
ENHANCING TEACHER COMPETENCE: A TRAINING NEEDS ANALYSIS

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Corresponding author: arininurfariha19@upi.edu**Abstract**

This study analyzes teacher training needs for developing pedagogical competencies at MTs Inovatif Daarul Ihsan through a quantitative method with a descriptive-exploratory approach. Data collected through the Training Needs Survey and analyzed using SPSS revealed that most teachers at the institution are classified as Level 2 (Decent) or Level 3 (Competent), with an average score of 34.31, below the established standard of 39. This finding indicates persistent professional inequality, particularly in pedagogical aspects, including lesson planning, subject matter expertise, teaching methods, and understanding of student characteristics. The predominantly young teaching staff further influences this competency gap. To address these needs, systematically designed training programs are required to cover pedagogical knowledge, innovative teaching models, and methodologies. The study recommends implementing comprehensive teacher pedagogical competency-based training focusing on three essential components: content knowledge, pedagogical knowledge, and pedagogical content knowledge. These competencies will enable teachers to not only master teaching methods but also apply them effectively to enhance student engagement and interaction in learning. This research provides valuable insights for policymakers, educators, and training institutions seeking to design more effective professional development programs to improve educational quality at MTs Inovatif Daarul Ihsan.

Keywords: content knowledge; educator competence; needs for developing; pedagogical competence; pedagogical content knowledge

Introduction

Education is one of the factors that is highly dependent on quality human resources (HR) (Karo so et al., 2024). In this context, investment in education is not only a necessity (Yusif, 2020) but also a determining factor in the future progress of a nation (Zheng & Huang, 2024). Quality education enables individuals to develop their potential and prepare themselves for the increasingly complex challenges of globalization (Alemayehu Assefa, 2024). However, to achieve quality education, educators who have adequate competencies are needed, especially in the pedagogical aspect.

Pedagogical competence is the teacher's ability to manage the learning process so that it runs effectively and efficiently. Teachers who have good pedagogical competence can create learning that is interesting, innovative, and by the needs of students (Zulkarnain et al., 2025). This is in line with the opinion of Sumual et al. (2024), who state that education plays an important role in improving the quality of human resources, and a good educational process cannot be separated from the role of competent teachers (Nadeem et al., 2025). According to the Regulation of the Ministry of National Education Regulation No. 16/2007, pedagogical competence includes understanding the characteristics of students, planning, learning, implementing educational learning, and evaluating learning (Permendiknas, 2007b). Therefore, developing teachers' pedagogical competence is an

important aspect in improving the quality of education.

The grand theory underlying this study is the theory of pedagogical competence developed by Shulman (1986). Shulman suggested that pedagogical competence includes three main aspects, namely content knowledge, pedagogical knowledge, and pedagogical content knowledge (Shulman, 1986). This theory emphasizes that teachers must not only master the material taught (Castro et al., 2024), but also be able to deliver it with methods that are by the characteristics of the learners (Al Khadhim, 2023). Moreover, the theory of constructivism as proposed by Vygotsky (1978) is pertinent to this study. Vygotsky (1978) posited the notion that effective learning occurs in the context of social interaction between educators and learners, wherein the educator assumes the role of a facilitator, fostering the development of learners' comprehension. Consequently, the development of pedagogical competence in teachers is imperative to establish an interactive and meaningful learning environment.

Several previous studies have shown that teacher training plays an important role in improving pedagogical competence. For example, Rahman (2021) found that hands-on practice-based training programs have a positive impact on improving teachers' teaching skills. Another study by Abdul (2025) emphasized the importance of technology-based training in helping teachers adapt to digital learning. Research by Mohamed et al. (2024) also shows that schools that regularly provide training for teachers tend to have higher levels of learning effectiveness than schools that do not provide training. According to Sajid et al. (2024) structured and practice-based training programs tailored to teachers' needs result in continuous improvement of competencies, enabling educators to better address modern educational challenges, including technology integration.

Despite the extensive research on teacher training approaches, there remains a significant gap in understanding how to effectively identify and address the specific pedagogical competency needs of teachers in Islamic boarding school contexts, particularly in Indonesia (Suyatno et al., 2023; Khairil & Sauri, 2022). While previous studies have explored general teacher training models, few have examined the unique challenges faced by educators in Islamic educational institutions where traditional values intersect with modern educational demands (Zidny et al., 2021; Amalia & Sapriya, 2022). Furthermore, existing literature has inadequately addressed how Training Needs Analysis (TNA) can be systematically implemented to design targeted professional development programs that respond to both institutional requirements and individual teacher needs in such specific educational environments (Hassan et al., 2020; Darling-Hammond et al., 2022).

