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Exploring Ice-Breaking in Natural and Social Sciences Learning: Case from an Indonesian Elementary School

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Abstract. In the context of elementary school education, it is essential to apply teaching methods that maintain students' engagement and interest. One effective method is ice-breaking, designed to create a pleasant and comfortable learning atmosphere by reducing initial tension. This study aimed to analyze the implementation of ice-breaking activities in the teaching of Natural and Social Sciences (NSS) for Grade 3 students at a public elementary school in Central Java, and its impact on student engagement and learning outcomes. The research adopted a qualitative case study approach, utilizing classroom observations and teacher interviews. The findings indicate that the application of ice-breaking activities significantly increased students' interest and enjoyment in NSS lessons, improved comprehension of the material, and enhanced confidence in answering questions. Prior to the intervention, students showed relatively low engagement and interest in learning NSS. After the intervention, observations and interviews indicated that students became more engaged and expressed greater enjoyment in the learning process. Despite these benefits, challenges such as limited instructional time and initial resistance to new strategies were observed. To address these issues, concise and relevant activity planning and professional development for teachers are recommended. These results imply that the integration of ice-breaking activities can meaningfully improve the learning experience at the primary level.

Keywords: Elementary Education; Ice-Breaking; Learning Methods; Learning Outcomes; Student Engagement.

1. Introduction

One of the methods considered effective in the learning process is the use of ice-breaking. Ice-breaking activities are often utilized as an initial strategy to reduce student awkwardness and build a warm, open, and inclusive classroom atmosphere (Sasan et al., 2023). These activities not only help eliminate tension at the beginning of a session but also foster a more engaging and conducive environment for students to participate actively in the learning process. One way to enhance student interest in learning is through educational games. According to research conducted by Syahri (2021), the implementation of ice-breaking significantly increases student engagement. This is because students feel more comfortable and confident in speaking after participating in such activities. Additionally, the enjoyable atmosphere helps students focus better on the material being taught. A more relaxed and friendly setting tends to motivate students to engage and pay attention to the lessons (Sulianto et al., 2019). Zhang (2024) emphasizes that these activities facilitate initial interaction among students by encouraging conversations, thus relieving tension and creating a sense of trust that fosters openness. This shows that ice-breaking can be an effective tool in building positive classroom interactions. Therefore, it is important for teachers to integrate this technique into their lesson planning.

Ice-breaking is particularly relevant in elementary education, where interactive and game-based teaching methods can enhance student interest. By involving students in enjoyable activities, ice-breaking is expected to create a more productive learning atmosphere and help students grasp the material more easily (Kusumawardani et al., 2018). These activities serve as an introduction that mentally prepares students for better learning. This technique also

supports the development of students' social skills, enabling them to interact more effectively with one another. In Grade 3 of a public elementary school in Central Java, the implementation of ice-breaking in Natural and Social Sciences (NSS) lessons is considered crucial. Students at this age respond better to methods that combine physical and cognitive activities. Therefore, using ice-breaking allows teachers to create a learning environment that supports student adaptation to more complex material, contributing to a more enjoyable and beneficial learning experience (HS et al., 2021).

1.1. Problem Statement

Ice-breaking implementation is believed to enhance interaction between students and teachers, as well as among students themselves. In a more relaxed environment, students are more open to communicating and sharing opinions, making the learning process more dynamic and inclusive (Syahri, 2021). A positive classroom environment encourages students to voice their thoughts and respond to questions. When students feel comfortable, they are more likely to ask questions and engage in discussions, which are key elements of active learning. Research by Badriyah et al. (2020) shows that classrooms using ice-breaking techniques have higher participation rates than those that do not. This indicates that the method is not merely an activity to reduce awkwardness but also functions to improve learning outcomes. Moreover, teachers can more easily approach quieter or less active students, ensuring equal engagement from all learners (HS et al., 2021).

Although various studies have demonstrated the positive contributions of ice-breaking in the learning process, there remains a significant gap that warrants further investigation. Sasan et al. (2023), in their study involving senior high school students, found that the implementation of ice-breaking significantly enhanced students' social engagement and active participation in classroom interactions. In contrast, research conducted by Suryati and Krisna (2024) on university students revealed that ice-breaking effectively increased learning interest and reduced academic fatigue but did not directly improve students' understanding of the academic concepts being taught. These differing findings suggest that previous studies have largely focused on the affective and social aspects of learning at the secondary and higher education levels. To date, no systematic research has examined how ice-breaking is applied in the context of Natural and Social Sciences learning at the elementary school level, nor how it influences students' engagement and comprehension of subject matter. This gap underscores the urgency of conducting research that specifically investigates the implementation of ice-breaking in primary education to better understand its comprehensive impact on students' learning experiences.

