



## RESEARCH ARTICLE

# Fostering madrasah teachers' divergent thinking: The role of metacognitive skills and professional development

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**Abstract:** This study examines how madrasah teachers foster divergent thinking through metacognitive awareness and professional development within the context of contemporary Islamic education. The research aims to explore teachers' lived experiences in developing creative instructional strategies and reflective teaching practices that respond to students' diverse learning needs. A qualitative phenomenological approach was employed to gain an in-depth understanding of the phenomenon. The participants consisted of 21 madrasah teachers selected through purposive sampling. Data were collected through in-depth semi-structured interviews and analyzed using phenomenological thematic analysis to identify key themes related to teachers' experiences in developing innovative teaching practices. The findings reveal that teachers' divergent thinking develops through three interconnected processes: classroom experiences that stimulate creative instructional experimentation, metacognitive reflection that supports adaptive teaching practices, and professional development activities that enhance pedagogical innovation. Teachers reported that reflective thinking enables them to evaluate instructional strategies and generate alternative learning approaches that better engage students. The novelty of this study lies in integrating divergent thinking, metacognition, and professional development within the framework of contemporary Islamic educational values, including *ijtihad*, *muhasabah*, *hikmah*, and *shura*. However, the study is limited to a specific madrasah context and qualitative data. The findings imply that strengthening reflective professional development programs can promote innovative teaching practices and improve the quality of Islamic education.

**Keywords:** divergent thinking, metacognitive skills, professional development, madrasa teacher, Islamic education.

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## 1. Introduction

The accelerating transformation of the twenty-first-century knowledge society has intensified the demand for creative and adaptive thinking skills in education systems worldwide. Contemporary educational discourse increasingly emphasizes the importance of higher-order thinking abilities, including creativity, critical thinking, and problem-solving, as essential competencies for navigating complex and uncertain global challenges (van Dorresteijn et al., 2024; Henriksen et al., 2021; Abdullah et al., 2025). Within this context, divergent thinking, defined as the ability to generate multiple novel and flexible ideas when addressing problems, has become a central construct in research on creativity and innovation in education (Runco & Acar, 2020). Divergent thinking is widely recognized as a fundamental cognitive process that enables teachers to design innovative instructional strategies and facilitate meaningful learning experiences that encourage students' creativity and intellectual exploration (Beghetto & Kaufman, 2021).

Teachers play a pivotal role in cultivating classroom environments that support creative learning and higher-order thinking. Studies in educational psychology indicate that teachers' cognitive dispositions, including their capacity for divergent thinking, significantly influence instructional innovation and the quality of classroom interaction (Henriksen et al., 2021). Teachers who demonstrate high levels of creative and flexible thinking are more capable of implementing learner-centered pedagogies, encouraging open-ended inquiry, and adapting instructional approaches to diverse learning needs (Fischer et al., 2022; Rawlings et al., 2025). Consequently, strengthening teachers' creative cognitive capacities has become a strategic priority in global educational reforms aimed at improving the quality of teaching and learning.

Recent research increasingly highlights the importance of metacognitive skills as a critical factor supporting teachers' higher-order cognitive processes. Metacognition refers to an individual's awareness and regulation of their own thinking processes, including planning, monitoring, and evaluating cognitive strategies during problem-solving activities (Byrge, Guzik, & Gilde, 2025; Veenman, 2021). In educational contexts, teachers' metacognitive awareness enables them to reflect on instructional practices, analyze classroom challenges, and generate alternative solutions for improving learning outcomes (Zohar & Barzilai, 2022). Empirical evidence suggests that metacognitive competence enhances teachers' capacity for reflective practice, adaptive expertise, and creative instructional design (Dignath & Veenman, 2021).

In addition to metacognitive competence, professional development represents another key mechanism for improving teachers' cognitive and pedagogical capacities. Continuous professional development programs provide opportunities for teachers to expand their pedagogical knowledge, engage in collaborative learning, and develop innovative teaching strategies (Desimone & Garet, 2020). Effective professional development initiatives have been shown to enhance teachers' instructional quality and promote reflective and creative teaching practices that support students' higher-order thinking skills (Darling-Hammond et al., 2021). Furthermore, professional development that integrates reflective practice and collaborative inquiry can strengthen teachers' capacity to experiment with new pedagogical approaches and foster creative learning environments.

Despite the growing body of literature on teacher cognition and professional learning, relatively limited research has examined these constructs within the context of Islamic educational institutions, particularly madrasahs in Indonesia. Madrasahs represent a distinctive educational subsystem that combines national curriculum standards with Islamic educational values and traditions. In recent years, the Indonesian government has implemented several reforms aimed at improving the quality of madrasah education, including initiatives to strengthen teacher competence and promote professional learning programs (Azra, Afrianty, & Hefner, 2021). These reforms reflect a growing recognition that teacher quality plays a crucial role in enhancing the effectiveness and competitiveness of Islamic education systems.

However, empirical studies suggest that madrasah teachers often face structural and pedagogical challenges that may limit the development of innovative teaching practices. These challenges include limited access to sustained professional development, traditional pedagogical orientations that emphasize knowledge transmission, and insufficient support for reflective teaching practices (Tan, 2020; Lukens-Bull, 2021). Such conditions may constrain teachers' opportunities to cultivate creative cognitive capacities, including divergent thinking, which are essential for fostering innovative learning environments in contemporary education. While

previous studies have examined metacognition, teacher professional development, and creativity in education, these variables are often investigated independently. Much of the existing literature focuses either on students' creative thinking or on general teacher professional competence, leaving limited empirical exploration of how teachers' metacognitive skills and professional development experiences interact to influence their divergent thinking abilities (Fischer et al., 2022). Moreover, studies addressing these relationships in Islamic educational contexts remain scarce in international scholarship. This limitation highlights a significant research gap in understanding the cognitive mechanisms that support creative teaching practices within madrasah education systems.