One approach used in identifying teacher training needs is Training Needs Analysis (TNA). TNA is a systematic process of determining the gap between the competencies currently possessed by educators and the competencies needed to improve learning effectiveness (Ngema, 2024). The TNA process includes organizational analysis, task analysis, and individual analysis to ensure that the training designed matches the needs of the teachers and the educational institution (Ashraf et al., 2023). Furthermore, a study by Zhang (2024) asserts that a comprehensive TNA can assist in designing a more targeted training program, so that teachers can gain maximum benefit from the training provided. However, most TNA implementations documented in the literature have focused on conventional school settings, with limited application in specialized educational contexts such as Islamic boarding schools, where teachers face unique pedagogical challenges stemming from the integration of religious education with national curriculum requirements (Noh et al., 2020; Gore et al., 2021; Sutrisno & Rusydiyah, 2022).

Based on preliminary studies conducted at MTs Inovatif Daarul Ihsan, it was found that most teachers have challenges in implementing innovative learning methods. Some teachers still use

conventional lecture methods without any variation in learning strategies. In addition, the ability to manage the class effectively still needs to be improved, so that the learning process does not run optimally. Another obstacle faced is the implementation of differentiated learning, which requires special strategies to adapt to the needs and potential of each student. Interviews with principals and teachers showed that the lack of ongoing training is one of the main factors hindering the development of teachers' pedagogical competence. Teachers stated that they need more structured and practice-based training programs to improve their ability to manage learning.

Muzaffar et al. (2023) assert that the success of teacher training depends on the relevance of the materials provided and the involvement of teachers in the planning and evaluation of the training. Based on a study conducted by Kamal et al. (2024). Training based on a collaborative approach is more effective in improving pedagogical skills than theory-based training. Therefore, teacher training at MTs Inovatif Daarul Ihsan should be designed with an approach that involves hands-on practice and reflection on teaching experiences.

The novelty of this research lies in its pioneering application of a comprehensive TNA framework specifically tailored for Islamic educational institutions, particularly focusing on the intersection of content knowledge, pedagogical knowledge, and pedagogical content knowledge in a madrasah boarding school setting (Kennedy, 2023; Koh et al., 2022). This study contributes to existing knowledge by developing a methodological approach for assessing teacher competencies in specialized educational contexts and proposing a structured, evidence-based training model that addresses the unique pedagogical requirements of Islamic boarding school teachers (Schipper et al., 2020; Raihani & Gurr, 2022). Unlike previous research that often applied generalized training approaches across different educational settings, this study emphasizes the importance of context-specific professional development interventions designed to enhance both religious and secular educational outcomes simultaneously (Hill et al., 2021; Herro et al., 2023; Utami et al., 2022).

Based on this background, the study aims to analyze the training needs for teachers at MTs Inovatif Daarul Ihsan to develop their pedagogical competence. Specifically, this research addresses several interconnected objectives. The study seeks to identify and analyze the current level of pedagogical competence among teachers at MTs Inovatif Daarul Ihsan using a systematic Training Needs Analysis framework (Louws et al., 2020), while also identifying specific gaps in teacher competencies across the domains of content knowledge, pedagogical knowledge, and pedagogical content knowledge (Baran & AlZoubi, 2023). Furthermore, this research aims to design an appropriate, contextually relevant training model that addresses the identified competency gaps and enhances teaching effectiveness in the Islamic boarding school environment (Rodriguez & Morrison, 2022). Finally, the study strives to propose sustainable professional development strategies that align with both institutional goals and individual teacher needs (Gumucs & Bellibacs, 2023; Rozi et al., 2022).

This research is guided by several key questions that inform the investigative process. The study examines what the current level of pedagogical competence is among teachers at MTs Inovatif Daarul Ihsan and what specific competency gaps exist among teachers in terms of content knowledge, pedagogical knowledge, and pedagogical content knowledge (Harris et al., 2022). Additionally, the research explores what training interventions would most effectively address the identified competency gaps (Copur-Gencturk & Thacker, 2021), and how a sustainable professional development program can be designed to continuously enhance teacher competencies in the specific context of an Islamic boarding school (Adnan et al., 2021; Bautista & Wong, 2023).

