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Enhancing Learning Quality in Elementary School Using a Scientific Approach and Quantum Teaching

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Abstract

This research aims to improve learning quality by implementing a scientific approach with quantum teaching settings in elementary school. The research method used is classroom action research, which has two cycles. Data collection instruments include observation sheets for implementing scientific approaches with quantum teaching settings and test items for learning outcomes. The results of the study show that in cycle I, both the teacher's skills and student activities indicate that students enjoy the learning activities, as evidenced by the emoticon choices of the 24 attending students; eight students chose the "very happy" emoticon, eleven students chose the "happy" emoticon, and five students chose the "neutral" emoticon. Meanwhile, in cycle II, out of the 24 attending students, 14 students chose the "very happy" emoticon, 11 students chose the "happy" emoticon, and one student chose the "neutral" emoticon. Regarding student learning outcomes, the average score in cycle I was 52.50%, which increased to 69.25% in cycle II. These results indicate that implementing scientific approaches with quantum teaching settings can improve the quality of education in schools.

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INTRODUCTION

In striving for the advancement of a nation, one crucial aspect to prioritize is education. If a country prioritizes education, it will have human resources capable of managing natural resources and supporting national development. Thus, various efforts are continually being made to enhance the quality of education (Masril et al., 2020; Novalinda et al., 2020; Zagoto et al., 2019).

The quality of education is more determined by how the process of learning and guidance is planned, managed, or implemented (Nurmaida, 2020). Teachers create quality learning (Fajra et al., 2020; Munthe & Lase, 2022).Quality learning is considered as learning that plans the learning process according to established procedures and designs the material to be taught to students to achieve the expected learning outcomes. However, creating quality learning takes work. Quality learning is said to be not only about students getting good grades, considering that the subject of learning itself is students with various characteristics and developmental stages that must be considered.

The discussion on the role of teachers in improving the quality of learning is an exciting topic. However, to date, there have been few studies specifically addressing the role of teachers in enhancing the quality of learning, even though this would help uncover relevant information regarding the role of teachers in improving the quality of learning (Indrawati & Nurpatri, 2022; Zuleni & Marfilinda, 2022). Identifying and understanding the mentioned aspects will improve classroom learning quality (Sutikno et al., 2022). If viewed carefully, this thinking can be used to reconsider what can be done to improve the quality of learning in every classroom moving forward.

The appropriate quality of learning is when it is adequate and serves its intended purpose fairly and equally for all students (Mutiara, 2022; Trivena & Hakpantria, 2022). For students as learning subjects, it is essential to consider a learning atmosphere that is not solely focused on achieving grades but also takes into account student engagement in learning, and school is an environment that can facilitate this (Mutira, 2024; Harefa, 2022). However, it is also about creating a learning environment that fosters student enjoyment.

Efforts to improve the quality of learning are a fundamental aspect that needs to be addressed to enhance the quality of education, with teachers being the focal point. In line with this, according to several studies, improving the quality of learning can also enhance student learning outcomes and optimize the management of available resources (Destiana et al., 2020). Thus, in order to improve the quality of learning, it consists of three categories: teacher skills, student activities, and student learning outcomes

The quality of learning in this research focuses on the quality of science learning in elementary schools. Improving the quality of education manifested in the classroom, precisely, the quality of learning should be done through societal guidance and the development of science and technology (Fathurrochman, 2021). Science is about systematically seeking knowledge about nature, not just a collection of factual knowledge, concepts, and principles, but also a discovery process. Science learning plays a significant role in educational and technological development as it aims to stimulate interest, develop science and technology, and understand the universe, which holds many secrets (Mawarni, 2020). Therefore, in this regard, the author chose science learning to focus on improving the quality of learning.

