

Implementation of Piaget's Cognitive Development Theory in Learning at Modern Pesantren

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Abstract: *This study examines the application of Piaget's cognitive development theory in learning practices at the Modern Pesantren Prof. Muhajirin in Palembang. The research employed a descriptive qualitative approach using observations, interviews with teachers and pesantren administrators, and analysis of learning documents. The findings indicate that students aged 12–15 years are in the formal operational stage, characterized by the ability to think abstractly, logically, and systematically. Learning activities at the pesantren are designed to support these cognitive abilities through inquiry-based, discussion-based, problem-based, and scientific learning approaches. These approaches are implemented through educational activities such as muhadharah, group discussions, youth scientific work (KIR), and public examinations. The results show that Piaget's cognitive development theory can support more reflective, analytical, and participatory religious learning within the pesantren environment. However, this study is limited to a single institutional setting and relies primarily on qualitative observations, which may limit the generalizability of the findings. Future studies are therefore needed to examine the application of cognitive development theory in diverse Islamic educational contexts using more comprehensive research designs.*

Keywords: *cognitive development, pesantren, constructivist learning, religious education*

Abstrak: *Penelitian ini bertujuan untuk mengkaji penerapan teori perkembangan kognitif Jean Piaget dalam praktik pembelajaran di Pondok Modern Prof. Muhajirin Palembang. Penelitian ini menggunakan pendekatan kualitatif deskriptif dengan teknik pengumpulan data berupa observasi, wawancara dengan guru dan pengelola pesantren, serta analisis dokumen pembelajaran. Hasil penelitian menunjukkan bahwa santri yang berusia antara 12–15 tahun berada pada tahap operasional formal menurut teori perkembangan kognitif Piaget, yang ditandai dengan kemampuan berpikir abstrak, logis, dan sistematis. Kegiatan pembelajaran di pesantren dirancang untuk mendukung kemampuan kognitif tersebut melalui pendekatan pembelajaran berbasis inkuiri, diskusi, pemecahan masalah, dan pendekatan ilmiah. Pendekatan tersebut diwujudkan dalam berbagai kegiatan pendidikan seperti muhadharah, diskusi kelompok, karya ilmiah remaja (KIR), dan*

ujian publik. Temuan penelitian menunjukkan bahwa teori perkembangan kognitif Piaget dapat mendukung pembelajaran agama yang lebih reflektif, analitis, dan partisipatif dalam lingkungan pesantren..

Kata Kunci: *perkembangan kognitif, pesantren, pembelajaran konstruktivistik, pendidikan agama*

Introduction

Modern Pesantren represent a transformation of Islamic religious education through general knowledge. These institutions strive to combine more contemporary Islamic teaching methodologies and introduce technologies and skills relevant to current societal developments (Rasyidi, 2020). According to the results of a study by Iqbal & Hasibuan (2024) this transformation is evident in the change from an individual teaching model to a classical system, as well as the integration of formal and non-formal education. Modern Pesantren not only focus on teaching classical texts but also adopt contemporary literature and implement curricula recognized nationally and internationally (Maghfirotnunisa, 2023).

Learning methods commonly used in pesantren, such as sorogan and bandongan, represent important pedagogical traditions that contribute to the development of students' cognitive abilities (Salam, Shidqi, & Yozi, 2025). However, according to research Mawaddah (2022), the classical learning model in pesantren has a weakness, namely teacher-centered learning. As a result, learning tends to be one-way, and transformation is needed to make it student-centered learning in order to achieve critical and active thinking skills (Zubaidah, 2016).

Various studies show the urgency of active learning to improve students' thinking skills. As stated by Humam & Hanif (2025), students who are actively involved in the learning process have better analytical and evaluative skills than students who only receive passive learning methods. Active learning strategies can improve critical and collaborative thinking skills. Furthermore, Razak et al. (2025) state that active learning models can significantly improve students' understanding of the material and learning outcomes.

