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ANALYSIS OF THE SCIENTIFIC LEARNING APPROACH IN ISLAMIC RELIGIOUS EDUCATION TO ENHANCE STUDENTS' CRITICAL THINKING

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ABSTRACTS

Background: *The rapid advancement of knowledge and technology in the 21st century necessitates a shift in educational methods, particularly in Islamic Religious Education (PAI). Observations reveal a concerning gap in critical thinking skills among students at PKPPS Minhajurrosyidin Jakarta.* ***Purpose:*** *This study seeks to explore how a scientific approach can address this deficiency effectively. This study focuses on the application of the scientific approach in Islamic Religious Education (PAI) at PKPPS Minhajurrosyidin Jakarta, aiming to enhance students' critical thinking skills. The background highlights the low critical thinking skills among students, supported by pre-survey data.* ***Method:*** *The research method employed is a qualitative approach, including document studies, interviews, observations, and Focus Group Discussions (FGD).* ***Result:*** *The findings indicate that the scientific approach effectively improves student engagement, understanding, and motivation. The average student score increased from 70 to 85, and 21st-century skills such as critical thinking, communication, and collaboration developed well.* ***Conclusion:*** *The study concludes that the scientific approach not only enhances academic understanding but also non-academic skills, such as communication and collaboration. Suggestions for future research include applying the scientific approach in other educational contexts to test the generalization of these findings and developing more innovative learning strategies to improve the effectiveness of Islamic religious education in various educational settings.*

A. INTRODUCTION

Islamic Religious Education (PAI) is a subject that studies Islamic teachings, encompassing creed (*aqidah*), law (*syariah*), and ethics (*akhlaq*). The objective of PAI is to develop Muslim individuals who are faithful, pious, and possess noble character. The Quran, as the primary source of Islamic teachings, provides guidance for humanity, including in the realm of Islamic religious education (Aladdiin and Ps 2019). As stated in Surah An-Nahl, verse 89,

وَأَنْزَلْنَا عَلَيْكَ الْكِتَابَ تِبْيَانًا لِكُلِّ شَيْءٍ وَهُدًى وَرَحْمَةً وَبُشْرَىٰ لِلْمُسْلِمِينَ ﴿٨٩﴾

which means: *"And We have sent down to you (Muhammad) the Book (the Quran) as clarification for all things and as guidance and mercy and good tidings for those who submit (to Allah)."*

From this verse, it is explained that the Quran functions as guidance, mercy, and good news for those who submit to Allah. In this context, religious education plays a crucial role in guiding students towards a better life, both spiritually and morally. However, the primary aim of PAI is not only limited to aspects of creed, law, and ethics but also includes the development of students' critical thinking skills. Critical thinking is the ability to analyze, evaluate, and conclude information logically and systematically (Parnawi and Ridho 2023). In PAI learning, critical thinking is necessary for students to deeply understand religious teachings, relate them to life realities, and apply them in relevant contexts (Sulaiman, Al Hamdani, and Aziz 2018).

The scientific learning approach, which emphasizes the process of discovery, problem-solving, and analytical thinking, plays a significant role in enhancing students' critical thinking skills. This approach encourages students to be active in the learning process through observation, data collection, analysis, and drawing conclusions based on existing evidence (Firman Muhammad Abdulrahman Akbar 2017). In PAI, the scientific approach enables students to analyze Quranic verses, study their historical context, and relate them to everyday life situations.

The urgency of this research is based on the importance of developing students' critical thinking skills in PAI learning. Critical thinking is crucial to help students understand religious teachings more deeply and relevantly to everyday life. Based on pre-survey data conducted at Pondok Pesantren Salafiyah Minhajurrosyidin Jakarta, students' critical thinking skills are still low on several indicators.

Previous studies have shown the importance of the scientific approach in learning. For instance, Piaget and Vygotsky, two prominent figures in constructivist learning theory, emphasize the importance of direct experience and social interaction in the learning process. Piaget argues that students learn through experience and interaction with their environment, while Vygotsky emphasizes the crucial role of social interaction and scaffolding in learning (Habsy et al. 2024). In PAI, the scientific approach aligns with this theory as it encourages students to learn through direct experience, discussion, and collaboration.

Moreover, research conducted by (Tamara 2018) shows that the cooperative learning approach can enhance students' critical thinking skills. Sharan found that students involved in cooperative learning showed significant improvement in their critical thinking skills compared to students who learned individually. In PAI learning, the cooperative approach can be applied through group discussions, joint projects, and

other collaborative activities that encourage students to share ideas and develop mutual understanding.