However, practically, Deniarti & Masduki (2016) states that in science learning in elementary schools, 1) many teachers still heavily emphasize learning based on memory, 2) practical implementation is severely lacking, and 3) the focus is on lecture-based presentations, resulting in minimal activities, no more than listening and copying. These problems are close to what is happening in the field. Science learning still needs to meet expectations. Teachers still focus on lecture-based teaching, providing ready-made information in concepts already in textbooks, question and answer sessions, and practising problem-solving, making science learning monotonous and textbook-oriented (Putri et al., 2020).

The level of student participation and engagement in the learning process shows that teachers rarely involve students in direct interaction with their environment. Most teachers adhere strictly to textbook sequences without considering their relevance to the student's learning environment. Consequently, students tend to feel bored during lessons, leading to a lack of enthusiasm for learning (Sauri, 2021; Sanusi et al., 2020). Many students appear indifferent, absorbed in their world, and do not care about the knowledge they should acquire. Thus, students merely accept the knowledge without digesting it or considering its relevance and usefulness. This situation results in the majority of students being passive. Teachers need help to engage indifferent students during the learning process. Consequently, learning becomes less effective as students fail to respond adequately to the lessons. When given assignments, some students need help to complete them thoroughly, and this trend continues with subsequent tasks, including homework and group assignments. Students are unwilling to be grouped heterogeneously; most avoid grouping with peers with weaker cognitive abilities.

After conducting reflection sessions with the class teacher, it was found that the issue stemmed from the limitations of teachers in using innovative and creative teaching models. In reality, students would be more engaged in learning if the learning scenarios were not rigid but packaged in a more varied, creative, and enjoyable manner. To address this issue, one innovative teaching model that can be applied is quantum teaching. Quantum teaching involves transforming learning into a lively experience, encompassing all its nuances. It is based on "bring their world into our world, and take our world to their world." This is the main principle or fundamental reason behind all quantum teaching strategies, models, and beliefs (Deporter et al., 2017). Quantum Teaching can be an alternative for teachers to try something different: to break away from the monotony and the use of conventional teaching methods that some teachers have applied (Muftahid & Napiroh, 2020).

Many studies utilize the scientific approach with a quantum teaching setting to enhance various aspects of learning quality at different educational levels (Asmarani, 2017; Aufa & Taufik, 2020; Durrotunnisa & Nur, 2020; Leasa & Ernawati, 2013; Putri, 2017; Tugiah & Asmendri, 2022). However, there needs to be a study on the scientific approach with a quantum teaching setting that focuses on the three criteria of learning quality: teacher skills, student activities, and student learning outcomes.

Therefore, the author aims to investigate the implementation of the scientific approach with a quantum teaching setting to enhance the quality of learning in schools. Combining the scientific approach, where each step is systematic and scientific, with quantum teaching is considered to be in line with science learning, transforming the scientific atmosphere into an enjoyable one with the concept of quantum teaching. The scientific approach with a quantum teaching setting in learning will make the learning environment more lively, less rigid, and enjoyable. The scientific approach's components, observation, questioning, gathering information, processing information, and communicating, are packaged with the syntax of quantum teaching, which includes growing, experiencing, naming, demonstrating, repeating, and celebrating. Therefore, this research is conducted to answer the question of how implementing the scientific approach with a quantum teaching setting can enhance the quality of elementary school science learning.

METHOD

The research method used in this study is a unique classroom action research model by Kemmis and McTaggart (1990). The study consists of two cycles, each encompassing four steps: planning, action, observation, and reflection, carried out within a single learning theme with a duration of three weeks per cycle. In the planning stage, a learning plan is developed, including objectives, strategies, teaching materials, and evaluation methods. Next, the action is carried out by applying a scientific approach and Quantum Teaching settings in the classroom. Observation is conducted during the action to monitor interactions, student engagement, and responses to the methods used. Observations are documented through detailed notes, video recordings, and student feedback, focusing on key elements such as participation levels, collaboration, and problem-solving behaviors. To measure student activities, assessment rubrics and observation checklists are used, evaluating indicators like active involvement, questioning, and task completion. After three weeks, reflection is done to evaluate the results, identify strengths and weaknesses, and plan improvements for the next cycle. This reflection includes a thorough analysis of the observational data, allowing researchers to make evidence-based adjustments. The second cycle follows the same steps with adjustments based on the reflection results from the first cycle, ensuring continuous improvement in the quality of science education. Each step is systematically detailed, ensuring clarity and a structured approach to achieving meaningful outcomes in student learning.