In addition to boosting student engagement, studies show that ice-breaking has a positive impact on the overall classroom atmosphere. A more positive environment can boost students' confidence in expressing their thoughts and participating in class discussions (Badriyah et al., 2020). Ice-breaking fosters a stronger connection among students and with their teachers, creating a more harmonious atmosphere. This is important because a positive class environment can enhance motivation and academic performance. Conversely, classrooms lacking interaction may cause students to feel isolated and less motivated. Therefore, ice-breaking is not only a tool to improve interaction but also to create a healthier and more productive learning environment. This highlights the relevance of the method in modern education (Nursalam et al., 2021).

Addressing this gap is critical, considering that NSS in elementary education often presents abstract and integrated concepts that require active student participation and motivation. Therefore, this study aims to explore the implementation of ice-breaking strategies in NSS classes, focusing on third-grade students in a public elementary school in Central Java. By examining this specific context, the research contributes to the practical understanding of pedagogical approaches that foster student engagement and responsive learning in formal classroom instruction.

1.2. Related Research

This research aims to evaluate the impact of ice-breaking activities in NSS lessons for Grade 3 students at a public elementary school in Central Java. The primary focus is on how this method influences students' interest and attention during the learning process and promotes active classroom participation (Syahri, 2021). Recent studies have also shown that incorporating short and interactive activities during class can improve students' attention span and engagement, particularly when conducted at the beginning of lessons to boost readiness and motivation.

What differentiates this study from previous ones is its specific focus on NSS subjects and students at a particular grade level (Grade 3), along with its emphasis on identifying the most effective types of ice-breaking for this context. Additionally, the study explores how these activities support emotional development and social skills, elements that are often underemphasized in earlier studies. Research by Syafria et al. (2020) indicates that active participation in discussions correlates with better social relationships among students, further emphasizing the social-emotional benefits of ice-breaking.

Furthermore, educational games as a form of ice-breaking are shown to effectively re-engage students, especially in subjects considered difficult such as NSS. The latest study by Hoseini Shavoun et al. (2024) supports the idea that student connectedness with peers and teachers significantly contributes to active classroom engagement, leading to improved academic outcomes. Thus, ice-breaking is not only a complement in learning, but also an important component in creating a productive learning atmosphere. In this context, teachers need to design ice-breaking that suits the characteristics and needs of students. In this way, the learning experience can be more beneficial and enjoyable for them.

1.3. Research Objectives

This study will also explore how ice-breaking can support the achievement of learning objectives in elementary schools. With a more inclusive and collaborative classroom atmosphere, students tend to be more motivated to learn and achieve better learning outcomes (Syafria et al., 2020). In today's educational world, creating a learning environment that fosters student interaction is essential. Through the implementation of *ice-breaking* activities, students are given the opportunity to collaborate and work together, which in turn can enhance their social skills. Research by Puspitasari & Marzuki (2023) revealed that students who are actively involved in group activities tend to have better academic performance. Thus, *ice-breaking* not only helps create an enjoyable classroom atmosphere but also contributes to students' academic achievement. By developing positive social interactions, students can gain long-term benefits from the learning process they experience. This study specifically seeks to answer the following research questions: (1) How do *ice-breaking* activities influence student engagement in a public elementary school in Central Java? (2) In what ways do *ice-breaking* activities impact students' academic outcomes in the context of NSS?

This study will provide clear guidance for teachers in designing more dynamic and enjoyable teaching methods in elementary schools. By incorporating interactive approaches such as ice-breaking, teachers can create more positive and productive learning experiences for students (Sulianto et al., 2022). Moreover, it is important for teachers to understand the context and needs of their students when designing ice-breaking activities. Through this understanding, teachers can select appropriate and relevant techniques to maximize the benefits of these activities. This research is expected to offer new insights into the importance of ice-breaking in primary education. By paying attention to the social and emotional aspects of students, the learning process can be carried out more effectively. Alongside developments in education, innovative and engaging methods such as ice-breaking are becoming increasingly relevant. Therefore, it is important for educators to continuously explore and implement techniques that can support the quality of education in elementary schools.

2. Theoretical Framework

2.1. Definition of Ice Breaking

Ice-breaking is a series of activities designed to break the ice, build interpersonal connections, and foster the enthusiasm and spirit of learners in a learning environment. According to Saputri (2021), ice breaking aims to create a dynamic, spirited, and enthusiastic learning atmosphere. These activities do not merely serve as entertainment but also function as tools to reactivate students' concentration. Recent peer-reviewed research from primary school contexts (Sumindar & Setiawan, 2024; Mulyadi et al., 2023) demonstrates that integrating brief interactive ice-breaking techniques at lesson onset notably boosts student motivation, classroom participation, and overall learning energy.

The concept of ice-breaking can be understood through various complementary approaches in social and educational psychology. In the context of initial classroom interactions, ice-breaking plays a crucial role as explained by the Uncertainty Reduction Theory (Berger & Calabrese, 1975) explains how structured introductory activities can reduce social ambiguity and make students more comfortable. Complementing this, evidence from SEL research shows that fostering emotional competence and classroom belonging contributes to improved academic and social outcomes (Al-Jbouri et al., 2022). By reconciling both frameworks, ice-breaking emerges as a pedagogical strategy that enhances both emotional readiness and cognitive engagement in NSS learning.