Furthermore, research conducted by (Rahmaniah et al. 2023) highlights the importance of critical thinking skills in education. Ennis states that critical thinking involves the ability to question, analyze, and evaluate information logically and systematically. In the context of PAI, this ability is essential for students to understand religious teachings deeply and relate them to life realities.

This research has novelty in several aspects. First, it highlights the importance of the scientific learning approach in the context of PAI, which has not been extensively discussed in previous literature. Most prior studies have focused more on general learning approaches without specifically linking them to PAI subjects. Thus, this research contributes new insights to the literature by exploring how the scientific approach can be applied in PAI learning to enhance students' critical thinking skills.

Second, this research uses empirical data from pre-surveys conducted at Pondok Pesantren Salafiyah Minhajurrosyidin Jakarta. This data provides a clear picture of students' critical thinking skills in the context of PAI learning, which can serve as a basis for designing more effective learning strategies. This data also provides empirical evidence on the need to improve students' critical thinking skills through more effective learning approaches.

Third, this research integrates constructivist learning theory with the scientific approach in the context of PAI learning. This integration provides a robust framework for understanding how students learn and how critical thinking skills can be developed through the scientific approach. Thus, this research contributes new insights to learning theory by integrating the scientific approach and constructivist theory in the context of PAI learning.

Several theories supporting this research include constructivist learning theory, cooperative learning theory, and critical thinking theory. Constructivist learning theory, as proposed by Piaget and Vygotsky, emphasizes the importance of direct experience and social interaction in the learning process. This theory supports the scientific approach in PAI learning as it encourages students to learn through direct experience, discussion, and collaboration.

Cooperative learning theory, as proposed by Sharan, emphasizes the importance of cooperation and collaboration in the learning process. This theory supports the scientific approach in PAI learning as it encourages students to work together in groups, share ideas, and develop mutual understanding (Wahyuni 2019).

Critical thinking theory, as proposed by Ennis, emphasizes the importance of critical thinking skills in education. This theory supports the scientific approach in PAI learning as it encourages students to question, analyze, and evaluate information logically and systematically (Fransiska, Purnama Sari, and Nasution 2024).

Pre-survey data conducted at Pondok Pesantren Salafiyah Minhajurrosyidin Jakarta shows that students' critical thinking skills are still low on several indicators. For example, only 18.18% of students can build basic critical thinking skills, and only 12.12% of students can organize strategies and critical thinking techniques. This data shows that there is still much room for improvement in PAI learning to enhance students' critical thinking skills.

Table 1. Critical Thinking Ability of PKPPS Minhajurrosyidin Students

No	Critical Thinking Ability Indicator	Number of Students with Correct Answers on each Indicator	Total Percentage (%) of Students with Correct Answers on Each Indicator
1	Providing simple explanations	16	48,48%
2	Building basic skills	6	18,18%
3	Summarizing	11	33,33%
4	Providing advanced explanations	9	27,27%
5	Organizing strategies and techniques	4	12,12%

Based on this data, it is clear that students' critical thinking skills need to be enhanced, especially in building basic skills, providing further explanations, and organizing strategies and critical thinking techniques. These pre-survey results will serve as a foundation for designing more effective learning strategies and aiding students in developing critical thinking skills in Islamic Religious Education (PAI) at PKPPS Minhajurrosyidin in East Jakarta in the future.

Islamic Religious Education plays a crucial role in shaping students' character and spirituality. However, to achieve this goal, it is essential to develop students' critical thinking skills through effective learning approaches. The scientific approach, which emphasizes discovery, problem-solving, and analytical thinking processes, has great potential to enhance students' critical thinking abilities in PAI. Supported by constructivist learning theory, cooperative learning, and critical thinking theory, this study aims to identify and evaluate the effectiveness of the scientific approach in improving students' critical thinking skills at Pondok Pesantren Salafiyah Minhajurrosyidin in Jakarta. Empirical data obtained from the pre-survey provide a strong basis for designing more effective and relevant learning strategies. Thus, this research is expected to make a significant contribution to the development of Islamic religious education.

B. METHOD

This research employs a qualitative approach. This approach was chosen to gain an in-depth understanding of the application of the scientific learning approach in Islamic Religious Education (PAI) and its impact on students' critical thinking skills. The qualitative approach provides flexibility in exploring the views and experiences of research subjects holistically, allowing the researcher to gather rich and varied information (Firman Muhammad Abdurrohman Akbar, Amelia, and Rodoni 2023).

The data collection techniques used in this study include document studies, interviews, observations, and Focus Group Discussions (FGD). The document study involved collecting and analyzing various relevant documents such as the curriculum, lesson plans (RPP), teaching modules, and learning evaluation reports at PKPPS Minhajurrosyidin. This document analysis aimed to understand how the scientific approach is integrated into the PAI curriculum and its implementation in teaching practices. Additionally, the document study provided insights into the standards and

guidelines used by teachers in teaching PAI, as well as identifying gaps between theory and practice.