1) Planning

In the planning phase, the researcher begins by analyzing the essential competencies for Science in Grade 5, Semester 2 to determine the prerequisite material needed to achieve those competencies. After studying the teaching material, the researcher selects content that aligns with these necessary competencies, ensuring that the material is relevant and appropriately sequenced to match the current classroom learning progress. The selected teaching material is designed to be interactive and engaging, directly corresponding to what is being studied in the classroom at that moment, allowing the lessons to flow naturally and in sync with the curriculum. The researcher also prepares a lesson plan using the scientific approach with a Quantum Teaching setting, prepares Student Worksheets, and creates instruments to observe student activities and the teacher's implementation of the scientific approach with the Quantum Teaching setting. Instruments to assess the quality of learning are also developed, along with documentation tools such as field notes and cameras. Additionally, the researcher prepares necessary learning resources, including media and materials, to support a cohesive and structured learning environment where the content being taught reflects ongoing classroom learning. This ensures that the lessons progress smoothly and are relevant to the students' current level of understanding.

2) Acting

In this stage, the plan that has been prepared is tested according to the steps made, which involves conducting the learning process by the scientific approach in a quantum teaching setting, consisting of observing, questioning, and answering. The teacher determines the objects to be observed by students, which are pictures of organisms in a food chain. This is followed by a question and answer session to identify which organisms are part of the terrestrial ecosystem food chain in the pictures. In this stage, the teacher intervenes by satisfying the students' curiosity by asking questions like "What's in it for me?" (AMBAK) that students must answer and benefit from answering those questions. Then, there's the trial phase, where information is gathered (experienced, named, demonstrated). In this phase, the teacher plans the students' learning experience by considering how to make the learning environment enjoyable, such as playing a food web game using ropes outside the classroom.

The information is processed and communicated (repeated). Students consolidate the overall picture of their previous learning experience in groups through individual worksheets. The celebration stage is flexible; the teacher praises all students for completing tasks well, encourages enthusiasm, conducts icebreakers, and adds various games to the learning process. The reflection stage is performed by having students choose an expression of the pictures by checking them to reflect on today's learning.

3) Observation

In this stage, the researcher, assisted by an observer, monitors the ongoing learning process and collects data. The activities observed include the teacher's skills in applying the scientific approach within a Quantum Teaching setting, focusing on how effectively the steps of this approach are implemented and their impact on student activities and learning outcomes. The observer plays a crucial role in documenting these observations, noting specific aspects such as the teacher's use of instructional strategies, student engagement levels, and any observed changes in student behavior or understanding. Observations are recorded in detail through structured field notes, checklists, and video recordings, ensuring a comprehensive and clear account of both teacher and student activities. This meticulous documentation allows for accurate analysis and evaluation of the teaching methods and their effectiveness in enhancing student learning.

4) Reflection

The researcher analyzes and reflects on the implementation and outcomes of the action. This is done to obtain a qualitative overview of the process's strengths and weaknesses. Thus, the reflection results can be used as a reference for improvements in subsequent actions.

This research was conducted in one of the elementary schools in Sarijadi District, Bandung City, through observation, interviews, pre-action, and action phases. To measure the criteria of learning quality, the implementation of the scientific approach with a quantum teaching setting was assessed using categories divided into a) Criteria for teacher skills in implementing the scientific approach with a quantum teaching setting in elementary school science learning, consisting of indicators (observation and questioning stages combined with the growing stage, trying or gathering information combined with experiencing, naming, and demonstrating stages, and processing data and communicating combined with repeating stages). b) Criteria for student activities during the implementation of the scientific approach with a quantum teaching setting in elementary school science learning, consisting of indicators (groups that can answer questions and groups that have finished answering questions, student groups that can show cooperation in group work, students who can be responsible for both group work and individual work). c) Criteria for student learning outcomes with indicators (students can explain the concept of energy flow, students can explain how energy flow occurs, students can mention when energy flow occurs, students can explain the roles of plants, herbivores, and carnivores in the food chain).