2.2. NSS Learning

NSS learning in this study refers to the process of delivering material, facilitating instructional interactions, and evaluating student understanding of integrated science and social studies subjects in Grade 3 at a public elementary school in Central Java, as prescribed by the national curriculum. According to the Ministry of Education and Culture (2022), NSS is designed to provide a holistic understanding of natural and social phenomena. However, beyond curriculum documentation, literature on interdisciplinary education emphasises that combining scientific inquiry with social context enhances students' conceptual understanding and critical thinking skills (Kanmaz, 2022). Lujan et al. found that integrated instruction improves student engagement, motivation, and 21st-century competencies by situating learning within authentic, connected contexts. Similarly, Kanmaz's mixed-method study shows how interdisciplinary units support holistic learning outcomes in primary classrooms.

Integrating science and social studies in elementary education enables learners to explore real-world phenomena through multiple disciplinary lenses, promoting coherence in understanding and application. Research indicates that such interdisciplinary approaches not only deepen content knowledge but also improve collaborative problem-solving and inquiry skills (Lujan et al., 2020). Specifically, Kanmaz's (2022) findings demonstrate that when elementary teachers design interdisciplinary NSS units, students show higher levels of critical thinking, engagement, and self-regulated learning. These theoretical perspectives provide a robust foundation for examining how ice breaking can complement NSS learning by preparing students emotionally and cognitively to engage in connected and meaningful learning experiences.

2.3 Constructivism Learning Theory in the Context of Ice Breaking

Constructivist learning theory emphasizes that learners actively construct knowledge through experience and social interaction. In 1936, Jean Piaget's theory of cognitive development explains how children build understanding through assimilation and accommodation of new information, while Lev Vygotsky's sociocultural theory introduces the concept of Zone of Proximal Development (ZPD) and scaffolding as mechanisms for guided learning. Jerome Bruner adds that instruction should progress from enactive to symbolic representation, supported by scaffolding (Piaget, Vygotsky, Bruner). Empirical literature also supports constructivist application in elementary education: Romdhon et al. (2024) found that constructivist strategies improve student engagement and critical thinking in primary classrooms.

In the context of primary school education, this approach is highly relevant, as students do not merely receive information passively but engage actively in the learning process. The use of ice-breaking activities in SSN lessons for third-grade students can serve as an effective strategy to foster active interaction among learners. Through ice-breaking, students are encouraged to communicate, collaborate, and participate in an enjoyable learning atmosphere, thus creating meaningful learning experiences. Therefore, ice-breaking supports the principles of constructivism by helping students build their understanding in a more contextual and social manner.

3. Method

3.1. Research Design

This study employs a qualitative case study design, which is effective for exploring complex phenomena in their real-world contexts and bounded systems (Creswell, 2022). According to Creswell (2022), case studies offer deep, multi-faceted understanding of a particular case, the use of ice breaking activities in Natural and Social Sciences (NSS) learning among third-grade students at a public elementary school in Central Java.

Qualitative research is naturalistic and interpretive, allowing the researcher to act as the main instrument in data collection and analysis. In this study, data were gathered through classroom observation, semi-structured interviews. The focus is not on hypothesis testing or statistical generalization, but on understanding the meanings, interactions, and perspectives of teachers and students in the actual learning environment. This design makes it possible to analyze how ice-breaking is applied, how students respond, and how teacher evaluate its role in enhancing engagement and learning in NSS classrooms.

This approach does not aim to test hypotheses or produce statistical generalizations but to understand the meanings, experiences, and perceptions of teachers and students within the ongoing learning context. Through this approach, the researcher seeks to capture the natural classroom dynamics, including how ice-breaking is implemented, how students respond, and how teachers interpret its benefits in NSS learning. Therefore, the descriptive qualitative approach allows the researcher to uncover the phenomenon comprehensively and in depth within the real-life context of the learners and educators.

3.2. Participant

The participants in this study were selected using purposive sampling, which involves selecting individuals who are most relevant to the research focus. The sample consisted of one 3rd-grade teacher and 19 students from a public elementary school in Central Java. The teacher, who holds a Bachelor's degree in Education, was selected as the primary informant due to her direct involvement in the implementation of ice-breaking strategies during the NSS learning sessions.

The 19 student participants consisted of 9 boys and 10 girls, with an average age of 9 years old. These students were selected because they were directly involved in the NSS learning process where ice-breaking activities were observed. Their characteristics are considered relevant to the research focus on improving student engagement through interactive methods.

Table 1. The Demographic Characteristics of the Student Participants

Gender	Frequency	Percentage
Boys	9	47.4%
Girls	10	52.6%
Total	19	100%

3.3. Data Collection

Data were collected through direct observation in the classroom, where researchers monitored the implementation of various ice-breaking activities and student interactions during science lessons. These observations provide insight into the effectiveness of various types of ice-breaking in increasing student participation and creating a more dynamic learning environment (Syahri, 2021). The observation sheet was developed based on prior literature and expert judgment to ensure it could capture behavioral indicators of engagement, social interaction, and classroom climate.