With this needs analysis, it is expected that an appropriate and effective training program can be

designed to improve the quality of teaching in the school. This research also seeks to provide recommendations regarding the ideal training model for teachers, so that they can be more adaptive to curriculum developments and educational technology that continues to evolve.

Literature Review

This literature review examines three interconnected dimensions essential to understanding teacher professional development in Islamic educational contexts: the conceptual framework of Training Needs Analysis (TNA), the theoretical foundations and practical gaps in pedagogical competence, and evidence-based training models that have demonstrated effectiveness in educational settings. These areas form the theoretical and practical foundation for the current study investigating pedagogical competence development at MTs Inovatif Daarul Ihsan. By systematically analyzing existing literature on these topics, this review establishes the conceptual framework that guides the research methodology and provides context for interpreting the findings. The intersection of these three dimensions is particularly relevant to addressing the unique challenges faced by teachers in Islamic boarding schools, where traditional pedagogical approaches must harmonize with contemporary educational demands and technological integration (Raihani & Gurr, 2022; Suyatno et al., 2023). Furthermore, this review identifies specific gaps in the literature regarding TNA implementation in specialized educational contexts, which the present study aims to address.

Conceptual framework of training needs analysis (TNA)

Training programs can enhance teachers' pedagogical competence. According to O'Sullivan (Musfah, 2011), Such training should be specifically designed to address teachers' actual needs to develop their professionalism. Training that does not align with teachers' needs tends to have little effect on improving their skills and may even reduce their motivation to learn, resulting in wasted time, effort, and resources (Darling-Hammond, 2006).

Training Needs Analysis (TNA) is a systematic process to identify gaps between current and desired competencies, ensuring training programs align with organizational goals (Bartram, 1994). According to Tovey (1997), TNA prevents resource waste by focusing on "necessary training activities" that address specific deficiencies. Mangkunegara (2003) further defines TNA as a study of educational problems through data collection to formulate actionable solutions, emphasizing its role in evidence-based decision-making. Bartram (1994) highlights the importance of structured TNA methods, such as surveys and interviews, to tailor training to teachers' needs while aligning with institutional objectives.

Pedagogical competence: Theory and gaps

Pedagogical competence encompasses teachers' ability to design effective learning experiences, manage classrooms, and evaluate outcomes (Chris. C. E. & L. C. Watkins, 2007). Teaching Profession and Ethics (Ramayulis, 2003) outlines five fundamental aspects of pedagogical competence that teachers must master: understanding students' characteristics, effective curriculum implementation, integration of technology in learning, conducting evaluations of learning outcomes, and fostering the holistic development of students. Despite the theoretical framework, empirical studies reveal persistent gaps in these competencies among teachers. For instance, research at MTs Inovatif Daarul

Ihsan identified weaknesses in the utilization of information and communication technology (ICT), implementation of classroom action research, and differentiated instructional strategies, highlighting the urgent need for targeted professional development programs. Likewise, a study involving 165 natural science teachers in Pekanbaru demonstrated generally low levels of pedagogical competence, with ICT skills and curriculum development emerging as critical areas requiring improvement (Febrianis et al., 2014). These findings underscore the importance of continuous, needs-based training to enhance teachers' pedagogical effectiveness and ultimately improve educational outcomes.

Evidence-based training models

Post-TNA, training models like In-House Training (IHT) have proven effective. Fadil & Aryani (2021) demonstrated that IHT improves pedagogical competence by providing context-specific, collaborative learning opportunities. This is consistent with research by Irwanto (2024), where structured IHT sessions improved teachers' ability to integrate technology and design student-centered lessons. In addition, short courses on curriculum development and student diversity are effective in addressing competency gaps.

Methodology

Research design and approach of the study

This research uses quantitative methodology (Wagner et al., 2024) and a case study approach (Ratnasari & Sudradjat, 2023) to explore the specific factors that influence teachers' pedagogical competence at MTs Inovatif Daarul Ihsan, to determine the level of competence among teachers, and formulate an appropriate training model. This research design is a combination of a descriptive approach (Miksza et al., 2023) and an exploratory approach (Adhikari & Timsina, 2024). The descriptive stage is used to map the current state of teachers' pedagogical competence, while the exploratory stage aims to design strategies to improve teachers' pedagogical skills in learning based on the research findings.