Addressing this gap is essential for advancing both theoretical and practical perspectives in teacher education research. From a theoretical standpoint, examining the interplay between metacognitive skills and professional development can contribute to a deeper understanding of how teachers develop creative cognitive capacities in professional learning contexts. From a practical perspective, identifying factors that foster teachers' divergent thinking may inform policy and institutional strategies aimed at strengthening teacher professionalism and instructional innovation in madrasah education. Therefore, the novelty of this study lies in its integrative approach that simultaneously examines the influence of metacognitive skills and professional development on madrasah teachers' divergent thinking. By focusing on teachers in Madrasah Aliyah (Islamic senior secondary schools) in Indonesia, this research contributes new empirical insights to the growing literature on teacher cognition, professional learning, and creative pedagogy within Islamic education contexts.

Based on these considerations, the objective of this study is to investigate the role of metacognitive skills and professional development in fostering divergent thinking among madrasah teachers. Specifically, this research seeks to analyze how teachers' metacognitive awareness and engagement in professional development activities contribute to their capacity to generate innovative teaching ideas and flexible instructional strategies. The focus of the study is to explore; (1) how madrasah teachers experience and interpret the development of divergent thinking in their instructional practices, particularly in generating creative ideas and alternative teaching strategies; (2) how teachers understand and apply metacognitive processes—such as planning, monitoring, and evaluating their teaching—in supporting reflective and innovative instructional practices; (3) how teachers experience professional development activities and how these experiences contribute to shaping their capacity to foster divergent thinking in the madrasah learning environment.

## **2. Literature review**

### **2.1. Divergent thinking in education**

Divergent thinking has been widely recognized as a central dimension of creativity that enables individuals to generate multiple, flexible, and original ideas in response to complex problems (Runco & Acar, 2020). In educational contexts, divergent thinking is particularly important because it supports innovative instructional practices and promotes the development of higher-order cognitive skills among both teachers and students (Henriksen et al., 2021). Scholars argue that teachers who possess strong divergent thinking abilities are more capable of designing creative learning environments, integrating diverse pedagogical strategies, and encouraging students to explore alternative perspectives during learning activities (Beghetto & Kaufman, 2021). Furthermore, divergent thinking among teachers has been associated with the implementation of learner-centered pedagogies that emphasize inquiry-based learning, collaborative problem-solving, and creative exploration in classrooms (Fischer, Malycha, & Schafmann, 2022).

Recent empirical studies indicate that teachers' divergent thinking significantly influences classroom innovation and instructional adaptability (Gajda, Beghetto, & Karwowski, 2021). Teachers who demonstrate higher levels of creative thinking tend to adopt flexible instructional approaches that allow them to adjust teaching strategies according to students' needs and contextual learning conditions (Henriksen et al., 2021). In addition, divergent thinking contributes to teachers' ability to generate novel teaching ideas, develop interdisciplinary learning activities, and create intellectually stimulating learning environments that foster students' curiosity and

creativity (Fischer et al., 2022). Consequently, fostering divergent thinking among teachers has become a crucial objective in contemporary teacher education and professional learning programs.

## **2.2. Metacognitive skills in teaching**

Metacognitive skills refer to individuals' awareness and regulation of their own cognitive processes, including planning, monitoring, and evaluating thinking strategies during learning and problem-solving activities (Veenman, 2021). In educational settings, metacognition plays a vital role in supporting reflective teaching practices and improving instructional decision-making processes (Zohar & Barzilai, 2022). Teachers with strong metacognitive awareness are better able to evaluate their instructional effectiveness, identify learning challenges, and adapt teaching strategies to enhance students' understanding (Dignath & Veenman, 2021).

Research in educational psychology suggests that metacognitive competence contributes significantly to the development of higher-order thinking abilities, including creativity and critical thinking (Schraw, 2020). Through metacognitive reflection, teachers can analyze their pedagogical practices, assess the outcomes of instructional strategies, and generate alternative approaches for improving learning processes (Zohar & Barzilai, 2022). Such reflective processes enable teachers to become more adaptive and innovative in their teaching practices, thereby enhancing their capacity for divergent thinking in classroom contexts (Rohatgi, & Hatlevik, 2026; Dignath & Veenman, 2021). Therefore, metacognitive skills are increasingly regarded as a key component of teacher professionalism and cognitive development in contemporary educational research.

## **2.3. Professional development and teacher innovation**

Professional development represents a fundamental mechanism for improving teachers' professional competence and instructional effectiveness (Darling-Hammond, Hyler, & Gardner, 2021). Contemporary models of teacher professional development emphasize collaborative learning, reflective inquiry, and continuous professional growth as essential components for enhancing teaching quality (Desimone & Garet, 2020). Effective professional development programs provide teachers with opportunities to engage in pedagogical experimentation, exchange ideas with colleagues, and reflect critically on their instructional practices (Darling-Hammond et al., 2021).