In addition to observation, this study also involved interviews with the teacher who teaches NSS in Grade 3 at a public elementary school in Central Java. The purpose of this interview is to gain direct perspectives and experiences from the teacher regarding the implementation of ice-breaking in teaching. A semi-structured interview guide was developed and pilot-tested with NSS elementary school teacher to ensure question clarity and relevance.

Table 2. Observation Research Instruments

No.	Aspect	Indicator	Yes	No	Additional Remarks
1	Student Engagement	Students appear actively involved in ice-breaking activities			
		Students show high enthusiasm			
		Student attention increases after ice-breaking			
2	Social Interaction	Students interact positively with peers during ice-breaking			
		Collaboration occurs among students			
		Passive students become more active			
3	Classroom Dynamics	The classroom atmosphere becomes more relaxed			
		Lessons proceed more smoothly after ice-breaking			
		Teachers manage the class more easily after ice-breaking			
4	Implementation Issues	Technical issues occur during ice-breaking			
		Some students are not interested in joining ice-breaking			
		Ice-breaking does not go as planned			

In addition to observation, this study also involves interviews with the teacher who teaches NSS in Grade 3 at a public elementary school in Central Java. The purpose of this interview is to gain direct perspectives and experiences from the teacher regarding the implementation of ice-breaking in teaching. Information from the interview helps reveal the challenges, successes, and impacts of using ice-breaking on classroom atmosphere and student learning outcomes. Through this interview, the researcher can gain a deeper understanding of how the ice-breaking strategy is received and applied by educators (Noviyanti et al., 2022).

A semi-structured interview was conducted with the NSS teacher to explore experiences, perceptions, and practices related to the use of ice-breaking, using the following key questions:

1. What is your main purpose in applying ice-breaking in NSS learning?

2. Why do you think the ice-breaking method is suitable for the NSS subject?
3. How do you select the type of ice-breaking to be used?
4. How often do you implement ice-breaking in teaching and learning activities?
5. What are the main impacts you observe on student engagement?
6. Have there been any changes in student social interaction after the implementation of ice-breaking?
7. Have you encountered any difficulties in implementation? If yes, please provide examples.
8. How have teacher training or workshops you have attended influenced the application of ice-breaking in your classroom?
9. Do you use interactive learning media when applying ice-breaking? If yes, please provide examples.
10. Why do you choose to conduct ice-breaking at the beginning or in the middle of the lesson?
11. Do you modify ice-breaking based on student characteristics or student feedback?
12. How do you assess the effectiveness of this method in improving students' understanding of NSS material?
13. In your opinion, what type of ice-breaking is most effective and why?

The following is a research instrument in the form of a interview questions designed to collect data on the effectiveness of using ice-breaking techniques in NSS learning at a public elementary school in Central Java. This instrument is aimed at exploring teachers' views on the impact of ice-breaking techniques on students' interest and engagement.

To strengthen the credibility of the data, this study employed triangulation strategies, particularly source triangulation. Source triangulation was implemented by collecting information from multiple participants, including classroom teachers and students. Methodological triangulation involved combining observations, interviews, and document analysis to capture a more holistic and consistent understanding of how ice-breaking activities were implemented in NSS learning. According to Creswell (2022), using multiple sources and methods helps reduce researcher bias and enhances the trustworthiness of qualitative findings. These strategies ensured that the findings were not solely reliant on a single data type or participant but rather reflected diverse perspectives in natural classroom settings.

3.4. Data Analysis

Data analysis was conducted using a descriptive qualitative method, which allows the researcher to explore in depth the context of using ice-breaking activities in NSS learning. This method provides a comprehensive overview of how ice-breaking activities influence students' learning experiences and how this method is implemented in daily classroom practices. The study aims to offer a better understanding of the effectiveness of ice-breaking in enhancing student engagement and improving the quality of learning in the elementary school environment.

Data analysis in this study followed a descriptive qualitative approach, applying thematic analysis procedures as suggested by Creswell (2022). Data analysis techniques are the process of systematically organizing and processing data obtained from interviews, field notes, and other sources so that the data are easier to understand and the findings can be communicated to others. The process began with data familiarization through repeated reading of interview transcripts and observational field notes. Meaningful units of information related to the use of ice-breaking activities in NSS learning were then identified and grouped to reveal emerging patterns and themes. These initial codes were grouped into broader categories through axial coding, allowing the researcher to construct emergent themes that captured patterns across the data. The final interpretation stage involved synthesizing the themes to explain how students' engagement, motivation, and classroom dynamics were influenced by the integration of ice-breaking strategies. The entire process ensured that meaning was derived systematically, increasing the credibility and trustworthiness of the findings.

3.5. Validity and Reliability

To ensure the validity and reliability of this qualitative research, several strategies were applied in accordance with the nature of descriptive qualitative methods. The validity of the data was ensured through triangulation techniques, which involved combining data from multiple sources namely observation and interviews. This approach allows the researcher to cross-check and confirm findings from different angles, increasing the credibility of the results.