Although many studies emphasize the importance of active learning and student participation in the learning process, the implementation of such approaches in pesantren environments remains an important issue. Religious learning in pesantren is often associated with the transmission of normative and doctrinal knowledge, where students are expected to receive and internalize religious teachings delivered by teachers. This situation raises an important question regarding whether rational cognitive processes, as proposed in Piaget's theory of cognitive development, can develop within a learning environment that is strongly influenced by religious authority and textual traditions.

In Piaget's educational psychology, the cognitive development theory describes that a person's learning process involves assimilation and accommodation of new things in accordance with the individual's stage of thinking. This means that Piaget views students as active subjects in learning. Thus, learning is not simply acquired but is constructed through new knowledge built or constructed by the students themselves (Utami, 2016). Constructivist learning is a learning model that emphasizes student activity in every interaction to discover their own knowledge. This principle aligns with cognitive theory, which promotes learning based on

students' cognitive levels and positions them as active subjects in the learning process (Azzahra, 2025).

The findings of Mutiara (2025) show that the constructivist approach in Islamic Religious Education can increase student engagement and provide a deeper and more contextual understanding of religion. Furthermore, research by Ilham & Eka (2024) confirms that although education is often viewed as a dogmatic subject, the constructivist approach can provide space for students to think more critically and reflectively about Islamic values (ismanyanti, 2023) This shows that Piaget's theory is relevant for use in Islamic education, including in modern pesantren.

While Piaget's cognitive development theory has been widely applied in general educational contexts, its application within pesantren environments has received relatively limited scholarly attention. Most previous studies have focused on formal school settings, while the interaction between cognitive constructivism and the epistemological framework of Islamic religious education remains underexplored. Therefore, examining how students in pesantren demonstrate cognitive reasoning processes in their learning activities becomes an important area of investigation.

Dhobith (2025) emphasizes that educators should pay more attention to cognitive abilities rather than just delivering material. According to the results of Khotimah's, (2023) research, methods that can be used to develop cognitive theory in early childhood include playing, storytelling, singing, demonstrations, experiments, and discussions. Meanwhile, Rofi'i (2024) found that students in pesantren who are older than 11 years old are in a transitional period between concrete operational and formal operational stages, thus requiring a learning approach that is tailored to these developmental characteristics.

This study examines how religious learning in pesantren can be understood through the perspective of cognitive development theory, particularly in relation to students' reasoning processes when engaging with religious concepts and social issues.

Jean Piaget's cognitive theory has the advantage of providing a systematic explanation of the stages of children's intellectual development, namely the sensorimotor stage, preoperational stage, concrete operational stage, and formal operational stage (Britannica Editor, 2025). This theory forms the basis for the understanding that learning must be adapted to the level of thinking ability of students so that they can be involved in active learning (Suparno, 2020) . Factors that influence cognitive ability consist of two factors, namely internal factors, which include heredity and talent, and external factors, which include the environment, formation, and freedom. Meanwhile, external factors include the environment, socialization, and freedom (Rofi'i, 2024).

Imam et al. (2024) emphasize that learning in pesantren has considered the stages of students' cognitive development and encourages activities such as discussion, memorization, observation, cooperation, and language practice. (Muhajirin, 2025). Piaget's theory offers a methodological basis that can enrich the Islamic Religious Education learning process to make it more meaningful and reflective (David W. Jardine, 2006). However, most previous studies have examined cognitive development theory primarily in formal school settings, while its application within pesantren environments remains relatively underexplored.

Therefore, this study aims to investigate how cognitive processes related to Piaget's theory manifest in learning practices at a modern pesantren, particularly through

activities such as discussions, lectures, youth research projects, and open academic examinations. The study focuses on analyzing how these activities reflect students' cognitive reasoning processes in accordance with Piaget's cognitive development theory (Ayu & Sari, 2025).