Recent research has demonstrated that sustained professional development initiatives can significantly influence teachers' instructional innovation and creativity (Fischer et al., 2022). Professional learning communities and collaborative professional development activities enable teachers to explore new teaching strategies, develop creative instructional materials, and implement innovative pedagogical approaches in their classrooms (Tambak, & Sukenti, 2025). Furthermore, professional development programs that integrate reflective dialogue and collaborative inquiry have been shown to enhance teachers' adaptive expertise and creative thinking capacities (Avalos, 2021). As a result, professional development is increasingly recognized as a critical factor in supporting teachers' cognitive and pedagogical transformation in modern educational systems.

Madrasahs constitute a distinctive educational system that integrates general education with Islamic values and religious instruction (Tan, 2020). In Indonesia, madrasahs play a significant role in providing education for millions of students across diverse social and cultural contexts (Azra, Afrianty, & Hefner, 2021). Despite their important educational function, madrasah teachers often face challenges related to limited professional development opportunities, traditional pedagogical approaches, and institutional constraints that may restrict instructional innovation (Lukens-Bull, 2021). Several recent studies highlight the need to strengthen teacher competence and professional learning in madrasah education to enhance the quality of teaching and learning (Tan, 2020). Improving teachers' cognitive capacities, including creative thinking and reflective teaching practices, is considered essential for enabling madrasah teachers to respond effectively to the evolving demands of contemporary education (Azra, Afrianty, & Hefner, 2021). However, empirical research examining how metacognitive skills and professional development contribute to fostering divergent thinking among madrasah teachers remains relatively limited in the international literature. Therefore, further investigation is required to

understand how teachers' metacognitive awareness and professional learning experiences shape their creative thinking capacities within madrasah contexts. Such understanding is essential for developing effective teacher education strategies that support innovative teaching practices and improve the quality of Islamic education in Indonesia.

### **3. Method**

#### **3.1. Research design**

This study employed a qualitative phenomenological research design to explore the lived experiences of madrasah teachers in fostering divergent thinking through metacognitive awareness and professional development (Creswell & Poth, 2022). Qualitative research is particularly appropriate for investigating complex educational phenomena because it enables researchers to gain deep insights into participants' perspectives, interpretations, and social experiences within specific contexts (Merriam & Tisdell, 2021). Within qualitative traditions, phenomenology focuses on understanding how individuals experience and interpret a particular phenomenon in their everyday professional and social lives (Neubauer, Witkop, & Varpio, 2019). The phenomenological approach seeks to uncover the essence of participants' lived experiences by examining how individuals construct meaning from their interactions with a specific phenomenon (Moustakas, 1994; Creswell & Poth, 2022). In the context of this study, phenomenology allows for an in-depth exploration of teachers' perceptions and experiences related to divergent thinking, metacognitive reflection, and professional development in madrasah education. Such an approach is particularly relevant for understanding cognitive and reflective teaching practices that cannot be fully captured through quantitative measurements (Van Manen, 2017; Creswell & Poth, 2022).

By focusing on teachers' subjective interpretations and professional experiences, this study aims to generate rich and contextualized insights into the cognitive processes that support innovative teaching practices in Islamic secondary schools. Phenomenological inquiry emphasizes participants' narratives as primary sources of knowledge, enabling researchers to capture the complexity and depth of human experiences within educational environments (Merriam & Tisdell, 2021).

#### **3.2. Research setting and participants**

The study was conducted in several Madrasah Aliyah (Islamic senior secondary schools) in Pekanbaru, Indonesia. Madrasah Aliyah represents an important component of the Indonesian educational system that integrates national curriculum standards with Islamic educational principles and values (Tan, 2020). These institutions play a significant role in shaping students' intellectual and moral development while maintaining a strong emphasis on religious education (Azra, Afrianty, & Hefner, 2021). The participants of this study consisted of madrasah teachers who had relevant teaching experience and had participated in professional development programs. In qualitative research, participants are selected based on their ability to provide rich and meaningful information related to the phenomenon being investigated (Creswell & Poth, 2022). Therefore, this study employed purposive sampling, which allows researchers to intentionally select participants who possess specific experiences relevant to the research objectives (Merriam & Tisdell, 2021).

The selection criteria for participants included several considerations. First, participants were required to have a minimum of three years of teaching experience in madrasah education to ensure that they possessed sufficient professional exposure to instructional practices and pedagogical challenges. Second, participants were expected to have participated in professional development programs, such as teacher workshops, training sessions, or teacher learning communities, which are important contexts for developing reflective and innovative teaching practices (Darling-Hammond, Hyler, & Gardner, 2021). Third, participants were selected based on their active involvement in instructional planning and classroom innovation, as these characteristics are closely associated with teachers' creative and reflective thinking processes. In phenomenological research, the number of participants is typically small because the primary objective is to gain deep insights into participants' lived

experiences rather than to achieve statistical generalization (Creswell & Poth, 2022). Accordingly, this study involved 21 madrasah teachers, which aligns with commonly recommended sample sizes for phenomenological studies (Merriam & Tisdell, 2021).

### **3.3. Data collection**

Data were collected through in-depth semi-structured interviews, which are widely used in qualitative research to obtain detailed descriptions of participants' experiences and perceptions (Kallio et al., 2016). Semi-structured interviews allow researchers to explore predetermined topics while also providing flexibility for participants to elaborate on their experiences and introduce new insights related to the research phenomenon (Merriam & Tisdell, 2021). Each interview lasted approximately 45–60 minutes, which provided sufficient time for participants to reflect on and articulate their experiences in depth. Interviews were conducted either face-to-face or through online communication platforms, depending on participants' availability and contextual considerations. Conducting interviews in flexible formats is recommended in qualitative research to facilitate participants' comfort and encourage open communication (Creswell & Poth, 2022).