Research site and participants

The research was conducted at MTs Inovatif Daarul Ihsan, a secondary Islamic school committed to educational innovation and teacher development. This site was selected because it provides a relevant context for exploring training needs analysis aimed at developing teachers' pedagogical competence, in line with the research objectives. The participants in this study consisted of 13 teachers who were selected using purposive sampling, a non-probability sampling technique that involves the deliberate selection of individuals based on specific characteristics relevant to the research aims (Ismawati et al., 2023; Fernandes & Solimun, 2022).

The selected teachers varied in terms of teaching experience, subject specialization, and exposure to previous training programs. These characteristics were chosen to ensure a diverse representation of perspectives and to identify specific gaps in pedagogical competence across different teaching contexts. Teachers who demonstrated a willingness to improve, yet had limited access to structured professional development opportunities, were prioritized, as they were most likely to

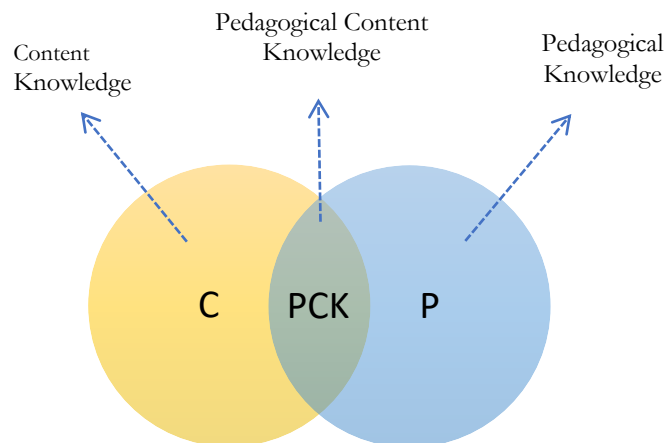
benefit from and contribute insights into the training needs analysis process. This method is particularly suited for qualitative research, where in-depth insights from participants with varied perspectives are essential for addressing the research questions.

The selection process involved the consideration of specific characteristics, including variations in educational qualifications (degrees in various disciplines), years of teaching experience (ranging from novices to experienced teachers), subject specialisation, and prior exposure to professional development opportunities. These characteristics were purposively selected as they represent significant factors that influence teachers' pedagogical knowledge, classroom practice, and readiness for professional growth. Moreover, the selection of participants with a range of backgrounds enabled the study to obtain a comprehensive understanding of training needs across different teacher profiles, thereby enhancing the applicability of the findings to the broader school context. This strategic selection of participant characteristics is ultimately expected to strengthen the validity of the training needs analysis and ensure that the resulting professional development interventions will address the real pedagogical challenges faced by teachers with various profiles at MTs Inovatif Daarul Ihsan.

Data collection and analysis

Data was collected through the application of survey techniques, with the Training Needs Survey (TNS) as the main instrument, and analyzed using IBM SPSS Statistics software (Alzahmi & Alshamsi, 2024). The TNS was developed based on teachers' pedagogical competencies, which include three main aspects: content knowledge, pedagogical knowledge, and pedagogical content knowledge, as defined by Shulman (1986). The TNS was carefully designed to assess three key indicators in the teacher competency model, as shown in Figure 1.

Figure 1. *Pedagogical content knowledge (Shulman, 1986)*



TNS evaluates teacher competence, which consists of three main aspects, namely Content Knowledge (C), Pedagogical Knowledge (P), and Pedagogical Content Knowledge (PCK). Content Knowledge refers to the mastery of teaching materials that teachers must have, while Pedagogical Knowledge relates to understanding effective learning strategies, methods, and approaches. Meanwhile, Pedagogical Content Knowledge is a combination of the two, namely the ability to teach material with an approach that is by the characteristics of students.

Before implementation, the TNS instrument underwent a rigorous validation process to ensure its content validity, construct validity, and reliability. Content validity was established through expert review by three senior education specialists with expertise in teacher professional development and pedagogical assessment (Gay et al., 2022). The experts evaluated each item for clarity, relevance, and alignment with the theoretical constructs being measured. Based on their feedback, several items were revised for improved clarity and contextual appropriateness. Construct validity was assessed using exploratory factor analysis with principal component extraction (Worthington & Whittaker, 2021), which confirmed the three-factor structure corresponding to the theoretical dimensions of Content Knowledge, Pedagogical Knowledge, and Pedagogical Content Knowledge. The reliability of the instrument was established through a pilot test with 30 teachers from similar Islamic educational institutions who were not part of the main study sample. Internal consistency was measured using Cronbach's alpha coefficient, resulting in values of 0.87 for Content Knowledge items, 0.84 for Pedagogical Knowledge items, and 0.89 for Pedagogical Content Knowledge items, all exceeding the recommended threshold of 0.7 (Taber, 2020). Test-retest reliability was also assessed with a two-week interval between administrations, yielding a correlation coefficient of 0.85, indicating strong temporal stability of the instrument.