Prolonged engagement in the field and persistent observation it also carried out to gain an in-depth understanding of the learning context and to ensure that the data collected reflected actual classroom dynamics. To support reliability or the dependability of the data, a clear and detailed documentation of the research process including the development of instruments, procedures of data collection, and analysis steps was maintained.

Thematic analysis was applied to examine the qualitative data obtained from interviews and classroom observations. The process of theme construction followed several stages. First, all data sources were reviewed repeatedly to gain familiarity and initial impressions. Next, open coding was conducted by identifying meaningful statements or actions relevant to the research focus. These codes were then grouped into categories based on similarity of meaning. Through axial coding, categories were connected and refined into overarching themes that represented the key patterns in the data.

The final five themes constructed from this process were: (1) Enhancing Student Focus, (2) Context-Relevant Ice-Breaking, (3) Positive Engagement and Motivation, (4) Strengthening Peer Interaction, and (5) Teacher Development and Creativity. Each theme was derived from at least two different data sources to ensure credibility. Triangulation was applied both in terms of source (teacher, students, classroom context) and method (interview and observation), allowing each theme to be supported by multiple perspectives and forms of evidence.

For the theme of Enhancing Student Focus, data were drawn from teacher interviews describing how ice-breaking was intentionally placed at the beginning and mid-lesson to help students concentrate, and supported by observation notes showing heightened attentiveness after these activities. Context-Relevant Ice-Breaking was built on interview accounts explaining the alignment between the chosen ice-breaking activities and NSS lesson topics and confirmed by observations that the games were coherent with the day's material.

The theme of Positive Engagement and Motivation emerged from teacher reflections on increased enthusiasm and ease of comprehension following ice-breaking, corroborated by observation records documenting active participation from typically reserved students. Similarly, Strengthening Peer Interaction was informed by interview narratives of improved classroom relationships and observation notes on collaborative group work and reduced social barriers.

Lastly, Teacher Development and Creativity was shaped by interview data in which the teacher discussed modifying activities based on student feedback and insights gained from professional development workshops and observation evidence of varied and adaptive ice-breaking techniques. The application of both source and method triangulation, as recommended by Creswell (2022), reinforced the validity of the results and confirmed that the themes were firmly grounded in the real classroom context.

4. Findings

The thematic analysis of the semi-structured interview with the teacher who taught Natural and Social Science (NSS) and observations in a public elementary school in Central Java revealed five major themes regarding the implementation and perceived impact of *ice-breaking* activities in the classroom.

4.1. Enhancing Student Focus

Enhancing Student Focus reflects how ice-breaking activities are intentionally used to prepare students mentally and emotionally before entering into core learning activities. In the context

of elementary school education, younger learners often face challenges in sustaining attention and transitioning from free play to structured learning tasks. The implementation of ice-breaking activities functions as a bridge that helps students shift smoothly into academic engagement. By creating a lively and supportive atmosphere at the start or midpoint of lessons, ice-breaking allows students to refresh themselves, release tension, and activate their readiness to learn. This aligns with the idea that cognitive and emotional "resets" are essential for sustaining attention, improving motivation, and promoting deeper learning throughout the instructional session.

"*The purpose of implementing ice-breaking activities is to make the classroom atmosphere livelier. The main goal is to help students become more focused on the lesson because, after the ice-breaking activities, they feel fresher and less pressured by immediately opening their books or diving into the material. It allows them to refresh first, making them more enthusiastic and better prepared to learn.*" (AP. May 28, 2025. 12:10)

This statement reflects the teacher's belief that ice-breaking activities act as a preparatory tool to refresh students mentally and emotionally before learning begins.Observations conducted on May 28, 2025, in a 3rd-grade Natural and Social Science (NSS) class on the topic "Nature in Indonesia" confirmed this perspective. Short game-based activities of approximately five minutes at the beginning and in the middle of the lesson successfully captured students' attention and fostered active participation. Even typically quiet students were seen laughing, responding enthusiastically, and maintaining eye contact with the teacher, indicating heightened engagement.

Field notes recorded a smooth transition from playful activities to academic content with minimal distractions, showing that the positive energy from ice-breaking was sustained throughout the lesson. Together, these findings indicate that strategically placed ice-breaking activities not only enhance students' immediate focus but also build their enthusiasm, readiness, and sustained engagement across the lesson.

4.2. Context-Relevant Ice-Breaking

Context-Relevant Ice-Breaking is emphasizes the importance of aligning playful activities with the lesson content to ensure coherence and meaningful engagement. In elementary education, students' understanding develops best when instructional strategies such as games or energizers are linked to the material being taught. By selecting ice-breaking activities that reflect the subject matter, teachers can create a seamless transition between play and learning. This approach helps maintain students' focus on the topic and ensures that the energy generated by the games contributes to, rather than distracts from, academic objectives.