The interview protocol was designed to explore several aspects related to the research focus. These aspects included teachers' experiences in generating creative instructional ideas, their metacognitive reflection during teaching practices, their engagement in professional development programs, and the challenges they encountered in fostering innovative teaching strategies in madrasah contexts. Open-ended questions were used to encourage participants to provide rich descriptions of their experiences and reflections (Kallio et al., 2016). In addition to interviews, field notes and reflective observations were used to complement the interview data. Field notes allow researchers to capture contextual information, nonverbal expressions, and situational factors that may influence participants' experiences (Merriam & Tisdell, 2021). The combination of multiple data sources helps strengthen the depth and richness of qualitative data.

### **3.4. Data analysis**

The interview data were analyzed using phenomenological thematic analysis, following the procedures proposed in Colaizzi's phenomenological method (Colaizzi, 1978; Morrow, Rodriguez, & King, 2015). This analytical approach aims to identify the core meanings embedded within participants' narratives and to construct a comprehensive description of the phenomenon under investigation. The analysis process involved several systematic steps. First, the researcher conducted familiarization with the data by repeatedly reading the interview transcripts in order to gain a holistic understanding of participants' experiences. Second, the researcher identified significant statements that directly related to the phenomenon of teachers' divergent thinking, metacognitive reflection, and professional development. Third, the researcher formulated meanings from these statements in order to capture the underlying cognitive and professional experiences expressed by participants. The next step involved organizing the formulated meanings into thematic categories that represent common patterns across participants' experiences. These themes were then integrated into a comprehensive description that reflects the essence of madrasah teachers' experiences in fostering divergent thinking through metacognitive awareness and professional learning processes. The final stage of analysis involved validating the thematic interpretation by comparing the results with the original interview data.

## **4. Result**

The findings of this study are organized into three major themes corresponding to the research focus: (1) teachers' experiences in developing divergent thinking, (2) teachers' metacognitive awareness in teaching practices, and (3) teachers' professional development experiences in supporting creative teaching. The analysis was derived from in-depth interviews with twenty-one madrasah teachers. Each theme reflects shared patterns of meaning emerging from participants' lived experiences. These findings reveal how divergent thinking among madrasah teachers develops through reflective cognitive processes and professional learning environments.

#### 4.1. Teachers' experiences in developing divergent thinking

The analysis of interview data indicates that madrasah teachers perceive divergent thinking as the ability to generate diverse instructional ideas and to adapt teaching strategies creatively according to students' learning needs. Teachers reported that divergent thinking is often stimulated by classroom challenges, particularly when students struggle to understand the material through conventional teaching methods. In such situations, teachers tend to experiment with alternative learning activities in order to make lessons more engaging and meaningful. The participants emphasized that divergent thinking is closely related to teachers' creativity in lesson design and their willingness to explore innovative pedagogical approaches. Furthermore, teachers explained that divergent thinking enables them to integrate various teaching strategies such as discussions, collaborative projects, storytelling, and problem-based learning activities. These practices encourage students to participate actively in the learning process and stimulate intellectual curiosity. As a result, divergent thinking becomes an important element in developing dynamic and student-centered classroom environments in madrasah education.

Another important finding is that teachers often develop divergent thinking through repeated classroom experiences. Many participants explained that teaching diverse groups of students encourages them to think creatively about how learning materials should be delivered. Teachers reported that each classroom situation requires different instructional responses, which motivates them to explore alternative ways of explaining concepts and engaging students. In this process, teachers gradually develop the capacity to view instructional problems from multiple perspectives. This ability helps teachers design learning activities that accommodate students' different learning styles and cognitive abilities. Over time, these experiences strengthen teachers' confidence in applying creative teaching strategies. Consequently, divergent thinking becomes an integral component of teachers' professional competence. One teacher explained how divergent thinking influences his instructional practices:

"In my experience as a teacher, divergent thinking means being able to see many possibilities when teaching a lesson. Sometimes students do not respond well to one teaching method, so I try to explore different strategies such as group discussions, role-playing, or problem-solving activities. By using various approaches, students become more interested in learning and they begin to express their own ideas." (T04).

Similarly, another teacher emphasized the importance of exploring alternative teaching strategies:

"When I prepare my lessons, I always try to think of different ways to present the material. If students seem bored or confused, I change my strategy and introduce activities that allow them to interact more actively with the lesson. This process requires creativity and flexibility, which I believe are important aspects of divergent thinking." (T12).

Another participant also highlighted how classroom challenges stimulate creative teaching:

"In madrasah classrooms, students often have different abilities and interests. This situation encourages me to think creatively about how to teach the material effectively. I often experiment with new teaching strategies because I believe that students learn better when the lesson is engaging and varied." (T19).

Teachers also highlighted the importance of openness to new ideas in developing divergent thinking. Participants explained that teachers who are willing to experiment with different teaching strategies tend to develop stronger creative abilities. Such openness encourages teachers to continuously explore new instructional techniques that improve classroom interaction. Teachers reported that divergent thinking helps them transform traditional teacher-centered approaches into more interactive learning experiences. Through these processes, students become more actively involved in discussions, collaborative tasks, and critical inquiry. These findings demonstrate that divergent thinking plays a vital role in supporting innovative teaching practices in madrasah classrooms. One participant described how divergent thinking influences instructional practices:

"In my experience as a teacher, divergent thinking means being able to approach teaching from many different angles. When students do not understand the lesson, I try to present the material in another way so that it becomes clearer. Sometimes I use group discussions, and other times I introduce problem-solving activities. I believe that teaching should not rely on only one strategy because students have different ways of learning. When I experiment with different approaches, I notice that students become more interested in the lesson. This process encourages them to express their ideas and participate more actively in class. For me, divergent thinking is essential for making learning meaningful and engaging." (T03).