In the context of TNS, the identification of training needs is done by analyzing the extent to which teachers have mastered these three aspects. If it is found that teachers have weaknesses in Content Knowledge, then training should focus on improving mastery of teaching materials. Conversely, if the constraint lies in Pedagogical Knowledge, training can be directed at learning strategies, classroom management, and effective evaluation methods. However, if there is a gap in pedagogical content knowledge, then the training program should be designed to help teachers connect the content with more effective ways of delivering it.

The survey was conducted in schools through the self-assessment method (Kittelman et al., 2024). Teachers completed the TNS under the supervision of the researcher to ensure data accuracy. Respondents were assured of confidentiality and anonymity in reporting to mitigate potential self-report bias, and the importance of honest responses was emphasized (Podsakoff et al., 2023). Additionally, triangulation was employed by incorporating principal observations and document analysis of teacher lesson plans to corroborate self-reported competency levels. The data analysis process followed a systematic sequence of steps guided by established quantitative analysis procedures (Creswell & Creswell, 2023; Muijs, 2021). First, the data were screened for completeness and accuracy, with missing values addressed using appropriate imputation techniques when necessary. Second, descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to provide an overall picture of the teachers' competency levels. Third, normality testing was conducted using the Shapiro-Wilk test to determine the appropriate statistical tests for further analysis.

Fourth, the TNS scores were categorized according to the predetermined competency levels (Develop, Worthy, Competent, Proficient) based on the Training Needs Assessment Tool framework. Fifth, comparative analyses were performed to examine differences in competency levels across demographic variables such as teaching experience, educational qualifications, and subject areas using appropriate parametric or non-parametric tests depending on the normality of data distribution. Finally, gap analysis was conducted by comparing current competency levels with the established standards to identify specific areas requiring intervention (Watkins et al., 2022). The data were analyzed quantitatively using descriptive techniques, with the average score of the TNS results used to identify gaps between teachers' actual competencies and the set standards. These competency

standards are determined based on certain reference values. For more details, the results of the training needs mapping can be seen in the Training Needs Assessment Tool presented in Table 1.

Table 1. *Training needs assessment tool*

TNS Score Range	Gap Category	Competency Level	Interpretation
12 – 20	Very High	Level 1 – Develop	The competency gap is huge, and urgent training is required
21 – 29	High	Level 2 – Worthy	The competency gap is significant, and training is highly recommended
30 – 38	Medium	Level 3 – Competent	Competency gaps exist, but are within reasonable limits; training is still required
39 – 48	Conforms to Standard	Level 4 – Proficient	No competency gaps; in line with expected standards

Source: Adapted from research by [Dikdik et al. \(2025\)](#)

To ensure the trustworthiness of the data analysis and interpretation, several quality assurance measures were implemented. Investigator triangulation was employed by having two independent researchers analyze the data separately and then compare their findings to reach a consensus ([Flick, 2022](#)). Member checking was conducted by sharing preliminary findings with selected participants to validate interpretations and conclusions. Additionally, an audit trail was maintained throughout the analysis process, documenting all analytical decisions and procedures to enhance the transparency and credibility of the findings ([Lincoln et al., 2023](#)).

Furthermore, the results of this competency mapping form the basis for developing a sustainable professional training model based on Content Knowledge (C), Pedagogical Knowledge (P), and Pedagogical Content Knowledge (PCK) and a professional community of teachers, which has proven effective in improving teachers' teaching skills through a reflective, collaborative and sustainable approach. The research findings provide a comprehensive picture of pedagogical competence achievement and the need for more structured training interventions. This study not only reveals the condition of teachers' pedagogical competence but also offers concrete solutions in the form of a real needs-based training model. It is hoped that this model can improve teachers' readiness to face educational challenges, encourage innovation in teaching practices, and create a more interactive and effective learning environment for students. In addition, the results of this study provide insights for policymakers in designing training programs that are more in line with the demands of 21st-century education.