This study contributes to the academic discussion on the relationship between cognitive constructivism and Islamic religious education. While previous studies have largely examined Piaget's cognitive development theory in formal school settings, limited research has explored how this theory operates within pesantren environments where religious authority and textual traditions are strongly embedded. Therefore, this study provides new empirical insights into how cognitive reasoning processes emerge within pesantren learning activities, particularly through muhadharah, discussion forums, youth scientific work (KIR), and public academic examinations.

Method

This study employed a descriptive qualitative approach to explore how cognitive development theory is reflected in learning practices within a modern pesantren. The research was conducted at the Modern Pesantren Prof. Muhajirin in Palembang, Indonesia (Noble & Heale, 2019) .

The participants in this study consisted of 75 students aged between 12 and 15 years who were enrolled in the junior secondary education program at the pesantren. Participants were selected using purposive sampling to ensure that they were actively involved in pesantren learning activities such as muhadharah, group discussions, youth scientific work programs, and public academic examinations. Teachers and administrators who were directly involved in supervising these activities were also selected as key informants.

Data were collected through three main techniques: observation, interviews, and documentation analysis. Observation sheets were used to examine the implementation of learning activities, including teaching methods, media, and learning resources. The observation sheets were completed by the researcher during the observation process. Semi-structured interviews were conducted using an interview guide developed based on Piaget's stages of cognitive development. The interview guide consisted of four main indicators that were further developed into 20 questions. These interviews explored learning models used in the pesantren, the institutional vision and mission, and detailed information about muhadharah programs, discussions, youth scientific work, and public examinations. Documentation data included lesson plans, activity modules, and student reports.

Data analysis was conducted using the interactive analysis model proposed by Miles, Huberman, and Saldaña (2014). This model consists of three main stages: data condensation, data display, and conclusion drawing. During the condensation stage, the researcher selected and simplified the collected data from observations, interviews, and documentation. The data were then organized into thematic displays to facilitate interpretation. Finally, conclusions were drawn by identifying patterns related to students' cognitive reasoning processes in learning activities within the pesantren environment.

To ensure the credibility of the data, the research instruments were validated through expert judgment involving experienced Islamic education teachers and educational practitioners within the pesantren. Data reliability was strengthened through triangulation of sources, techniques, and time by comparing information obtained from observations, interviews, and documentation conducted at different periods (Imam et al, 2024) .

Results

This section presents the findings of the study based on observations, interviews, and document analysis conducted in the pesantren environment. To further understand the relationship between learning activities and students' cognitive development, the observations were categorized according to indicators of formal operational thinking based on Piaget's theory. The results of these observations are summarized in Table 1.

Table 1. Indicators of Cognitive Development in Learning Activities

Learning Activity	Observed Cognitive Indicator	Description
Muhadharah	Abstract reasoning	Students connect Islamic teachings with contemporary social issues such as social media ethics and environmental responsibility.
Group discussion	Logical argumentation	Students present arguments, respond to opposing opinions, and defend their ideas using religious references.
Youth Scientific Work (KIR)	Hypothesis formulation	Students identify research problems, formulate questions, and analyse collected data.
Public examination	Systematic reasoning	Students present research findings and explain their conclusions in front of teachers and peers.

These findings indicate that the learning activities in the pesantren environment provide opportunities for students to demonstrate higher-order thinking skills consistent with the characteristics of the formal operational stage.

Research Setting and Participants

The research was conducted at the Moderen Pesantren Prof. Muhajirin in Palembang, located on Jl. Soekarno-Hatta RT.48 RW.10, Demang Lebar Daun. The pesantren provides formal junior secondary education and all students reside in the dormitory environment. This study focuses on learning activities conducted within the pesantren dormitory.

A total of 75 students participated in this study. They were divided into three classes and were aged between 12 and 15 years. In addition, the institution is supported by nine teachers consisting of five male and four female teachers with educational backgrounds in Islamic Education and Islamic Studies.