Another teacher expressed a similar experience:

“Teaching in madrasah requires creativity because students come from diverse backgrounds and have different learning abilities. I often try to design lessons that allow students to think independently and share their opinions. If one method does not work effectively, I try another approach that encourages more interaction. I believe that teachers must always be flexible in responding to classroom situations. Through this process, I gradually develop new teaching ideas that make learning more interesting. Students become more enthusiastic when the lesson involves discussion and collaborative activities. Therefore, divergent thinking helps me create a learning environment that motivates students to explore knowledge more deeply.” (T09).

A third participant also described similar experiences:

“When planning my lessons, I usually think about several possible ways to present the material. I consider how students might respond to each activity and which strategy might help them understand the topic better. Sometimes I combine storytelling with group discussions to make the lesson more engaging. I also encourage students to ask questions and share their perspectives during the learning process. These strategies help students feel more involved in the classroom. Over time, I realize that exploring different teaching methods improves the effectiveness of my lessons. This experience shows me that divergent thinking is an important skill for teachers.” (T15).

#### **4.2. Teachers’ metacognitive awareness in teaching practices**

The second theme emerging from the data relates to teachers’ metacognitive awareness in teaching practices. Participants explained that reflective thinking is an important aspect of their professional activities. Teachers frequently evaluate their instructional strategies in order to understand how effectively students respond to the learning process. This reflection helps teachers identify strengths and weaknesses in their teaching methods. Through continuous reflection, teachers become more aware of how their instructional decisions influence student learning outcomes. Such awareness enables teachers to adjust their teaching strategies according to classroom dynamics. Consequently, metacognitive reflection becomes an essential mechanism for improving teaching effectiveness.

Participants also described how metacognitive awareness occurs during different stages of the teaching process. Teachers reported that they engage in reflective thinking when planning lessons, during classroom instruction, and after completing teaching sessions. During lesson planning, teachers carefully consider how to organize learning activities so that students can understand the material effectively. During instruction, teachers monitor students’ reactions and participation in order to evaluate whether the teaching strategies are working as intended. After the lesson, teachers reflect on the outcomes of their teaching and consider possible improvements for future classes. These reflective processes help teachers develop more effective instructional strategies. Several participants also emphasized that metacognitive awareness strengthens teachers’ ability to manage classroom dynamics effectively. By monitoring students’ engagement and learning progress, teachers can identify moments when instructional adjustments are necessary. Such reflective practices contribute to the development of flexible and adaptive teaching strategies that support students’ learning needs. One participant described the role of reflection in improving teaching practices:

“After each class, I usually reflect on my teaching and think about what worked well and what could be improved. This reflection helps me understand how students respond to my teaching methods and encourages me to explore new ways of explaining the material.” (T06).

Another teacher highlighted the importance of monitoring students’ responses during lessons:

“While teaching, I always observe students’ reactions to the lesson. If they seem confused or less interested, I immediately try to adjust my strategy. This process requires continuous reflection because every class situation is different.” (T14).

A similar perspective was expressed by another participant:

“Reflection is an important part of my teaching practice. By evaluating my lessons, I can identify which activities help students learn better. This process allows me to improve my teaching and develop more creative learning strategies.” (T21).

Another significant finding is that metacognitive awareness encourages teachers to adopt a continuous learning mindset. Teachers explained that reflection allows them to learn from both successful and unsuccessful

teaching experiences. When a lesson does not proceed as expected, teachers analyze the situation and attempt to identify the factors that contributed to the problem. This analysis motivates teachers to experiment with alternative teaching strategies in future lessons. Through these processes, teachers gradually develop stronger reflective thinking abilities. These abilities support the development of innovative and flexible teaching practices. One teacher explained the role of reflection in teaching:

“After every lesson, I usually reflect on what happened in the classroom. I ask myself whether students understood the material and which activities helped them the most. If I notice that some students are still confused, I think about how I can explain the topic differently in the next class. This reflection helps me understand the effectiveness of my teaching strategies. I believe that teachers must continuously evaluate their teaching in order to improve. Through reflection, I learn how to adapt my teaching to students’ needs. This process helps me become a better teacher.” (T07).

Another participant highlighted the importance of monitoring students’ responses:

“During the lesson, I pay close attention to students’ reactions and participation. If students appear less engaged, I immediately try to change my approach. Sometimes I introduce new activities that encourage students to interact with each other. Observing students helps me understand whether the lesson is effective. This awareness allows me to make adjustments while teaching. I believe that teachers must remain attentive to the learning atmosphere in the classroom. Such reflection helps improve the quality of instruction.” (T13).

A third teacher described a similar reflective process:

“Reflection is a habit that I practice after every teaching session. I analyze which parts of the lesson worked well and which parts need improvement. This process helps me understand how students learn and what strategies are most effective. I often write notes about my teaching experiences so that I can review them later. These notes help me plan better lessons in the future. Through reflection, I become more aware of my teaching decisions. This awareness improves my ability to design creative learning activities.” (T21).