Interviews were conducted with various parties directly involved in the learning process at PKPPS Minhajurrosyidin, including teachers, students, and stakeholders. These semi-structured interviews allowed the researcher to explore information deeply and flexibly according to the respondents' answers. Interviews with teachers focused on the teaching methods used, the challenges faced in implementing the scientific approach, and their views on the effectiveness of this approach in enhancing students' critical thinking. Meanwhile, interviews with students aimed to understand their perceptions, experiences, and level of engagement in the learning process using the scientific approach. Interviews with stakeholders, such as the head of the school and the boarding school administrators, were conducted to gain strategic views and policies supporting the implementation of this approach. Through these interviews, the researcher could obtain rich and varied data that illustrated different perspectives on the application of the scientific approach in PAI.

Observations were conducted by directly observing the learning process in the classroom. The researcher observed the interactions between teachers and students, the teaching methods used, students' participation in learning activities, and how the scientific approach was applied in practice. These observations helped the researcher gain a real picture of classroom dynamics and the effectiveness of the teaching methods used. Observations were carried out systematically using pre-prepared observation guidelines, covering important aspects that needed to be observed, such as the use of scientific methods in teaching, students' responses to these methods, and students' engagement in the learning process. The results of these observations provided empirical data that supported the findings from the interviews and document studies.

Focus Group Discussions (FGD) were conducted involving small groups of teachers, students, and stakeholders. The FGD aimed to deepen the findings from the interviews and observations and gather feedback from various parties regarding the effectiveness of the scientific learning approach in enhancing students' critical thinking. In the FGD, participants were invited to openly discuss their experiences, challenges faced, and suggestions for improvement. This group discussion provided an opportunity for participants to share their views and ideas, as well as clarify and confirm the research findings. The FGD also helped the researcher identify issues that might have been overlooked in individual interviews and observations.

The data sources in this study consisted of primary and secondary data. Primary data were obtained directly from respondents, including teachers, students, and stakeholders at PKPPS Minhajurrosyidin. Teachers provided information about the application of the scientific learning approach, the challenges faced, and their views on its effectiveness in improving students' critical thinking. Students shared their perceptions, experiences, and level of engagement in the PAI learning process using the scientific approach. Stakeholders, such as the school principal and boarding school administrators, provided strategic views on the implementation and impact of this approach in the context of equivalent education in the boarding school. This primary data was crucial as it provided direct insights into the practices and experiences of the research subjects in applying the scientific approach in PAI. Secondary data were obtained from relevant documents such as the curriculum, lesson plans, teaching modules, evaluation reports, and related literature. This secondary data was used to

complement and support the findings from the primary data and provide a broader context regarding the application of the scientific approach in PAI. Secondary data also helped the researcher understand the policies and guidelines used in PAI learning and how the scientific approach was integrated into the curriculum and teaching practices.

Triangulation was used to ensure the validity and reliability of the data collected in this study. Triangulation was done in several ways. First, source triangulation was conducted by using various data sources, namely teachers, students, and stakeholders. By involving various data sources, the researcher could obtain diverse perspectives on the application of the scientific learning approach in PAI. This helped the researcher identify gaps and inconsistencies in the data and strengthen the validity of the findings. Second, method triangulation was conducted by using various data collection techniques, namely document studies, interviews, observations, and FGD. The use of various techniques allowed the researcher to collect rich and varied data and ensure the accuracy and consistency of the findings. Method triangulation also helped the researcher identify and address biases that might arise from using only one data collection technique. Third, theory triangulation was conducted by using various relevant theories to analyze the data and strengthen the interpretation of the findings. The theories used in this study included constructivist learning theory, cooperative learning theory, and critical thinking theory. Constructivist learning theory, as proposed by Piaget and Vygotsky, emphasizes the importance of direct experience and social interaction in the learning process. Cooperative learning theory, as proposed by Sharan, emphasizes the importance of cooperation and collaboration in the learning process. Critical thinking theory, as proposed by Ennis, emphasizes the importance of critical thinking skills in education. By using these various theories, the researcher could obtain a strong framework for understanding how the scientific approach is applied in PAI learning and its impact on students' critical thinking skills.

Through this qualitative approach and triangulation techniques, this research is expected to provide a comprehensive and in-depth understanding of the application of the scientific learning approach in PAI and its impact on students' critical thinking skills at PKPPS Minhajurrosyidin Jakarta. The empirical data obtained from various sources and data collection methods used in this study provided a rich and holistic picture of the phenomenon studied and allowed the researcher to develop relevant and practical recommendations for improving PAI learning in the future. This research is also expected to make a significant contribution to the development of learning theory and PAI teaching practices, as well as to enhance the quality of Islamic religious education.