Results

The findings presented in this section are organized to address the research objectives of identifying and analyzing the current level of pedagogical competence among teachers and

determining specific competency gaps across the domains of content knowledge, pedagogical knowledge, and pedagogical content knowledge. The results are structured into three subsections: (1) overall competency levels, (2) specific competency domain analysis, and (3) demographic factors influencing competency level.

Overall competency levels

The results of the TNS analysis filled out by teachers of MTs Inovatif Daarul Ihsan show variations in competency levels based on the mapping in the Training Needs Assessment Tool. The average score obtained illustrates the extent of the gap between the teacher's actual competence and the expected standard. In general, the survey results indicate that most teachers are in the Level 2 (Worthy) to Level 3 (Competent) category, indicating a need for further training to reach the Level 4 (Proficient) level by established professional standards. These findings emphasize the importance of more systematic and needs-based training interventions to improve teachers' pedagogical skills in the modern education era. For more details, the TNS results are presented in Table 2.

Table 2. *TNS results of teachers of mts inovatif daarul ihsan*

N	Valid	13
	Missing	0
Mean		34.31.00
Std. Error of Mean		1.052
Median		35.00.00
Mode		38
Std. Deviation		3.794
Variance		14.397
Skewness		-.346
Std. Error of Skewness		.616
Kurtosis		-1.756
Std. Error of Kurtosis		1.191
Range		9
Minimum		29
Maximum		38
Sum		446
Percentiles	25	30.00.00
	50	35.00.00
	75	38.00.00

Source: Results of SPSS Data Analysis Based on TNS Field Data

As shown in Table 2, the overall competency analysis reveals a mean score of 34.31 (SD = 3.794) across all teachers (N = 13), which falls within the Medium Gap category (Level 3 - Competent)

according to the Training Needs Assessment Tool. This indicates that while teachers possess fundamental pedagogical competencies, they have not yet reached the proficiency level (39-48) required by professional standards. The negative skewness value (-.346) suggests a slight tendency toward higher scores, while the relatively high standard deviation indicates considerable variation in individual competency levels. The minimum score of 29 falls in the High Gap category (Level 2 - Worthy), while the maximum score of 38 approaches but does not reach the Conforms to Standard category, further confirming that none of the participants achieved Level 4 - Proficient status.

Figure 2. *Distribution of teachers by competency level categories*

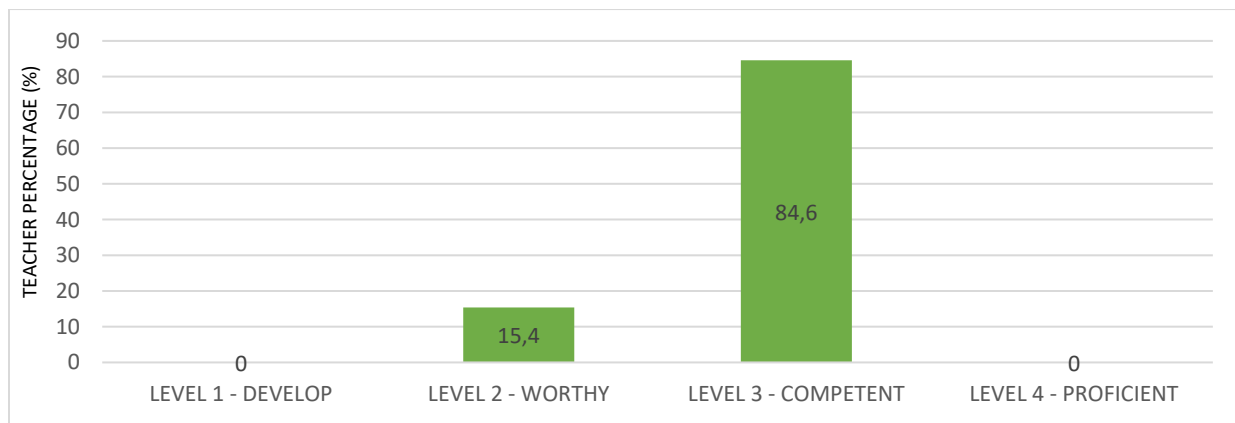


Figure 2 illustrates the distribution of teachers across competency level categories, showing that 15.4% of teachers ($n = 2$) fall into the High Gap category (Level 2 - Worthy), while the majority (84.6%, $n = 11$) are in the Medium Gap category (Level 3 - Competent). Notably, no teachers were found to be in either the Very High Gap category (Level 1 - Develop) or the Conforms to Standard category (Level 4 - Proficient). This distribution confirms that while there are no cases of severe competency deficiency requiring urgent intervention, there is also a complete absence of teachers meeting the proficiency standard, highlighting the systematic nature of the competency gap across the institution.