#### **4.3. Teachers’ professional development experiences in supporting creative teaching**

The third theme emerging from the analysis relates to teachers’ professional development experiences. Participants reported that professional development activities provide valuable opportunities to enhance their pedagogical knowledge and creative teaching abilities. Teachers explained that workshops, training programs, and teacher learning communities expose them to new instructional ideas and innovative teaching strategies. Through these activities, teachers learn how to design learning experiences that encourage critical thinking and creativity among students. Professional development also allows teachers to exchange ideas with colleagues and learn from each other’s teaching experiences. Such collaborative learning environments contribute significantly to teachers’ professional growth. Participants also emphasized that professional development encourages teachers to experiment with innovative teaching practices. Exposure to new pedagogical approaches motivates teachers to integrate creative learning activities into their classrooms. Teachers reported that training sessions often introduce them to modern teaching strategies such as project-based learning, collaborative learning, and inquiry-based instruction. These approaches help teachers create more interactive and engaging learning environments. As a result, students become more actively involved in the learning process. These findings indicate that professional development plays a critical role in supporting instructional innovation. One teacher explained how professional development influenced her teaching practices:

“Participating in professional development workshops has helped me discover many new teaching strategies. Through these programs, I learned how to design learning activities that encourage students to think critically and creatively.” (T02).

Another participant emphasized the value of collaborative learning among teachers:

“When teachers share their teaching experiences during training sessions, we often learn many useful ideas. Sometimes a colleague’s experience can inspire me to try new teaching strategies in my own classroom.” (T10).

Similarly, another teacher described how professional learning activities encourage instructional innovation:

“Professional development programs motivate me to improve my teaching. After attending training sessions, I often try to apply the new strategies I learned, and I notice that students become more engaged in the learning process.” (T17).

Another important finding is that professional learning communities foster collaboration among teachers. Participants reported that discussions with colleagues often inspire them to try new teaching strategies. Sharing experiences with other teachers allows participants to learn practical solutions to common classroom challenges. Through collaborative dialogue, teachers gain new perspectives on effective teaching practices. These interactions also encourage teachers to reflect on their own teaching approaches. Consequently, professional development contributes to both cognitive and professional growth. One teacher described how training influenced teaching practices:

“Participating in teacher training programs has given me many new ideas about how to improve my teaching. During the workshops, we discuss different teaching strategies and share experiences with other teachers. These discussions help me see teaching from different perspectives. I often try to apply the strategies I learn during training sessions in my classroom. When I use these new strategies, students become more engaged in the lesson. Training programs also encourage me to reflect on my teaching practices. As a result, I feel more confident in developing creative learning activities.” (T02).

Another participant emphasized collaborative learning:

“Professional development programs allow teachers to exchange ideas and learn from each other. During training sessions, we often discuss the challenges we face in the classroom. These discussions help me discover new solutions to teaching problems. I learn many useful strategies from my colleagues. Sometimes a colleague’s experience inspires me to try a different approach in my own classroom. Through collaboration, we can improve our teaching practices together. This process helps teachers develop more creative and effective instructional strategies.” (T11).

A third teacher described a similar experience:

“After attending professional development workshops, I feel more motivated to improve my teaching. The training sessions introduce us to many innovative teaching methods. I often adapt these methods to suit the needs of my students. Students respond positively when the lesson involves interactive activities. Professional development also encourages me to reflect on my role as a teacher. Through continuous learning, I become more confident in implementing creative teaching strategies. These experiences help me foster a more engaging learning environment.” (T18).

Overall, the findings demonstrate that madrasah teachers’ divergent thinking is shaped by a dynamic interaction between classroom experiences, metacognitive reflection, and professional learning opportunities. Teachers who actively reflect on their teaching practices and participate in professional development activities are more likely to develop innovative instructional strategies that foster student engagement and creativity. These results highlight the importance of strengthening reflective teaching practices and providing sustained professional development opportunities for madrasah teachers in order to support the development of creative and flexible teaching approaches.

## 5. Discussion

The findings of this study reveal that madrasah teachers’ divergent thinking emerges through dynamic interactions between classroom experiences, reflective cognitive processes, and professional learning environments (Lee, & Chung, 2025). Teachers reported that divergent thinking enables them to generate multiple instructional strategies and adapt their teaching approaches to students’ diverse learning needs. This finding aligns with contemporary research indicating that divergent thinking plays a central role in fostering creativity and instructional innovation in educational contexts (Putri et al., 2025; Henriksen et al., 2021; Sukenti & Tambak, 2023). Scholars argue that teachers with strong divergent thinking abilities tend to design more flexible and student-centered learning environments that stimulate intellectual curiosity and creative engagement among learners (Jin et al., 2026; Beghetto & Kaufman, 2021). Such creative pedagogical practices are increasingly recognized as essential for preparing students to navigate complex knowledge societies (Tambak, & Sukenti, 2020; Fischer, Malycha, & Schafmann, 2022). Within the context of Islamic education, these practices resonate with the concept of *ijtihad*—the intellectual effort to explore new solutions through critical reasoning and creative interpretation (Abdulla Alabbasi et al., 2026; Sahin, 2020). Therefore, divergent thinking among madrasah teachers can be understood as an important manifestation of intellectual openness and pedagogical innovation within contemporary Islamic education.