C. RESULT AND DISCUSSION

Table 2. Analysis of the Scientific Learning Approach in PAI Subjects at PKPPS Minhajurrosyidin Jakarta

Stage	Informant	Results
Observing	• Ust. Ubaid M., S.Pd.I. (PAI Teacher) • Class Observation XI IPA PKPPS Minhajurrosyidin • Interview Group of XI Science class students	Observation: The teacher invites students to observe natural and social phenomena related to the PAI material. Interview: Zaenal, XI IPA student "The PAI teacher here is fun and exciting, I like it when we are invited to directly observe the practice of prayer and fasting in the school environment." Ubaid, S.Pd. (PAI Teacher): "We try to make PAI learning more interactive and interesting by applying the scientific learning approach. We use direct observation of prayer and fasting practices in the school environment so that students can understand and internalize Islamic teachings more deeply and contextually."
Inquire	• Ust. Ubaid M., S.Pd.I. (PAI Teacher) • Class Observation XI IPA PKPPS Minhajurrosyidin • Interview Group of XI Science class students	Observation: The teacher encourages students to ask questions about the phenomena they observe. Interview: Siti, a student of class XI IPA: "With the scientific learning approach, I became more courageous in asking questions about the meaning and wisdom of the religious teachings taught." Ubaid, S.Pd. (PAI Teacher): "We encourage students to actively ask questions through the scientific learning approach, by providing opportunities for them to ask in-depth questions about the teachings of the Islamic religion. Islam and its relevance in everyday life."
Collect information	• Ust. Ubaid M., S.Pd.I. (PAI Teacher) • Class Observation XI IPA PKPPS Minhajurrosyidin	Observation: The teacher provides relevant learning resources to students. Interview: "Ratna, Science XI student: 'We were actively encouraged to look for references from the Qur'an and hadith to support our understanding of the

	• Interview Group of XI Science class students	material, so it was easier to understand the context.'" Ubaid, S.Pd. (Teacher PAI): "We encourage students to gather information from various sources, including the Qur'an and hadith, so that they can understand and relate the teachings of Islam. with the current situation and context."
Associating	• Ust. Ubaid M., S.Pd.I. (PAI Teacher) • Class Observation XI IPA PKPPS Minhajurrosyidin • Interview Group of XI Science class students	Observation: The teacher helps students connect the information they obtained with the PAI concept that is being learned. Interview: "Fitri, a student of class XI IPA: 'Learning PAI is more enjoyable. Easy understandable because we invited to associate Islamic teachings with life situations everyday.'" Ubaid, S.Pd. (PAI teacher): "We apply the scientific learning approach by relating the teachings of Islam to the situation real life, making it easier for students to understand and relate concepts religion with the context of their daily lives."
Communicating	• Ust. Ubaid M., S.Pd.I. (PAI Teacher) • Class Observation XI IPA PKPPS Minhajurrosyidin • Interview Group of XI Science class students	Observation: Teachers encourage students to convey their learning results to others. Interview: "Siti, a student of class XI IPA: 'When PAI Teacher applied the scientific learning approach to the 'Communicating' indicator, I felt more confident to discuss and share my opinions about Islamic teachings with my classmates.'" Ubaid, S.Pd. (PAI Teacher): "We at PKPPS Minhajurroosyidiin Jakarta apply the scientific learning approach to the 'Communicating' indicator by holding group discussions and simulating real situations to facilitate students in communicating and conveying their understanding of Islamic teachings effectively."

This study shows that the application of the scientific learning approach in Islamic Religious Education (PAI) subjects at PKPPS Minhajurrosyidin Jakarta succeeded in increasing students' engagement and critical thinking skills. In the observing stage, teachers invite students to observe natural and social phenomena related to PAI material, which makes learning more interesting and contextual. The questioning stage encourages students to ask questions about the meaning and wisdom of religious teachings, increasing their courage and curiosity. In the information gathering stage, students are encouraged to look for references from the Qur'an and hadith, which facilitates understanding of the material. The associating stage helps students connect Islamic teachings to everyday life, making learning more relevant. The communicating stage increases students' confidence in discussing and sharing their understanding of Islamic teachings. This approach not only improves students' critical thinking ability but also their communication skills, making PAI learning more effective and meaningful.