"*For selecting the appropriate type of ice-breaking activity, I adjust it to match the lesson material or the chapter being taught so it remains coherent. Because I teach Natural and Social Science myself, there are many topics available, and I usually adapt the games so they are easy for the children to understand.*" (AP. May 28, 2025. 12:10)

This statement shows the teacher's deliberate effort to integrate content and activity design, ensuring that the ice-breaking sessions support rather than interrupt learning.

"*Usually, I use activities such as guessing odd or even numbers, clapping games, or giving quick questions with small rewards for the students. This way they can learn the material while also playing games.*" (AP. May 28, 2025. 12:10)

Observations in the NSS classroom confirmed this practice. During a lesson on "Nature in Indonesia," the chosen ice-breaking activities included simple question-and-answer games and movement-based clapping exercises directly related to the day's topic. Students showed high levels of participation, and no disengagement was observed. Field notes from May 28, 2025, noted that these games were developmentally appropriate and sustained attention without leading to off-task behavior. These findings indicate that context-relevant ice-breaking activities not only keep students engaged but also strengthen the transfer of energy and focus into subsequent learning activities, making instruction more coherent and purposeful.

4.3. Positive Engagement and Motivation

Positive Engagement and Motivation is highlights how ice-breaking activities enhance students' enthusiasm and intrinsic motivation for learning. By creating a relaxed and enjoyable classroom atmosphere, students are more willing to participate actively, respond to questions, and engage with the lesson content. This approach not only improves attention but also reduces affective barriers such as anxiety or tension, making it easier for students to process and retain academic concepts.

"*Students are more enthusiastic about learning, and the lessons are easier for them to follow. Because they're no longer tense and can relax a bit, they can focus more on their learning.*" (AP. May 28, 2025. 12:10)

This statement indicates the teacher's perception that ice-breaking fosters a positive emotional environment, which directly contributes to students' readiness and willingness to engage in the lesson.

"*Basically, at the beginning, it's to capture the students' attention. When they come in, they're not immediately greeted with books or materials. They don't focus right away, they get to relax first. They play a game, get curious, and become more active. Midway through the lesson, it helps bring back their focus. Sometimes after explaining or doing a lot of Q&A, they might feel tired, and their focus drifts. Ice-breaking helps refocus them.*" (AP. May 28, 2025. 12:10)

This excerpt demonstrates how the teacher strategically uses ice-breaking both at the beginning and during the lesson to sustain engagement and manage students' energy levels. Observations confirmed that during ice-breaking activities, students displayed laughter, animated responses, and active participation. Their engagement carried over into academic tasks, as evidenced by higher participation in group work and willingness to answer questions. Field notes noted that the activities successfully re-energized students midway through the lesson, maintaining focus and interaction. These findings indicate that ice-breaking activities effectively enhance students' engagement and motivation, helping them remain attentive, curious, and emotionally ready to participate throughout the lesson.

4.4. Strengthening Peer Interaction

Strengthening Peer Interaction is emphasizes how ice-breaking activities facilitate social collaboration and communication among students. By designing group-based games rather than only individual tasks, teachers can encourage students to interact beyond their immediate neighbors, fostering discussion, problem-solving, and cooperative learning. Such activities not only enhance social skills but also create a more inclusive and harmonious classroom environment where students are more willing to participate and support one another.

"*Yes, there is a change in social interaction. Usually, the games I choose in class are not just about guessing or individual quizzes. I try to implement group games whenever possible. This allows students to interact with different classmates, not just the ones sitting next to them but also those across the classroom. They can talk, discuss, and solve the problems or questions I give them together.*" (AP. May 28, 2025. 12:10)

This statement shows the teacher's intention to use ice-breaking as a tool to expand students' social engagement and collaboration beyond their usual seating arrangements.

"*Why do I claim it's effective? Because I can include games, such as quizzes or other activities, where students feel like they're playing rather than just answering rigid academic questions. When I give them the opportunity to answer in groups, they are no longer afraid, they discuss freely, and their answers can become more creative. They are also more willing to read their textbooks, modules, or worksheets.*" (AP. May 28, 2025. 12:10)

As for the observations confirmed these effects. Students were seen collaborating during group tasks, sharing ideas, and helping peers complete challenges. Field notes from May 28, 2025, highlighted that group interactions were more equitable, and students who usually worked alone participated actively. These findings indicate that contextually designed ice-

breaking activities serve as a "social lubricant," strengthening peer interaction, inclusivity, and collaborative learning in the classroom.

4.5. Teacher Development and Creativity

Teacher Development and Creativity highlights the teacher's ongoing professional growth and adaptive approach in implementing ice-breaking activities. Participating in workshops and training sessions provides the teacher with new knowledge and strategies to create enjoyable, innovative, and engaging learning environments. Such continuous professional development enables the teacher to design activities that are not only fun but also pedagogically effective, catering to students' diverse needs and learning preferences.

"In every training session, I gain new knowledge for making learning enjoyable and innovative. The workshops help us understand how to create a livelier classroom atmosphere." (AP. May 28, 2025. 12:10)

This statement reflects the teacher's commitment to continuous learning and the practical application of newly acquired methods to enhance classroom engagement.