The study also highlights that teachers' classroom experiences significantly contribute to the development of divergent thinking. Participants reported that encountering diverse student characteristics encourages them to experiment with alternative instructional approaches and explore creative learning strategies. This finding supports previous studies suggesting that teachers' creativity often develops through reflective responses to classroom challenges and contextual learning needs (Abdulla Alabbasi et al., 2026; Fischer et al., 2022). When teachers actively engage with complex classroom situations, they are more likely to generate innovative solutions that enhance the quality of learning experiences (Byrge, Guzik, & Gilde, 2025; Henriksen et al., 2021; Sukenti et al., 2025). Such adaptability is particularly important in contemporary education systems that emphasize student-centered learning and problem-solving skills (van Dorresteijn et al., 2024). In Islamic education, responding creatively to learners' needs reflects the pedagogical principle of *tarbiyah*, which emphasizes holistic development and the nurturing of learners' intellectual and moral capacities (Sahin, 2020; Fischer et al., 2022; Rawlings et al., 2025). Consequently, the ability of madrasah teachers to develop divergent thinking can be seen as an essential component of effective Islamic pedagogy in the modern era.

Another important finding relates to the role of metacognitive awareness in shaping teachers' divergent thinking abilities. Participants explained that reflective thinking helps them evaluate their instructional strategies and identify areas for improvement. This finding is consistent with research suggesting that metacognition enables teachers to regulate their cognitive processes and improve their instructional decision-making (Veenman, 2021; Tambak, & Sukenti, 2025). Teachers who demonstrate strong metacognitive awareness are more capable of analyzing classroom situations, monitoring students' learning progress, and adapting teaching strategies to improve learning outcomes (Abdulla Alabbasi et al., 2026; Zohar & Barzilai, 2022). Such reflective practices encourage teachers to explore alternative teaching approaches, thereby enhancing their capacity for divergent thinking (Dignath & Veenman, 2021; Sukenti, & Tambak, 2025). In the context of Islamic education, reflective thinking resonates with the concept of *muhasabah*, which encourages individuals to engage in self-evaluation and continuous improvement in both intellectual and spiritual domains (Sahin, 2020). Thus, metacognitive reflection among madrasah teachers not only supports instructional innovation but also aligns with the ethical and spiritual values embedded in Islamic educational traditions.

The findings further demonstrate that metacognitive reflection contributes to the development of adaptive teaching practices. Teachers reported that they frequently monitor students' responses during classroom activities and adjust their teaching strategies accordingly. This finding reflects previous research emphasizing that metacognitive competence enables teachers to become more flexible and responsive in their instructional practices (Veenman, 2021; Tambak et al., 2025). When teachers engage in reflective monitoring, they are able to identify learning difficulties and design alternative strategies that facilitate deeper student understanding (Zohar & Barzilai, 2022). Such adaptive expertise is increasingly regarded as a critical competence for teachers in contemporary educational systems (Abdulla Alabbasi et al., 2026; Darling-Hammond, Hylar, & Gardner, 2021). Within Islamic educational philosophy, adaptability and reflective learning are closely associated with the principle of *hikmah*, which emphasizes wisdom and thoughtful decision-making in educational practice (Sahin, 2020). Therefore, the metacognitive awareness demonstrated by madrasah teachers reflects a combination of professional competence and ethical responsibility.

The present study also highlights the significant role of professional development in fostering teachers' divergent thinking. Participants emphasized that training programs and teacher learning communities provide valuable opportunities to learn innovative teaching strategies and exchange pedagogical ideas. This finding corresponds with research showing that effective professional development enhances teachers' creativity, instructional innovation, and reflective practice (Darling-Hammond et al., 2021). Professional development initiatives that emphasize collaborative learning and reflective dialogue enable teachers to explore new teaching approaches and integrate creative strategies into their classrooms (Avalos, 2021). Furthermore, such programs promote continuous professional growth by encouraging teachers to engage in lifelong learning (Desimone & Garet, 2020). In the context of Islamic education, the pursuit of knowledge and professional excellence reflects the concept of *talab al-'ilm*, which emphasizes continuous learning as a fundamental obligation for educators and learners alike (Halstead, 2021). Consequently, professional development programs play an important role in strengthening both the intellectual and ethical dimensions of madrasah teachers' professional identities.

Another key finding is the importance of collaborative professional learning among teachers. Participants reported that discussions with colleagues often inspire them to explore new teaching strategies and rethink their instructional practices. This finding is supported by previous research indicating that collaborative learning environments foster innovation and professional growth among teachers (Avalos, 2021). Teacher collaboration allows educators to share experiences, exchange ideas, and develop collective solutions to classroom challenges (Darling-Hammond et al., 2021). Such collaborative interactions also promote reflective dialogue that strengthens teachers' metacognitive awareness and creative thinking capacities (Fischer et al., 2022). In Islamic educational traditions, collaborative knowledge-sharing reflects the concept of *shura*, which emphasizes consultation and collective wisdom in decision-making processes (Halstead, 2021). Therefore, professional collaboration among madrasah teachers can be viewed as both a pedagogical and ethical practice that supports the development of innovative teaching strategies.

The integration of divergent thinking, metacognitive reflection, and professional development also highlights the importance of transformative teacher education (Fu, & Qi, 2025). The findings suggest that teachers who actively engage in reflective practice and professional learning are more likely to develop innovative instructional strategies that enhance student engagement (Tambak, & Sukenti, 2024). This observation aligns with contemporary teacher education models that emphasize reflective inquiry and creative problem-solving as key components of professional competence (Henriksen et al., 2021; Muhajir et al., 2025). When teachers cultivate these competencies, they become better equipped to facilitate meaningful learning experiences that support students' intellectual growth (Beghetto & Kaufman, 2021; Rasyidi et al., 2025). In Islamic education, transformative learning is closely related to the concept of *ta'dib*, which emphasizes the integration of knowledge, ethics, and intellectual discipline in educational practice (Sahin, 2020). Therefore, fostering teachers' divergent thinking can contribute to the holistic development of both educators and learners in madrasah contexts.

