaga et al., "Upaya Meningkatkan Hasil Belajar Biologi Melalui Model Discovery Learning Pada Peserta Didik Kelas XI IPA Di SMA Negeri 18 Medan T.P 2022/2023," *Pediaqu : Jurnal Pendidikan Sosial Dan Humaniora* 1 no. 4 (2023): 436–55.

⁸ Lailatul Afifah Ardi et al., "Teori Konstruktivisme Dalam Pembelajaran Dan Bimbingan Konseling : Fondasi Teoritis Dan Implikasi Praktis Bagi Peserta Didik," *Current Issues in Counseling* 5, no. 1 (2021), <https://doi.org/doi.org/10.24036/0438cic>.

⁹ Amin Otoni Harefa, *Penerapan Teori Pembelajaran Ausebel Dalam Pembelajaran* (Medan: Universitas Dharmawangsa Medan, 2013)

accept feedback, and develop communication skills and self-confidence¹⁰.

One learning strategy that integrates concept mapping and presentation is the Intelligence Mapping Presentation (IMP). This strategy emphasizes concept mapping as a means of understanding the material and presentation as a means of communicating that understanding. Through this strategy, students not only learn to understand concepts in depth but also learn to convey their ideas confidently to their peers.

Research conducted by Shodiq shows that the Intelligence Mapping Presentation strategy can increase student participation in learning. Students become more active in discussions, collaborate, and convey learning outcomes. Furthermore, the use of concept maps helps students understand the material in a more structured manner, making the learning process more meaningful¹¹. Another advantage of the IMP strategy is its ability to simultaneously develop cognitive and affective aspects. In the cognitive aspect, students are trained to understand and connect important concepts in the learning material. In the affective aspect, students have the opportunity to practice courage, responsibility, communication, and self-confidence through presentation activities. Thus, this strategy has the potential to improve both conceptual understanding and student self-confidence.

However, research on the effectiveness of the Intelligence Mapping Presentation strategy in science learning at the Madrasah Ibtidaiyah level is still relatively limited. Most previous studies have examined the use of concept maps or presentations separately. However, integrating the two strategies has the potential to have a greater impact on improving the quality of learning.

Based on the description, it can be understood that the low conceptual understanding and self-confidence of fifth-grade students at MIN 7 Ponorogo require attention and appropriate solutions. One alternative that can be implemented is the use of the Intelligence Mapping Presentation strategy that integrates concept mapping and presentation activities in the learning process. This strategy is expected to improve the understanding of science concepts while fostering students' self-confidence through active involvement in learning.

RESEARCH METHOD

Although previous studies have reported that concept mapping effectively improves students' conceptual understanding, while presentation-based learning enhances participation and self-confidence, these instructional approaches have generally been implemented and investigated separately. Research integrating concept mapping and presentation into a single instructional strategy, particularly in elementary science learning, is still relatively limited. In addition, previous studies have primarily focused on a single learning outcome, either cognitive or affective, rather than examining both simultaneously. Therefore, empirical evidence regarding the effectiveness of an integrated instructional strategy in

¹⁰ Rahma Darnella, Syarifah, and Dini Afriansyah, "Penerapan Metode Concept Mapping (Peta Konsep) Dan Pengaruhnya Terhadap Kemampuan Berpikir Kritis Siswa Pada Materi Sistem Gerak Di MAN1 Palembang," *Jurnal Intelektualita: Keislaman, Sosial, Dan Sains* 9, no. 1 (2020), <https://doi.org/10.19109/intelektualita.v9i1.5579>.

¹¹ Jafar Shodiq, Rendy Rinaldy Saputra, and Hazlin Kuswara, "Penerapan Strategi Pembelajaran Intelligence Mapping Presentation Untuk Meningkatkan Partisipasi Belajar Siswa," *Jurnal Education and Development* 8, no. 1 (2020): 65–72, <https://doi.org/https://doi.org/10.37081/ed.v8i1.1500>

improving both conceptual understanding and students' self-confidence remains insufficient.

This study offers a novel contribution by integrating concept mapping and presentation into a unified instructional approach, namely the Intelligence Mapping Presentation Strategy (IMPS). Unlike previous studies, this research simultaneously examines the effectiveness of IMPS in improving two essential learning outcomes, namely science conceptual understanding and students' self-confidence among fifth-grade students at Madrasah Ibtidaiyah. Furthermore, this study employs a quasi-experimental design to provide empirical evidence regarding the effectiveness of IMPS in elementary science education. Therefore, this research contributes to the existing literature by demonstrating that the integration of visual concept mapping and presentation activities can effectively enhance both cognitive and affective learning outcomes in science learning.