Descriptive qualitative data analysis techniques were used to evaluate teacher skills and student activities. For the criteria of student learning outcomes, the author sampled three categories of student groups: a) Four students with high cognitive abilities, b) Four students with moderate cognitive abilities, and c) Four students with low cognitive abilities. These categories were determined based on information from interviews with the homeroom teacher. Additionally, demographic details of the students, such as their age, grade level, and prior knowledge, were considered to ensure a comprehensive understanding of their learning context. The students were aged 10-11 years old and were in Grade 5. Their prior knowledge varied, with some having a strong foundation in science concepts and others requiring more support. This demographic information helped tailor the analysis to better assess the effectiveness of the teaching methods across different student groups.

RESULTS AND DISCUSSION

Results

Data and research descriptions to obtain an overview of the implementation of the scientific approach with a quantum teaching setting are obtained based on three criteria:

a) Criteria for teacher skills in implementing the scientific approach with Quantum Teaching settings in science learning at the elementary level.

This consists of several important indicators. First, the observation and questioning stages are combined with the growing stage. In this phase, the teacher must create an environment that supports students' curiosity and motivates them to ask questions. The teacher also needs to guide students in carefully and critically observing natural phenomena.

Next, the experimentation or information-gathering stage is combined with the experiencing, naming, and demonstrating stages. At this point, the teacher facilitates students in conducting experiments or practical activities relevant to the learning material. Students are given the opportunity to experience the scientific process directly, allowing them to name the concepts or phenomena they encounter and then demonstrate their findings. The teacher must ensure that students fully understand the concepts being learned through direct experience and practical application.

The final stage is data processing and communication, combined with the repeating stage. Here, the teacher guides students in analyzing and interpreting the data they have collected, as well as communicating their findings effectively. The teacher needs to ensure that students can systematically process data and use various communication methods to convey their observations and experimental results. This cycle is repeated to reinforce students' understanding and develop critical thinking skills and scientific communication abilities.

Throughout this process, the teacher must continue to create a dynamic and interactive learning environment, in line with the principles of Quantum Teaching, which emphasizes the creation of meaningful and enjoyable learning experiences for students. The teacher also needs to use various creative techniques and strategies to maintain student engagement and motivation throughout the learning process.

b) Criteria for student activities during the implementation of the scientific approach with Quantum Teaching settings in science learning at the elementary level.

This consists of several important indicators. First, there are groups that can answer questions and groups that have completed answering questions. In this context, students are expected to actively engage in discussions, demonstrating their understanding of the material by answering the teacher's questions. Groups that efficiently complete their responses show that they can process information and collaborate well.

Next, the criteria include groups of students who can demonstrate cooperation in group work. This involves students working together harmoniously, sharing tasks, and supporting each other to achieve common goals. Effective cooperation is reflected in students' ability to listen to each other's ideas, divide responsibilities fairly, and resolve conflicts constructively. This fosters a sense of community and enhances the learning experience by leveraging diverse perspectives within the group.

Lastly, students who can take responsibility for group work and individual tasks are crucial. This means that each student not only contributes to the group's success but also takes responsibility for their personal learning. Responsible students are those who complete assigned tasks on time, stay focused on their work, and help ensure that the group stays on track. They also reflect on their learning process, striving to improve and contribute meaningfully to both individual and group outcomes.