Furthermore, the findings highlight the relevance of integrating contemporary educational approaches with Islamic educational values. The development of divergent thinking among madrasah teachers demonstrates that Islamic education can adapt to modern pedagogical challenges while maintaining its ethical foundations. This perspective supports previous research emphasizing that Islamic education must continuously evolve in response to changing educational and societal contexts (Byrge, Guzik, & Gilde, 2025; Halstead, 2021). By encouraging creative thinking and reflective teaching practices, madrasah education can contribute to the development of intellectually active and morally responsible learners. Such integration reflects the broader objective of Islamic education to balance intellectual excellence with ethical responsibility (Xu, Reiss, & Lodge, 2026; Sahin, 2020; Chapakiya et al., 2025). Consequently, the promotion of divergent thinking among teachers represents an important step toward strengthening the relevance and quality of contemporary Islamic education.

Overall, the findings of this study demonstrate that fostering divergent thinking among madrasah teachers requires a holistic approach that integrates reflective cognitive processes, professional learning opportunities, and ethical educational values (Rohatgi, & Hatlevik, 2026). Teachers who engage in metacognitive reflection and professional development are more likely to develop innovative instructional strategies that enhance student engagement and creativity. These findings support contemporary research emphasizing the importance of creativity, reflection, and collaboration in teacher professional development (Tambak, Sukenti, & Firdaus, 2024; Darling-Hammond et al., 2021). At the same time, the integration of Islamic educational values such as *ijtihad*, *muhasabah*, *hikmah*, and *shura* provides a meaningful framework for understanding the ethical dimensions of innovative teaching practices. By combining modern pedagogical approaches with Islamic educational principles, madrasah teachers can develop creative and reflective teaching practices that contribute to the advancement of Islamic education in the twenty-first century.

## 6. Conclusion

This study concludes that madrasah teachers' divergent thinking develops through the interaction of classroom experiences, metacognitive reflection, and professional development practices. The findings reveal that teachers cultivate divergent thinking when they actively respond to diverse classroom situations by designing multiple instructional strategies and adapting learning approaches to students' different needs. Teachers'

classroom experiences encourage them to explore creative pedagogical solutions that foster student engagement and support meaningful learning processes. In addition, the findings indicate that metacognitive awareness plays a critical role in strengthening teachers' reflective teaching practices, enabling educators to evaluate their instructional decisions and continuously improve their pedagogical strategies. Furthermore, professional development activities, such as workshops, training programs, and collaborative teacher learning communities, contribute significantly to enhancing teachers' creative capacities and instructional innovation. These results suggest that divergent thinking among madrasah teachers is not only a cognitive competence but also a professional and reflective practice that supports the development of dynamic and student-centered learning environments.

The study lies in its integrative exploration of the relationship between divergent thinking, metacognitive awareness, and professional development within the context of madrasah education. While previous studies often examine teacher creativity, metacognition, or professional development as separate constructs, this study provides a holistic understanding of how these elements interact in shaping teachers' innovative teaching practices in Islamic educational institutions. Moreover, this research contributes to the literature by contextualizing these pedagogical processes within the framework of contemporary Islamic educational values, such as *ijtihad* (creative reasoning), *muhasabah* (reflective self-evaluation), *hikmah* (wisdom in educational practice), and *shura* (collaborative consultation). By integrating modern educational theories with Islamic pedagogical principles, this study offers a conceptual contribution to the development of innovative teaching practices in madrasah education.

Despite these contributions, this study has several limitations. First, the research was conducted within a limited number of madrasah institutions, which may restrict the generalizability of the findings to broader educational contexts. Second, the study relied primarily on qualitative interview data, which reflects participants' subjective experiences and perceptions. Although this approach provides rich and in-depth insights into teachers' lived experiences, further studies employing mixed-method or quantitative approaches may provide additional empirical validation of the findings. Third, the study focused primarily on teachers' perspectives, while students' experiences of creative teaching practices were not extensively explored. Finally, the findings of this study have important implications for educational practice, policy, and future research. For educational practice, the results highlight the importance of encouraging reflective teaching practices and providing opportunities for teachers to develop creative instructional strategies. For educational policy, the findings suggest that teacher professional development programs should emphasize reflective learning, collaborative dialogue, and innovative pedagogical approaches that support the development of teachers' divergent thinking. Within the context of Islamic education, integrating contemporary pedagogical approaches with Islamic educational values can strengthen the relevance and quality of madrasah education in responding to modern educational challenges. Future research may further explore how divergent thinking among teachers influences students' creativity, critical thinking, and learning outcomes in Islamic educational settings.

### **Author Contribution Statement**

Contributions of the authors in this article: Putri Masriani Harahap, contributed as concepts and drafters of the article; Fatimah Nadiroh binti Mohd Nor, contributed as data analyzers and interpreters; Nurhayati Nurhayati, as the drafter of the manuscript; Khairunnisa Siregar, contributed in collecting data and critically revising the article. All authors agree to take responsibility for all aspects of this work.

### **Disclosure of Interests**

We have no conflict of interest to declare.

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