Table 3. Assessment Results of the Scientific Learning Approach in PAI Subjects at PKPPS Minhajurroosyidiin Jakarta

Aspects	Before	After	Assessment Indicator
Average Value	70	85	• Elaboration question about the concept of Islamic Education • Multiple choice questions about Islamic history • Essay questions about the application of PAI in daily life
Student Activity	Low	High	• Raising hands to ask questions • Participating in discussion • Completing assignments on time
Learning Motivation	Simply	High	• Enthusiasm in following the lesson • Desire to learn more about PAI • Perseverance in doing assignments
21st Century Skills	Evolve	Good	• Critical and creative thinking: -Analyzing information - Developing arguments - Asking critical questions • Problem solving: - Identifying problems - Finding a solution - Applying the solution • Communication and cooperation: - Conveying ideas clearly - Working together in a group. - Listening carefully

This study shows that the application of the scientific learning approach in Islamic Religious Education (PAI) subjects at PKPPS Minhajurrosyidin Jakarta succeeded in improving various important aspects of learning. The average student score increased from 70 to 85, showing a better understanding of the concepts, history, and applications of PAI. Student engagement from low to high, with more students raising their hands, participating in discussions and completing assignments on time. Students' learning motivation also improved from moderate to high, characterized by greater enthusiasm, desire to explore PAI, and perseverance in doing assignments. In addition, students' 21st century skills, such as critical thinking, problem solving, and communication and cooperation, developed well after the application of the scientific approach. These results show that the scientific approach not only improves academic achievement but also non-academic aspects that are important for students'.

Table 4. Comparison of Student Activity

Assessment Indicator	Approach Scientific	Approach Traditional
Cognitive		
Follow the teacher's explanation with carefully	85%	60%
Answer the teacher's question appropriately	75%	50%
Ask the teacher if something is not clear understandable	65%	40%
Expressing his/her opinion or idea clearly	60%	35%
Participate in the discussion actively	70%	45%
Doing the task well Affective	80%	55%
Affective		
Enthusiastic in following the learning	80%	50%
Motivated to learn	75%	45%
Have high curiosity	70%	40%
Eager to do the task	75%	50%
Cooperate with friends well	70%	45%
Demonstrate a positive attitude towards learning	80%	55%
Psychomotor		
Follow instructions well	85%	60%

Complete tasks precisely and thoroughly	80%	55%
Organize time well	75%	50%
Manage learning resources well	70%	45%
Maintain cleanliness and neatness learning environment	75%	50%

The results showed that the scientific learning approach was significantly more effective than the traditional approach in improving student activeness in various assessment indicators. In the cognitive aspect, students taught with the scientific approach were more active in following the teacher's explanation (85% vs. 60%), answering questions appropriately (75% vs. 50%), and participating in discussions (70% vs. 45%). In the affective aspect, they showed higher enthusiasm (80% vs. 50%) and greater learning motivation (75% vs. 45%). In the psychomotor aspect, students with the scientific approach were also better at following instructions (85% vs. 60%) and doing tasks thoroughly (80% vs. 55%). Overall, the scientific approach succeeded in improving students' engagement in learning more comprehensively than the traditional approach.

Table 5. Assessment Data of Student Motivation in Learning

Indicator	FGD Results	Interview Results	Observation
Student Activity in Learning	Students are more active in participating in learning, such as asking questions, answering questions, and discussing.	Students expressed that they are more active in participating in learning using the scientific learning approach.	Students ask more questions, answer questions, and engage in discussions more in learning using the scientific learning approach.
Student Enthusiasm in Learning	Students show high enthusiasm in learning, as seen from their spirit and focus.	Students expressed that they are more enthusiastic in participating in learning using the scientific learning approach.	Students appear more enthusiastic and focused in participating in learning using the scientific learning approach.
Student Concentration in Learning	Students find it easier to concentrate and focus during learning.	Students expressed that they find it easier to concentrate and focus during learning using the	Students find it easier to concentrate and focus during learning using the

		scientific learning approach.	scientific learning approach.
Student Desire to Learn	Students show a strong desire to learn and understand the subject matter.	Students expressed that they have a strong desire to learn and understand the subject matter using the scientific learning approach.	Students show a strong desire to learn and understand the subject matter using the scientific learning approach.
Student Satisfaction with Learning	Students are satisfied with the learning they participate in.	Students expressed that they are satisfied with the learning they participate in using the scientific learning approach.	Students appear satisfied with the learning they participate in using the scientific learning approach.

The results showed that the use of the scientific learning approach significantly improved students' motivation in learning. Based on the results of FGDs, interviews and observations, students became more active in learning, as seen from the increased frequency of asking and answering questions and discussing. Students' enthusiasm also increased, with them showing higher enthusiasm and focus during learning. Students reported that they find it easier to concentrate and focus, and have a strong desire to learn and understand the subject matter. In addition, students' level of satisfaction with the learning also increased, with many students feeling satisfied with the applied scientific learning method. These overall findings indicate that the scientific learning approach is not only effective in increasing students' engagement but also in building their motivation to learn.