This study employed a quantitative approach using a quasi-experimental design with a nonequivalent control group design. The study involved two groups: an experimental class that received instruction using the Intelligence Mapping Presentation Strategy (IMPS) and a control class that received conventional learning. A pre-test and post-test were administered to both groups to measure students' conceptual understanding and self-confidence before and after the treatment. The participants were 48 fifth-grade students of MIN 7 Ponorogo in the 2025/2026 academic year. Twenty-four students from Class VA were assigned as the experimental group, while twenty-four students from Class VB served as the control group. Saturated sampling was employed because all members of the population were included in the study.

The research instruments consisted of a conceptual understanding test, a self-confidence questionnaire, and documentation. The conceptual understanding test was used to assess students' mastery of science concepts, while the self-confidence questionnaire measured students' confidence during science learning. The validity and reliability of the instruments were examined before data collection. The study was conducted in three stages: preparation, implementation, and evaluation. Before the treatment, both groups completed the pre-test and self-confidence questionnaire. During the treatment, the experimental class learned using the Intelligence Mapping Presentation Strategy (IMPS), while the control class received conventional instruction.

The implementation of IMPS in the experimental class consisted of the following steps:

1. The teacher introduced the learning objectives and explained the science topic.
2. Students identified the main concepts from the learning materials.
3. Students constructed concept maps individually or collaboratively.
4. Students organized the relationships among concepts into a structured visual map.
5. Each group presented its concept map in front of the class.
6. Other students asked questions, provided feedback, and participated in discussions.
7. The teacher clarified misconceptions, reinforced key concepts, and concluded the lesson.
8. At the end of the learning process, students completed the post-test and the self-confidence questionnaire.

Meanwhile, students in the control class participated in conventional learning through teacher explanations, question-and-answer sessions, and individual exercises without concept mapping or presentation activities. The collected data were analyzed using SPSS version 27. Descriptive statistics were used to summarize the data. The normality test (Shapiro–Wilk) and homogeneity test (Levene’s Test) were conducted as prerequisite tests. Hypothesis testing was performed using the Independent Samples t-test to examine differences between the experimental and control groups. Furthermore, a MANOVA test was conducted to determine the simultaneous effect of the Intelligence Mapping Presentation Strategy on students’ conceptual understanding.

RESULT AND DISCUSSION

Science learning in Islamic elementary schools requires students to understand concepts deeply, not simply memorize them. According to David Ausubel, learning strategies that actively engage students are necessary for meaningful learning.¹² One strategy that can be used is the Intelligence Mapping Presentation strategy, which utilizes concept maps and presentations to help students understand the relationships between concepts in a more engaging way.¹³ The results of the study showed that students’ conceptual understanding using the Intelligence Mapping Presentation strategy was higher than that of conventional learning.

The Independent Sample T-Test obtained a Sig. (2-tailed) value of 0.001 (<0.05), indicating a significant difference between the experimental and control classes. This is supported by the mean difference of 8.375, indicating a higher average for the experimental class. Furthermore, Cohen’s *d* value of 1.003 (>0.8) is considered significant. Thus, the Intelligence Mapping Presentation strategy was effective in improving fifth-grade students’ understanding of science concepts at MIN 7 Ponorogo. The average conceptual understanding score in the experimental class was 87.92, while in the control class it was 79.54. This difference indicates that the Intelligence Mapping Presentation strategy can improve students’ conceptual understanding in science learning. Conceptual understanding is a student’s ability to understand, explain, and connect one concept to another accurately. According to Anderson and Krathwohl, conceptual understanding falls within the cognitive domain, requiring students not only to memorize information but also to interpret, explain, and apply the concepts learned.¹⁴ Therefore, learning needs to be designed to enable students to actively construct understanding. The Intelligence Mapping Presentation strategy supports the conceptual understanding process because students organize information in the form of concept maps, making the relationships between concepts clearer and more structured. According to Tony Buzan, mind mapping helps the brain organize.