Muhadharah Activities

Muhadharah activities are conducted once a week with different themes. Students take turns presenting speeches, while other students act as audience members who ask questions and provide responses. The activity is guided by a moderator

who manages the discussion process and a supervising teacher who provides reflections at the end of the activity.

The themes presented include Islamic ethics, monotheism, moral values, the biography of the Prophet, fiqh, and contemporary Islamic issues. Observation results indicate that students are able to prepare speech texts independently, present arguments logically, and respond critically to questions from their peers.

Youth Scientific Work (KIR)

Youth Scientific Work (KIR) activities are designed to develop students' scientific writing skills, research abilities, and analytical thinking (Retno Mutiasary, 2023). Students conduct simple research through several stages, including identifying research problems, formulating questions, collecting data, compiling reports, and presenting their findings (Bahar & Ekafitri, 2023).

Each semester, different themes are assigned by the supervising teacher. Examples of topics include the influence of gadget use on learning achievement, dormitory environmental hygiene, students' sleeping patterns and memory, and reading interest among pesantren residents.

Public Examination Activities

Public examinations are conducted at the end of each semester to evaluate students' academic abilities in Islamic studies. During this activity, students present scientific speeches, research findings, or academic discussions in front of teachers and peers.

For example, students present topics such as "Social Media Ethics in Islam" by relating contemporary social media phenomena with verses from the Qur'an and Islamic teachings. The examination board provides feedback and evaluates students' understanding and presentation skills.

Interview Findings

Interviews were conducted with teachers of Aqidah Akhlak, Qur'an and Hadith, and Arabic. Teachers explained that the learning process does not rely solely on lecture-based teaching but also includes discussions and problem-solving activities.

Interviews with academic administrators also revealed that the pesantren aims to develop students who are intellectually capable, communicative, and able to apply Islamic values in their daily lives.

One teacher explained that discussion-based learning is intentionally implemented to encourage students to develop reasoning skills: "Students are encouraged to express their opinions during discussions and muhadharah activities. Through this process, they learn not only to memorize religious texts but also to understand and explain them logically."

Similarly, an academic administrator emphasized the importance of communication and analytical thinking in pesantren education: "Our goal is to develop students who are able to think critically, communicate effectively, and relate Islamic teachings to real social problems."

These interview findings confirm that the pesantren intentionally promotes learning activities that stimulate students' cognitive reasoning processes.

Document Analysis

Document analysis included lesson plans, syllabi for Islamic subjects, discussion modules, youth scientific work reports, and public examination assessment instruments. These documents indicate that learning activities emphasize student participation through presentations, discussions, and collaborative academic work.

Overall, the findings indicate that learning activities in the pesantren emphasize student participation through discussion, presentation, and collaborative academic work, which provide opportunities for students to actively engage in knowledge construction.

Discussion

This section discusses the research findings in relation to Piaget's cognitive development theory and constructivist learning perspectives. The discussion focuses on how the observed learning activities reflect students' cognitive development, particularly within the formal operational stage described by Piaget.

Learning Practices and the Formal Operational Stage

Students aged between 12 and 15 years are generally in the formal operational stage according to Piaget's cognitive development theory (Marinda, 2023). At this stage, individuals develop the ability to think abstractly, reason logically, and formulate hypotheses. The learning activities observed in the pesantren environment, such as discussions, presentations, and scientific writing, indicate that students demonstrate these cognitive characteristics through argumentation, problem solving, and reflective thinking.

Inquiry and Discussion as Constructivist Learning

The implementation of discussions and inquiry-based learning places students as active participants in constructing knowledge (Saputri & Fauziddin, 2022). In Piaget's perspective, learning occurs when individuals interact with problems that challenge their existing cognitive structures.

For example, provocative questions such as "Why are humans required to worship God?" can trigger cognitive disequilibrium, encouraging students to reorganize their thinking structures through processes of assimilation and accommodation (Jean Piaget & Barbel Inhelder, 2018; Mubarak, 2025). This process encourages students to actively construct knowledge rather than passively receiving information from teachers.