Overall, these criteria ensure that students not only absorb scientific concepts but also develop essential skills such as critical thinking, communication, collaboration, and responsibility. The Quantum Teaching setting enhances these activities by creating an engaging, supportive, and dynamic learning environment that encourages active participation and deep understanding of the subject matter.

c) Criteria for student learning outcomes and their indicators in the context of the concept of energy flow in elementary science learning include several key aspects.

First, students should be able to explain the concept of energy flow. This means they should understand and articulate how energy is transferred from one organism to another within an ecosystem. They should be familiar with the basic terms and definitions related to energy flow, such as producers, consumers, and decomposers.

Second, students should be able to explain how energy flow occurs. This involves explaining the processes through which energy moves through different trophic levels in a food chain or food web. Students should be able to describe and explain the sequence of energy transfer from the sun to plants (producers), then to herbivores (primary consumers), and subsequently to carnivores (secondary and tertiary consumers).

Third, students need to identify when energy flow occurs. They should recognize that energy flow is a continuous process that happens whenever one organism consumes another organism or organic material. Students should understand that energy is always being transferred within an ecosystem, maintaining balance and supporting life.

Lastly, students should be able to explain the roles of plants, herbivores, and carnivores in the food chain. They should explain how plants (producers) convert solar energy into chemical energy through photosynthesis, which is then used by herbivores (primary consumers) when they eat plants. Carnivores (secondary and tertiary consumers) then obtain energy by eating herbivores. Students should be able to provide specific examples of each type of organism and explain their importance in maintaining energy flow within an ecosystem.

Overall, these criteria ensure that students gain a comprehensive understanding of energy flow within ecosystems. They should be able to explain the basic concepts, describe the processes involved, identify the timing of energy transfer, and explain the roles of various organisms in the food chain. This holistic understanding is essential for students to grasp the complexity and interdependence of life within ecosystems.

The first cycle presents an overview of the observing and questioning stages combined with the growing stage. Students are actively involved in the learning process, observing objects presented by the teacher, namely pictures of organisms in a food chain of a terrestrial ecosystem used in a game to arrange the images. Additionally, the students mention the names of these organisms, such as cabbage, hibiscus flower, mouse, grasshopper, eagle, sparrow, and caterpillar. This aligns with the proposed framework of quantum teaching implementation planning (Deporter et al., 2017). In the growing stage, which involves students, they are engaged through games. This stage also yielded findings that interventions to stimulate students' curiosity through questions or student-led Q&A sessions were successful. During the pre-action phase, the questions raised by students, whether prompted or unprompted by the teacher, were mainly at the lower levels of Bloom's taxonomy (C1), even when instructed to ask questions. However, after implementing the scientific approach in a quantum teaching setting, the teacher intervened by presenting the lesson to stimulate students' curiosity without explicitly instructing them to ask questions orally. As a result, there was a noticeable difference in the questions asked before and after the action, with a development in the types of questions asked. Initially, most questions were at levels C1 and C2, often requiring prompting from the teacher. However, during the action phase, questions flowed naturally related to the learning process and the material, and the categories of questions asked by students developed into levels C3, C4, and even C5. This active role of students in the learning process empowers educators to facilitate a more engaging and effective learning environment.

In the trying or gathering information stage, combined with the experiencing, naming, and demonstrating stages, the finding was the presentation of learning through the scientific approach with a quantum teaching setting, aiming for students to learn through direct group experiences. This intervention resulted in increased cooperation among students because they engaged in group games. The group atmosphere was made competitive, with the introduction of rewards, encouraging cooperation and enthusiasm among the students to become the fastest and most accurate group. This was evident from the observation results showing that students' scientific attitudes, particularly in terms of cooperation, improved as they completed tasks faster than the specified time. This aligns with quantum teaching, where in the naming stage, students discover data themselves when their interest peaks, by exploring the school environment, creating a different learning atmosphere, not always confined to the classroom as usual. This collaborative nature of the learning environment fosters a sense of belonging among educators and researchers, encouraging them to contribute to the development of elementary science education.