Specific competency domain analysis

To address the second research objective, the analysis examined competency levels across the three specific domains of the TNS framework. Table 3 presents the mean scores for Content Knowledge (CK), Pedagogical Knowledge (PK), and Pedagogical Content Knowledge (PCK), revealing differential patterns of strengths and weaknesses.

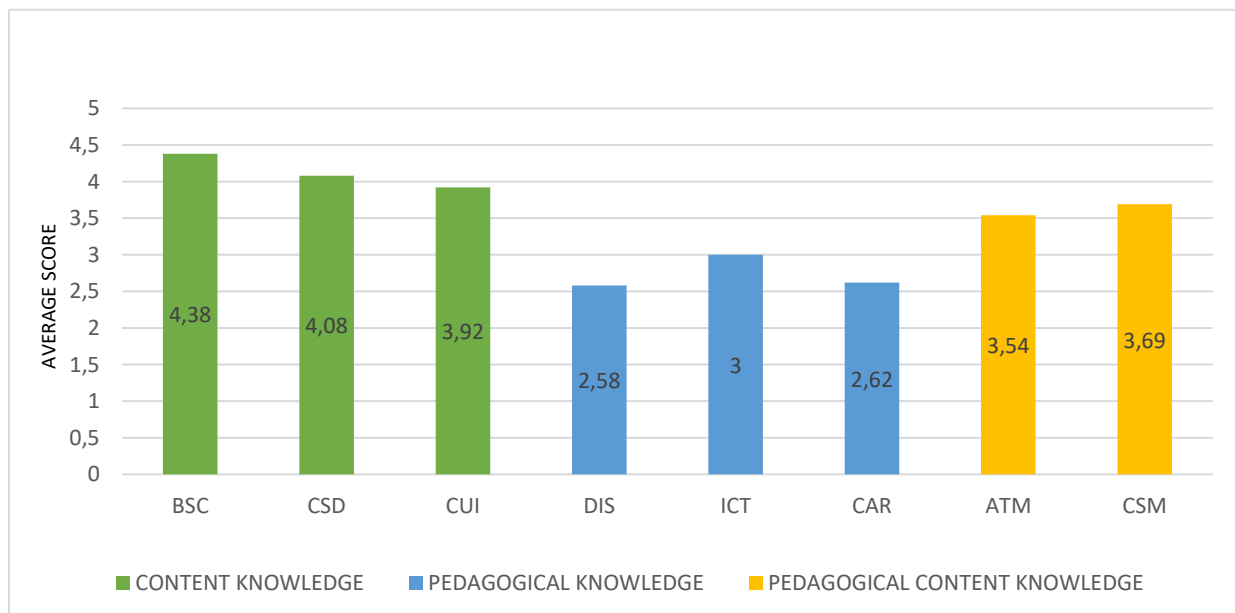
Table 3. *Mean scores across competency domains*

Competency Domain	Mean Score	Standard Deviation	Gap Category
Content Knowledge (CK)	12.77	1.589	Medium
Pedagogical Knowledge (PK)	10.08	2.362	High
Pedagogical Content Knowledge (PCK)	11.46	1.713	Medium
Overall TNS Score	34.31	3.794	Medium

Source: Primary Data Analysis, 2025

The domain-specific analysis reveals that Pedagogical Knowledge (PK) represents the area of greatest concern, with a mean score of 10.08 (SD = 2.362) placing it in the High Gap category. This indicates significant deficiencies in teachers' understanding and application of instructional strategies, classroom management techniques, and assessment methodologies. In contrast, Content Knowledge (CK) emerged as the relative strength among the three domains, with a mean score of 12.77 (SD = 1.589) in the Medium Gap category, suggesting that teachers have a somewhat stronger grasp of subject matter content compared to pedagogical approaches. Pedagogical Content Knowledge (PCK), which represents the integration of content and pedagogical expertise, falls between these two domains with a mean score of 11.46 (SD = 1.713), also categorized as a Medium Gap. Further item-level analysis within each domain, as presented in Figure 3, identified specific competency elements requiring targeted intervention.