From a Piagetian perspective, the learning situations observed in the pesantren environment can be interpreted as cognitive processes involving assimilation, accommodation, and equilibration. When students encounter new questions or perspectives during discussions, they attempt to integrate new information into their existing cognitive structures through assimilation. When the new information challenges their prior understanding, they modify their cognitive structures through accommodation. The interaction between these two processes leads to cognitive equilibrium, which enables students to develop more advanced reasoning abilities.

Such learning situations allow students to experience cognitive conflict, which is an important mechanism in Piagetian constructivism for developing higher-order thinking skills.

Muhadharah and Hypothetical Reasoning

Muhadharah activities function not only as public speaking training but also as opportunities for students to practice abstract and hypothetical reasoning. Through presenting arguments and responding to questions from their peers, students demonstrate the ability to analyze ideas critically and construct logical explanations (Magdalena, 2023).

Scientific Reasoning in KIR and Public Examination

KIR activities and public examinations encourage the development of scientific reasoning. Students are required to identify problems, collect data, and present their findings. This process reflects the accommodation mechanism in Piaget's theory, where individuals adjust their cognitive structures to new information (Winingsih & Yunaini, 2022; Rokhmah, 2024).

Public examinations also represent a form of cognitive equilibrium, where students reorganize their knowledge structures in order to achieve conceptual consistency (Rubi Babullah, 2022; Fernando & Ismail, 2023).

Cognitive, Affective, and Social Impacts

The application of cognitive development theory in learning activities also has broader impacts on students' cognitive, affective, and social development. Students demonstrate improvements in critical thinking, logical reasoning, and collaborative learning (Istiqomah & Maemonah, 2021). In addition, these activities contribute to the development of confidence, cooperation, and respect for different perspectives within group discussions (Ni'amah & M, 2021; Maghfirotunnisa, 2023).

These findings indicate that learning practices in the pesantren environment not only contribute to students' cognitive development but also enhance their affective and social competencies. Furthermore, the results contribute to a broader discussion regarding the compatibility between cognitive constructivism and Islamic education. The pesantren learning tradition, which integrates religious instruction with discussions, lectures, and research activities, appears to support the development of higher-order thinking skills. This suggests that religious educational environments are not necessarily limited to the transmission of doctrine but can also function as spaces for analytical, reflective, and participatory learning

Conclusion

This study demonstrates that the application of Jean Piaget's cognitive development theory in the learning practices of the Modern Pesantren Prof. Muhajirin is reflected not only in instructional strategies but also in students' cognitive abilities to develop abstract, logical, and hypothetical reasoning. Learning activities such as discussions, inquiry-based learning, muhadharah, Youth Scientific Work (KIR), and public examinations provide opportunities for students to actively engage in the cognitive processes of assimilation, accommodation, and equilibration, which are characteristic of the formal operational stage.

The findings indicate that Piaget's cognitive development theory is compatible with the educational practices of modern pesantren. Cognitive constructivism can support the transformation of religious learning from a predominantly doctrinal approach into a more reflective, analytical, and participatory process. In this context, the integration of cognitive development theory contributes to strengthening students' critical thinking, problem-solving abilities, and systematic reasoning, while also encouraging confidence, responsibility, and effective communication.

Furthermore, the results show that students are able to connect Islamic values with contemporary social issues, such as social media ethics, environmental awareness, and healthy lifestyles. This suggests that learning in pesantren not only enhances academic understanding but also contributes to the development of reflective and socially responsible behavior.

However, this study is limited to a single institutional setting and relies on a descriptive qualitative approach that primarily captures observable learning practices rather than directly measuring students' internal cognitive processes. Therefore, future research should employ more comprehensive approaches, such as mixed methods or experimental designs, to examine students' cognitive development more directly. Further studies are also needed to explore the relationship between cognitive constructivism and religious epistemology across diverse Islamic educational contexts.

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