D. ANALYSIS/DISCUSSION

1. Analysis of the Scientific Learning Approach in PAI Subjects at PKPPS Minhajurrosyidin Jakarta

This study analyzes the application of the scientific learning approach in Islamic Religious Education (PAI) subjects at PKPPS Minhajurrosyidin Jakarta and its influence on students' engagement and critical thinking skills. Based on data obtained from various sources, including classroom observations, interviews with teachers and students, and Focus Group Discussions (FGDs), it appears that the scientific approach significantly improves the quality of Islamic Education learning.

In the observing stage, teacher Ust. Ubaid M., S.Pd.I. invites students to observe natural and social phenomena relevant to PAI materials. Direct observation of prayer and fasting practices in the school environment helps students understand and internalize Islamic teachings more deeply and contextually. According to (Arini and Umami 2019), constructivist theory by Piaget and Vygotsky supports this approach, stating that effective learning occurs through direct experience and interaction with the environment. This research is in line with the findings of (Lesmana, Sutisnawati, and Maulana 2023) which show

that the cooperative learning approach increases student engagement and their understanding.

The questioning stage showed that students became more courageous and motivated to ask questions about the meaning and wisdom of religious teachings, which showed an increase in curiosity and critical questioning skills. Siti, an 11th grade science student, felt more free to ask in-depth questions about Islamic teachings. This supports Ennis' theory in research (Mujib et al. 2022) which emphasizes the importance of critical thinking skills in education, where students are encouraged to question, analyze, and evaluate information logically.

At the information gathering stage, students actively seek references from the Qur'an and hadith to support their understanding of the material. Ratna, a student of class XI IPA, stated that this approach makes it easier for them to understand the context of the material. This approach is supported by inquiry-based learning theory, which states that students learn better when they actively seek and explore information on their own.

The associating stage helps students connect Islamic teachings to everyday life, which makes learning more relevant and meaningful. Fitri, a student of class XI IPA, felt that linking religious teachings with real-life situations made it easier for them to understand religious concepts. This is in line with contextual learning theory which emphasizes the importance of linking subject matter with students' daily experiences to improve understanding and retention.

The communicating stage showed an increase in students' confidence in discussing and sharing opinions about Islamic teachings. Siti felt more confident to discuss with her classmates when the scientific approach was applied. This supports Vygotsky's findings regarding the importance of social interaction in learning, where students learn through discussion and collaboration with others (Muhammad, Darmayanti, and Sugianto 2023).

The results of this study are consistent with previous findings showing the effectiveness of the scientific learning approach in improving students' engagement and critical thinking skills. This approach not only improves students' academic understanding but also non-academic skills such as communication and collaboration. This study makes an important contribution to the educational literature by showing that the scientific approach can be effectively applied in PAI learning to improve students' engagement and critical thinking skills. Further studies can delve deeper into the factors that influence the effectiveness of this approach and how it can be applied in other learning contexts.

2. Assessment Results of the Scientific Learning Approach in PAI Subjects at PKPPS Minhajurroosyidiin Jakarta

This study demonstrates that the implementation of a scientific learning approach in the Islamic Religious Education (PAI) subject at PKPPS Minhajurrosyidin Jakarta has successfully improved various important aspects of learning. This improvement is evident from the data showing significant changes in various assessment indicators after the implementation of the scientific approach.

The average student score increased from 70 to 85 after the application of the scientific approach. This improvement encompasses essay questions about PAI

concepts, multiple-choice questions about Islamic history, and essay questions about the application of PAI in daily life. According to constructivist learning theory pioneered by Piaget and Vygotsky, effective learning occurs when students are actively involved in the learning process, understanding the material through direct experience and social interaction. This increase in scores indicates that students have a deeper understanding of the material, in line with the constructivist view that knowledge is built through active and interactive processes (Saksono et al. 2023).

Student engagement, which was initially low, increased significantly. This indicator was measured through the frequency of students raising their hands to ask questions, participating in discussions, and completing tasks on time. These results are consistent with the research by (Hartono and Akbar 2023), which shows that cooperative learning enhances student participation in the classroom. The applied scientific approach encourages students to actively engage in learning, increasing their curiosity and involvement in the learning process.

Students' learning motivation increased from moderate to high, marked by greater enthusiasm, a desire to delve deeper into PAI, and persistence in completing assignments. The motivation theory by (Hartono and Akbar 2023) on intrinsic and extrinsic motivation states that a learning environment that supports students' autonomy and competence can enhance intrinsic motivation. The scientific approach, which emphasizes exploration and problem-solving, provides opportunities for students to feel more autonomous and competent, thereby increasing their motivation to learn.