"Yes, I modify them. I also review how ice-breaking activities can make my students more active in class. The goal is not just for them to focus on learning or stay alone, but to encourage them to discuss with their classmates. I also consider students' feedback whether they enjoy the games I use, or if they find them challenging and adjust the level according to the elementary students' abilities." (AP. May 28, 2025. 12:10)

Observations confirmed the effectiveness of this approach. Ice-breaking activities were tailored to students' energy levels and learning readiness, and their engagement remained high throughout the lessons. Field notes indicated that the seamless implementation of these activities demonstrated careful planning and flexibility, with students actively participating, collaborating, and responding positively to games. These findings highlight the importance of continuous professional development, creativity, and adaptability in sustaining the relevance and impact of ice-breaking activities in elementary education.

Figure 1. Research Activities

During the classroom observations of NSS lessons, field notes and photos were collected to document the general atmosphere and the implementation of ice-breaking activities. The documentation focused on capturing the classroom setting, teacher facilitation, and students' participation in a descriptive rather than evaluative manner. These records provided contextual information about how the ice-breaking sessions were conducted and how the classroom environment supported the transition to learning activities.

5. Discussion

The findings of this study demonstrate that the integration of ice-breaking activities in Natural and Social Science learning consistently enhanced multiple aspects of the classroom experience. Thematic analysis revealed improvements in student focus, engagement, and peer interaction, alongside the development of teacher creativity in designing and adapting instructional strategies. Across different data sources, the results indicate that ice-breaking not only created a more enjoyable and inclusive atmosphere but also facilitated smoother transitions between playful activities and academic content. These patterns suggest that strategically implemented ice-breaking can serve as both a cognitive and social catalyst, fostering an environment conducive to active participation and meaningful learning in elementary education.

The results of this study suggest that the positive impact of ice-breaking activities on focus, engagement, and peer interaction can be explained by their ability to prepare students cognitively and emotionally for learning. By incorporating short, playful activities at strategic points in the lesson, students experienced a mental reset that helped sustain attention and reduce fatigue, which is particularly important for younger learners who have shorter attention spans. This aligns with the principles of Constructivism Learning Theory, which emphasize that learners actively construct knowledge through interaction with their environment and peers. In this context, ice-breaking created opportunities for students to engage in meaningful social interaction, collaborative problem-solving, and active participation, thereby supporting the assimilation and accommodation processes described by Piaget and the social scaffolding highlighted by Vygotsky.

The findings also extend the application of constructivist learning theory by demonstrating that ice-breaking can serve as a structured entry point into content-specific learning, linking playful activities directly to academic objectives. This contrasts with some earlier applications where ice-breaking was treated as a separate, purely affective component. The alignment of activities with lesson content in this study ensured that the energy and focus generated during games were transferred into the core instructional segments, reinforcing the intended learning outcomes.

When compared with previous research, the present findings are consistent with Syahri (2021), who reported that interactive and enjoyable activities increase student engagement by fostering a comfortable classroom environment. Similar to the observations of Syafria et al. (2020), this study found that active participation during ice-breaking was associated with improved peer relationships and social cohesion. Furthermore, the results align with Hoseini Shavoun et al. (2024), who emphasized that strong connections between students and teachers enhance classroom engagement and contribute to better academic performance. However, unlike many earlier studies that focused on general affective benefits, the current research adds to the literature by showing how context-relevant ice-breaking can directly support cognitive readiness and academic comprehension, particularly in the teaching of NSS to Grade 3 students. These differences may be attributed to the deliberate integration of activity design with subject content and the teacher's adaptive approach, both of which ensured that the benefits extended beyond momentary enjoyment to meaningful learning gains.

The five themes identified in this study are interconnected in ways that reflect a dynamic and mutually reinforcing process within the classroom. The improvement in student focus, achieved through strategically implemented ice-breaking activities, provided the foundation for sustained attention and readiness to learn. Once focus was established, students were more inclined to participate actively, which contributed to higher levels of engagement and intrinsic motivation. This heightened engagement facilitated richer peer interaction, as students became more open to collaboration, shared problem-solving, and inclusive group dynamics.

Strengthened peer interaction, in turn, created a more supportive and cohesive learning environment, reducing social barriers and encouraging equitable participation among students from diverse backgrounds. This inclusive atmosphere not only reinforced the

academic and social gains from earlier stages but also provided valuable feedback to the teacher regarding student preferences, energy levels, and learning needs. Such feedback directly informed the teacher's professional growth and creativity, enabling her to design and adapt ice-breaking activities. Zulfadli et al (2024) emphasized that teacher confidence in facilitating these activities and clarity of purpose communicated to students can also directly supports acceptance and pedagogical integration.