In the processing data and communicating stage, combined with the repeating stage, the finding through the implementation of the scientific approach with a quantum teaching setting was an intervention by the teacher to stimulate students' objective attitudes or prioritize data/facts. This intervention took the form of worksheets that had to be completed individually. The researcher suspected that students attempted to consolidate the food web of a terrestrial ecosystem previously done as a group into a food pyramid individually, depicting a marine ecosystem. If students could transfer the food web into the food pyramid, they succeeded in prioritizing data/facts. The finding was that out of the 24 students present, more than half, namely 14, answered correctly. This aligns with the repeating stage in quantum teaching, where the teacher designs the learning process for students to consolidate the overall picture of what they have previously learned.

In the celebration stage, the strategies employed include:

- They praised each student who completed their task.
- They were singing together for an ice-breaking session during the learning process.
- It showcases other groups through games that create a light competitive atmosphere to earn group scores and rewards for winning the game.
- having a class party by taking group photos at the end of the lesson, which will be uploaded on social media and are enjoyed by students.

The games involved the lesson material, where the teacher tries to instil the principle of quantum teaching: everything has a purpose. The teacher praises each student when they finish their task, expressing the principle of acknowledging every effort. Group scores are provided, and rewards for the fastest group express the principle that if something is worth learning, it is worth celebrating. The principle of everything speaking has already been implemented in stage 3, and the principle of experiencing before naming has been implemented in stage 2.

The findings in this stage show that students become more enthusiastic and faster in completing each task with the presence of rewards provided by the teacher, whether it's scores, food rewards, or advantages compared to other groups. Furthermore, through the celebration strategy implemented through learning activities in games, students will feel happy about the learning activities. This is evidenced by the 24 students present: 8 chose the emoji "very happy," 11 chose the emoji "happy," and 5 chose the emoji with a neutral expression.

In Cycle Two, during the observing and questioning stage, combined with the growing stage, the category of questions asked by students developed into levels C3, C4, and even C5, which had increased from the previous cycle. More questions emerged in categories C3, C4, and even C6. The questions asked by students were still procedural at first, but they later evolved into analytical questions, progressing from checking their assumptions to forming hypotheses.

In the try or gather information stage, combined with the naturalizing, naming, and demonstrating stage, the finding is the presentation of learning through the scientific approach with a quantum teaching setting, aiming for students to learn through direct experience in groups. This intervention increased student cooperation as they engaged in group games. The group atmosphere was competitive, with rewards offered, fostering collaboration and enthusiasm among students to become the fastest group. Observations showed that students focused on enhancing their scientific attitudes, particularly regarding cooperation, as they completed tasks more quickly than the designated time.

In the process and communication information stage, combined with the repeat stage, the finding is through implementing the scientific approach with a quantum teaching setting. The intervention carried out by the teacher aimed to enhance students' objective attitudes or prioritization of data/facts. This intervention involved individual completion of worksheets. The researcher suspected that students attempted to consolidate the concepts they had worked on in groups regarding factors influencing ecosystem changes. They depicted them individually on a mind map, specifically efforts to preserve ecosystems in human environments. The findings from all 24 attending students showed that they all responded correctly.

In the celebrated stage, the findings were consistent with those of Cycle I. The students became more enthusiastic and efficient in completing tasks due to the rewards provided by the teacher, including scores, food rewards, and advantages over other groups. Furthermore, celebrating through game-based learning activities elicited enjoyment among students towards the learning process. This was evident from the responses of the 24 attending students: 14 students chose the emoticon expressing very happy, 11 students chose the emoticon indicating happy, and one student selected the emoticon with a neutral expression. To validate the level of student satisfaction indicated by the emoticons, interviews were conducted with a sample of students who were considered representative of the overall group. These interviews provided deeper insights into the students' experiences and confirmed their emotional responses as reflected in the emoticon choices. Success in the learning process can be observed from various teacher and student factors. This encompasses the teacher's behavior during teaching sessions as well as the students' responses and behaviors as a result of the learning experiences presented above, which can then reflect the quality of learning in terms of teacher skills and student activities.