21st-century skills, including critical thinking, problem-solving, as well as communication and collaboration, developed well after the implementation of the scientific approach. Students showed improved abilities in analyzing information, constructing arguments, asking critical questions, identifying problems, seeking solutions, applying solutions, conveying ideas clearly, collaborating in groups, and listening attentively (Rosnaeni 2021). Research by (Erlangga et al. 2023) emphasizes that 21st-century skills are crucial for students' success in an increasingly complex and knowledge-oriented world. The scientific approach, which emphasizes active involvement and critical thinking, aligns with these needs, indicating that students not only excel academically but also develop skills relevant to future challenges.

(Sastradinata 2023) explains the views of educational experts such as Dewey, who emphasize the importance of direct experience and reflection in the learning process, supporting the findings of this study. Dewey argues that effective learning occurs when students are actively engaged in meaningful experiences relevant to their lives. The scientific approach, with its focus on observation, experimentation, and reflection, aligns with these principles, demonstrating that students can develop a deeper understanding and strong critical thinking skills.

The results of this study are consistent with previous research showing the effectiveness of the scientific approach in learning. For example, research by (Ridzal et al. 2022) found that the scientific approach enhances conceptual understanding and student engagement in science learning. Similar results were found in the study by (Sarifah and Nurita 2023), which showed that inquiry-based learning improves students' critical thinking and problem-solving skills. This

research adds to the evidence that the scientific approach is not only effective in science education but also in PAI subjects, demonstrating the flexibility and universality of this approach in improving the quality of education.

The research findings indicate that the scientific learning approach has a significantly positive impact on PAI learning at PKPPS Minhajurrosyidin Jakarta. The improvements in average scores, student engagement, learning motivation, and 21st-century skills demonstrate that this approach is effective in developing various important aspects of learning. These results are supported by constructivist and motivational learning theories and are consistent with previous research showing the effectiveness of the scientific approach in enhancing educational quality. This approach not only improves students' academic achievements but also important non-academic aspects for students' overall development, making it a worthwhile learning model to apply in various educational contexts.

3. Comparison of Student Activity

The research results indicate that the scientific learning approach is significantly more effective than the traditional approach in enhancing student engagement across various assessment indicators. Here is a deeper analysis based on cognitive, affective, and psychomotor aspects. In the cognitive aspect, students taught with the scientific approach are more active in following teacher explanations (85% vs. 60%), accurately answering questions (75% vs. 50%), and participating in discussions (70% vs. 45%). The constructivist learning theory proposed by Piaget and Vygotsky supports these findings. Piaget posits that learning occurs when students actively interact with their environment and construct their own understanding. Vygotsky adds that social interaction and scaffolding from teachers are crucial in helping students reach their full potential. The scientific approach, which emphasizes observation, experimentation, and reflection, aligns with these principles and encourages students to actively participate and think critically.

In the affective aspect, students using the scientific approach show higher enthusiasm (80% vs. 50%) and greater learning motivation (75% vs. 45%). According to (Pincus 2024) motivation theory, intrinsic motivation increases when students feel competent, autonomous, and related to the learning process. The scientific approach provides opportunities for students to explore, inquire, and discover answers on their own, which enhances their sense of ownership over the learning process and intrinsic motivation. These results are also supported by previous research showing that learning involving active student participation tends to increase their motivation and interest in learning(Daniel et al. 2024).

In the psychomotor aspect, students with the scientific approach are better at following instructions (85% vs. 60%) and completing tasks meticulously (80% vs. 55%). Dewey's active learning theory emphasizes the importance of direct experience in the learning process, allowing students to develop psychomotor skills through practice and real-world application. The scientific approach, involving direct experimentation and observation, provides opportunities for students to practice their psychomotor skills in meaningful contexts.

Although the research results show the advantages of the scientific approach, it is important to consider other factors that may influence these outcomes. First, the effectiveness of the scientific approach can vary depending on the quality of implementation and the teacher's ability to apply it. Well-trained teachers in this approach are more likely to succeed in enhancing student engagement and involvement. Second, student characteristics can also affect the results. Students more accustomed to traditional learning methods may need time to adjust to the scientific approach. Therefore, adequate training and support for teachers and gradual adjustments for students are crucial for the success of this approach.

According to (Rahmulyana et al. 2024) in their meta-analysis "Visible Learning," teaching methods that actively involve students have a significant positive impact on learning outcomes. Previous studies also support these findings, such as research by (Nurhasanah, Pribadi, and Ismawati 2022) showing that active and collaborative learning improves student understanding and engagement compared to traditional methods. Additionally, research by (Syaparuddin, Meldianus, and Elihami 2020) indicates that students in classes with active learning are 1.5 times more likely to pass than students in classes with traditional teaching.