¹² Harefa, Penerapan Teori Pembelajaran Ausubel Dalam Pembelajaran

¹³ Nazar Ikhwan, Nirwana Anas, and Ramadhan Lubis, “Pengaruh Strategi Pembelajaran Intelligence Mapping Presentation Terhadap Kemampuan Representasi Siswa Pada Pembelajaran IPAS Di Kelas IV MIS YPI Batang Kuis,” *Jurnal Sains Students Research* 3, no. 2 (2025): 212–21, <https://doi.org/https://doi.org/10.61722/jssr.v3i2.4184>

¹⁴ Shodiq, Saputra, and Kuswara, “Penerapan Strategi Pembelajaran Intelligence Mapping Presentation Untuk Meningkatkan Partisipasi Belajar Siswa.”

information visually, thus facilitating understanding and retention.¹⁵ This aligns with David Ausubel's theory of meaningful learning, in which students systematically link new information to existing cognitive structures. The use of colors, symbols, and keywords helps students not only memorize but also classify and explain concepts in their own words, thus strengthening their understanding.¹⁶ This finding is also supported by previous research showing that the Intelligence Mapping Presentation strategy makes students more active in learning and improves mastery of the material, because students are directly involved in developing a framework for thinking through mind mapping.¹⁷

Self-confidence is an important affective aspect of learning. According to Lauster, self-confidence plays a role in fostering students' courage to ask questions, answer questions, and express opinions. Confident students tend to be more active, while those lacking confidence tend to be afraid of making mistakes, embarrassed, and passive.¹⁸ Therefore, learning strategies are needed to support increased student self-confidence. The results of the Independent Sample T-Test showed a Sig. (2-tailed) value of 0.001 (<0.05), indicating a significant difference in self-confidence between the experimental and control classes. This is supported by a mean difference of 9.667 and a Cohen's d value of 1.876 (>0.8), which is considered large. The average self-confidence of the experimental class (128.00) was also higher than that of the control class (118.33), indicating that the Intelligence Mapping Presentation strategy was effective in increasing student self-confidence.

This success aligns with constructivism theory, which states that self-confidence is formed through experience and social interaction. Creating and presenting concept maps provides students with a sense of confidence, satisfaction, and positive reinforcement.¹⁹ According to Hakim, this is an important internal factor in building self.²⁰ This finding is also supported by previous research showing that presentations and group discussions effectively train students' courage in asking questions and expressing opinions. With the Intelligence Mapping Presentation strategy, previously passive students become more confident because they have a visual guide in the form of a concept map when explaining the material. This indicates that this strategy not only improves cognitive aspects but is also effective in developing students' affective aspects, particularly self-confidence.²¹

CONCLUSION

¹⁵ Muhamad Husni and Zainuddin, "Memahami Konsep Pemikiran Mind Map Tony Buzan (1970) Dalam Realitas Kehidupan Belajar Anak," 1970.

¹⁶ Harefa, Penerapan Teori Pembelajaran Ausebel Dalam Pembelajaran.

¹⁷ Ikhwan, Anas, and Lubis, "Pengaruh Strategi Pembelajaran Intelligence Min Mapping Presentation Terhadap Kemampuan Representasi Siswa Pada Pembelajaran IPAS Di Kelas IV MIS YPI Batang Kuis."

¹⁸ Santika Purwa Ningsih and Attin Warmi, "Analisis Kepercayaan Diri (Self-Confidence) Pada Pembelajaran Matematika Siswa SMP," *Maju* 8, no. 2 (2021): 621–28.

¹⁹ Ardi et al., "Teori Konstruktivisme Dalam Pembelajaran Dan Bimbingan Konseling : Fondasi Teoritis Dan Implikasi Praktis Bagi Peserta Didik."

²⁰ Muflih Pratama and Eryanti Novita, "Hubungan Antara Kepercayaan Diri (Self Confidence) Dengan Penyesuaian Sosial (Social Adjustment) Pada Remaja Kelas X Di SMA Swasta Nurul Amaliyah Tanjung Morawa," *Tabularasa: Jurnal Ilmiah Magister Psikologi* 4, no. 2 (2022): 121–28.

²¹ Shodiq, Saputra, and Kuswara, "Penerapan Strategi Pembelajaran Intelligence Mapping Presentation Untuk Meningkatkan Partisipasi Belajar Siswa."

1. The intelligence mapping presentation strategy significantly improved fifth-grade students' conceptual understanding in science learning compared with conventional instruction.
2. The implementation of IMPS also enhanced students self-confidence by encouraging them to present ideas, ask questions, and actively participate in classroom discussions.
3. The integration of concept mapping and presentation activities in IMPS provides a meaningful, student-centered learning experience that effectively supports both cognitive and affective development in elementary science education..

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