Next, the author presents the quality of learning based on the third criterion, which is the learning outcomes of students in science lessons obtained from Cycle I and Cycle II.

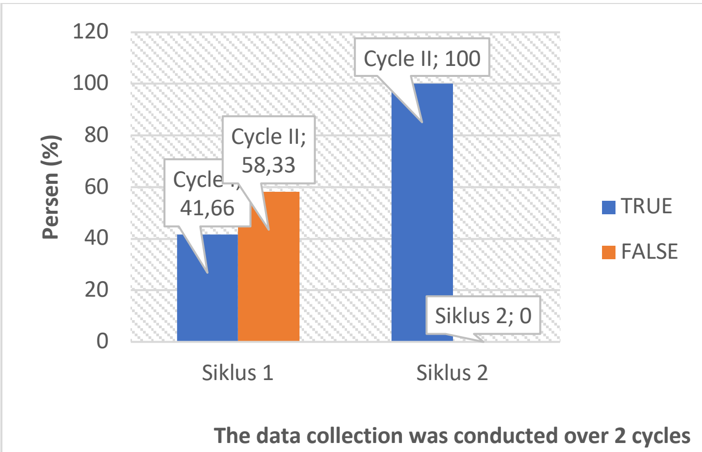

Figure 1. Summary of Student Learning Outcomes

The question was given to reveal the learning outcomes of the science subject that had been taught. The number of students who answered correctly and the number of students who answered incorrectly are shown in Graph 1. Graph 1 indicates an improvement in students' ability to answer questions correctly. In Cycle I, out of a total of 24 students, only 14 students responded correctly. However, in Cycle II, all students, or 24 out of the total, answered correctly. Thus, the science learning outcomes in elementary school show an increase from 58.33% in Cycle I to 100% in Cycle II. The data from the research results on the criteria of teacher skills, student activities, and student learning outcomes in this learning implementation serve as evidence that the scientific approach with quantum teaching makes students physically and mentally active in learning. Students not only receive the material but also discover concepts through learning activities and interactions that occur in multi-directions, such as interactions between students in group learning activities, exchanging opinions, and sharing tasks within groups. The teacher's role is to facilitate question-and-answer sessions and guide students in group work while students ask questions about things they don't understand. The lesson ends with the teacher giving recognition or acknowledgement to enhance motivation and students' activity in learning (Purniwantini et al., 2021).

CONCLUSION

Based on the description of the quality of learning, criteria of teacher skills, and student activities, as well as the reflection on the criteria of teacher skills and student activities, reflected in students' responses to the learning activities. In Cycle I, students showed enjoyment towards learning, where 8 out of 24 students chose the emoticon "very happy," 11 students chose the emoticon "happy," and 5 students chose the emoticon with a flat expression. In Cycle II, the number of students showing enjoyment towards learning increased, with 14 out of 24 students choosing the emoticon "very happy," 11 students choosing the emoticon "happy," and one student choosing the emoticon with a flat expression. The implementation of the scientific approach with quantum teaching is not limited to scientific stages alone but also provides a fun learning atmosphere, not rigid, and an active, meaningful, and enjoyable learning environment. This positive learning environment, fostered by the teaching method, instils confidence in students to communicate their learning process in solving each problem.

Then, the criteria for student learning outcomes show an increase of 41.67%. Student learning outcomes are an essential criterion that is easily measurable because it provides information to teachers about the success of learning in achieving the targeted competencies. Students' success in attaining satisfactory learning outcomes reflects an educator's implementation of a quality learning process characterized by high student learning activities. With the results obtained, it can be concluded that the implementation of scientific learning with quantum teaching settings is efficacious in improving the quality of science learning in elementary school, as reflected in the increased enjoyment of students towards learning and the significant improvement in learning outcomes from cycle I to cycle II.

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