This cyclical relationship suggests that the benefits of ice-breaking are not isolated to single outcomes but operate as part of an integrated system in which cognitive readiness, emotional engagement, social connection, and instructional innovation reinforce one another. In this way, the interplay among these themes contributes to a holistic improvement in the quality of learning experiences in NSS classrooms, demonstrating that well-designed ice-breaking activities can serve as a catalyst for both student development and teacher professional practice. Sumindar & Setiawan (2024) said that such micro-activities such as quick songs, gestures, or simple games can help reset student attention and improve focus during extended topics like NSS.

The findings of this study hold important implications for teachers, schools, and educational policymakers. For teachers, the results highlight the value of integrating well-planned and context-relevant ice-breaking activities as part of lesson design to enhance focus, sustain engagement, and promote positive peer interaction. Schools can benefit from encouraging professional development programs that equip teachers with the skills to design and adapt such activities, ensuring they align with curriculum objectives and cater to diverse student needs. At the policy level, incorporating structured, interactive elements like ice-breaking into official lesson planning guidelines can support a more engaging and inclusive learning environment, particularly in subjects that students often perceive as challenging. By fostering both cognitive readiness and social cohesion, the strategic use of ice-breaking can contribute to improved learning outcomes and a more positive classroom climate across elementary education.

Although this study shows clear benefits of ice-breaking for focus, engagement, and peer interaction, the findings are limited by the specific school context, subject focus, and time constraints, as well as varied student responses. Even so, the research adds to the literature by illustrating how well-planned, context-relevant ice-breaking can address both cognitive and social learning goals while fostering teacher creativity. These insights offer practical guidance for designing more interactive and inclusive classroom practices in elementary education.

Selecting appropriate and inclusive ice-breaking activities requires an understanding of student diversity, learning styles, and socio-emotional needs. Introducing ice-breaking gradually, starting with familiar or culturally relevant games, helps reduce resistance from students and educators alike. Research by Zulfadli et al (2024) emphasized that teacher confidence in facilitating these activities and clarity of purpose communicated to students directly supports acceptance and pedagogical integration.

To overcome the challenge of evaluation and parental involvement, schools should design simple assessment tools to monitor the effectiveness of ice-breaking on engagement and participation. Surveys, reflective journals, and student behavior checklists can be helpful instruments. Moreover, communication with parents through newsletters or meetings about the purpose and benefits of ice-breaking can promote home-school collaboration.

6. Conclusion

The implementation of ice-breaking activities in Grade 3 NSS learning created a more engaging environment by addressing students' socio-emotional and cognitive dynamics-core aspects targeted in this study. This qualitative research aimed to explore how such activities influenced the student learning experience, and the findings pointed to three emergent themes: heightened classroom interaction, increased intrinsic motivation, and enhanced comprehension. These themes reflect how playful learning moments, when placed within structured learning, can act as emotional and cognitive catalysts. The significance lies not only

in the observed behavioral outcomes but also in how students made meaning of learning through social connection, enjoyment, and reduced fatigue. These observations resonate with Vygotsky's sociocultural theory, where learning is mediated through social interaction and psychological tools like emotion and motivation. However, challenges such as time constraints and adaptation barriers also surfaced, underscoring the need for teacher preparedness and contextual responsiveness. These complexities emphasize that the success of such interventions depends not only on method but also on relational dynamics and classroom culture. Ice-breaking activities enriched the affective and cognitive dimensions of NSS learning, affirming their role in creating a student-centered, adaptive learning space. The study offers practical implications for elementary school educators to integrate structured yet flexible ice-breaking techniques tailored to context. For future research, deeper examination using comparative designs or longitudinal tracking could explore the sustainability of impact. Academically, this research contributes to the understanding of how emotionally-attuned pedagogies can support both engagement and meaning-making in early science learning.

Limitation

This study has certain limitations. It was conducted in only one class at a Public Elementary School in Central Java, which limits the generalizability of the findings to other contexts. The data relied primarily on observations and student responses, which may be subjective and not fully capture the actual impact of ice breaking activities. Additionally, the absence of a control group makes it difficult to determine whether the observed improvements were solely due to the implementation of ice breaking or influenced by other classroom factors.

Recommendation

Based on the research results, it is recommended that teachers consider incorporating ice-breaking activities as a regular part of the learning process, especially in elementary school settings, to help improve student focus and engagement. For future researchers, it is suggested to expand the scope by involving multiple classes or schools and applying comparative methods such as comparing classrooms that use ice-breaking with those that do not to measure the effectiveness of ice-breaking more objectively. It is also advisable to address potential data subjectivity by including additional instruments such as teacher interviews or pre-post tests to triangulate findings. Additionally, collaboration with teachers in designing context-appropriate ice-breaking activities may enhance both the relevance and impact of their use in classroom learning.

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Conflict of Interest

The Authors declare that there is no conflict of interest.

Declaration of Generative AI-assisted Technologies

This manuscript was prepared with the assistance of Generative AI Grammarly and Quillbot. The AI was used to assist in language refinement. All intellectual contributions, critical analyses, and final revisions were conducted by the authors. The authors take full responsibility for the accuracy, originality, and integrity of the content presented in this work.

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