These research findings support the conclusions of constructivist learning theory, motivation theory, and active learning theory, which show that the scientific approach is more effective in enhancing student engagement compared to traditional approaches. This approach not only improves cognitive aspects such as understanding and active participation but also affective aspects such as motivation and enthusiasm, as well as psychomotor aspects such as practical skills. However, the success of this approach largely depends on the quality of implementation and adjustments made by teachers and students. Therefore, continuous teacher training and support are essential to ensure the effectiveness of the scientific learning approach in enhancing student engagement and involvement.

4. Assessment Data of Student Motivation in Learning

This study shows that the use of a scientific learning approach significantly increases student motivation in learning at PKPPS Minhajurrosyidin Jakarta. The data obtained through FGD, interviews, and observations provide a comprehensive overview of the increase in student motivation in various aspects, such as activeness, enthusiasm, concentration, the desire to learn, and satisfaction with learning. Students are more active in participating in learning, as evidenced by the increased frequency of them asking questions, answering questions, and engaging in discussions. Based on constructivist learning theory, as discussed by (Agustyaningrum and Pradanti 2022) concerning Piaget and Vygotsky, active involvement in the learning process is crucial because students build their understanding through interactions with their environment and others. The scientific approach that encourages students to actively ask questions and engage in discussions aligns with this theory, and the results of this study support the view that interactive learning enhances student activeness.

Student enthusiasm also increased, with them showing higher levels of enthusiasm and focus during learning. Intrinsic motivation theory, as explained by (Ratnaningtyas 2018) in the Self-Determination Theory (SDT), states that a learning environment that supports autonomy, competence, and social relationships can increase students' intrinsic motivation. The scientific approach, which provides space for students to explore and understand the material in-depth, appears to meet these three basic psychological needs, thereby enhancing their enthusiasm.

Students reported that they find it easier to concentrate and focus during learning. This can be associated with cognitive theory (Wisman 2020), which emphasizes the importance of attention and focus in the learning process. The scientific approach that encourages students to actively engage in learning activities helps them focus their attention and improve concentration, in line with this theory. Students show a strong desire to learn and understand the subject matter. This is consistent with active learning theory, which states that students involved in the learning process tend to have higher motivation to learn. The scientific approach, with its focus on discovery and problem-solving, makes learning more relevant and interesting for students, thus increasing their desire to learn.

Student satisfaction with learning also increased, with many students feeling satisfied with the applied scientific learning method. Student satisfaction can be linked to Herzberg's job satisfaction theory, which states that factors such as achievement, recognition, and challenging work can increase satisfaction (Gilbert, Eka, and Limanto 2022). In education, the scientific approach that provides intellectual challenges and recognition for student achievements seems to enhance their satisfaction with learning.

This study is in line with the views of education experts who emphasize the importance of active and constructivist learning approaches. For example, research by (Suyasmini 2022) shows that cooperative learning, which is part of the scientific approach, increases student motivation and engagement. Additionally, research by (Rafiqah, Amin, and Wayong 2019) in the field of physics education shows that active learning methods significantly improve students' conceptual understanding compared to traditional methods.

The results of this study strengthen theories supporting active and interactive learning approaches and show that the scientific approach is effective in increasing student motivation and engagement. This approach not only helps students understand the subject matter better but also builds essential skills such as critical thinking, problem-solving, and communication, which are relevant for success in the 21st century. These findings provide practical implications for educators to implement the scientific approach in teaching, especially in subjects that require deep understanding and active student involvement.

E. CONCLUSION

This study concludes that the application of the scientific learning approach in Islamic Religious Education (PAI) subjects at PKPPS Minhajurrosyidin Jakarta significantly improves various important aspects of student learning. Data from Focus Group Discussions (FGDs), interviews and observations showed that students became

more active in the learning process, as seen from the increased frequency of asking and answering questions and participating in discussions. Students' enthusiasm also increased, with them showing higher enthusiasm and focus during learning. Students concentrate more easily and have a strong desire to learn and understand the subject matter, as well as feeling more satisfied with the applied learning method. In addition, students' critical thinking skills, including analyzing information, solving problems and making decisions, also improved. These findings indicate that the scientific learning approach is not only effective in improving students' academic understanding but also non-academic skills that are important for their overall development. The results of this study are consistent with theory and previous research supporting active and interactive learning, and provide strong evidence that the scientific approach can be effectively applied in PAI learning contexts to improve students' engagement and critical thinking skills.

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