Figure 3. *Item-level analysis of competency gaps by domain*



Within the Content Knowledge domain, teachers demonstrated relative strength in mastery of basic subject concepts (BSC) (mean = 4.38) but showed noticeable weaknesses in curriculum integration understanding (CUI) (mean = 3.92) and maintaining curriculum subject development (CSD) (mean = 4.08). The Pedagogical Knowledge domain revealed more pronounced gaps in several critical areas: implementing differentiated instruction strategies (DIS) (mean = 2.85), utilizing information and communication technology (ICT) in teaching (mean = 3.00), and conducting classroom action research (CAR) (mean = 2.62). The latter represents the single most significant deficiency across all competency elements assessed. For the Pedagogical Content Knowledge domain, the most substantial gaps were observed in adapting teaching methods (ATM) to diverse learning needs (mean = 3.54) and developing context-specific teaching materials (CSM) (mean = 3.69).

Demographic factors influencing competency levels

The analysis also examined potential relationships between teachers' demographic characteristics and their TNS scores to provide additional context for understanding the competency gaps. Table 4 summarizes the mean TNS scores across key demographic variables.

Table 4. *Mean TNS scores by demographic characteristics*

Demographic Factor	Categories	n	Mean Score	SD
Teaching Experience	< 5 years	7	32.14	2.911
	5-10 years	4	35.75	2.062
	> 10 years	2	38.00	0.000
Educational Qualification	Bachelor's (S1)	11	33.45	3.532
	Master's (S2)	2	38.00	0.000
Subject Area	Religious Studies	5	35.60	3.647
	Science/Mathematics	3	33.33	4.619
	Social Sciences	3	32.33	3.055
	Languages	2	35.50	3.536
Previous Training Exposure	No formal training	5	31.60	2.608
	Some training (1-2 programs)	6	35.17	3.125
	Extensive training (3+ programs)	2	38.00	0.000

Source: Primary Data Analysis, 2025

The analysis of demographic factors revealed several significant patterns. Teaching experience emerged as a strong predictor of competency levels, with mean scores progressively increasing from 32.14 for teachers with less than 5 years of experience to 38.00 for those with more than 10 years ($p < .05$, one-way ANOVA). Similarly, educational qualification showed a significant relationship with competency levels, with Master's degree holders scoring higher (mean = 38.00) than Bachelor's degree holders (mean = 33.45) ($p < .01$, independent t-test). Previous exposure to professional development training also demonstrated a strong association with TNS scores, with extensively trained teachers scoring significantly higher than those with no formal training ($p < .01$, one-way ANOVA). Subject area specialization showed some variation in mean scores, though these differences did not reach statistical significance ($p = .42$, one-way ANOVA).

These findings suggest that the competency gaps observed at MTs Inovatif Daarul Ihsan may be partially attributable to the demographic composition of the teaching staff, which is characterized by a predominance of early-career teachers with limited previous training exposure. Specifically, 53.8% of teachers had less than 5 years of experience, and 38.5% had received no formal pedagogical training before this assessment. The identified patterns have important implications for designing differentiated professional development interventions that account for varying levels of experience and prior training.

Discussion

The TNS results obtained from the teachers showed that the average score achieved was 34.31, slightly lower than the set standard of 39. Confirmation from the principal indicated that one of the

challenges faced by this educational institution is the competence of teachers who still do not fully meet the standards, both in the use of technology and in the implementation of teaching tasks. The TNS results also reflect that the competence of teachers at MTs Inovatif Daarul Ihsan, the majority of which consist of young educators, has not yet reached the level of professionalism as required by Permendiknas No. 16 of 2007 concerning Standards for Academic Qualifications and Teacher Competencies (Permendiknas, 2007a). As professional educators, teachers are expected to have four main competencies, namely pedagogical, personality, social, and professional competencies (Permendiknas, 2007a). However, in terms of pedagogical competence, there are still several obstacles that require attention, especially in terms of planning and implementing classroom learning, mastering learning theory, evaluation methods, and understanding the characteristics of students (Amaliah et al., 2024).

Based on the results of the data analysis, no respondents fell into the “Very High” category (Level 1 - Develop), indicating that there were no individuals with very large competency gaps. However, there are two respondents, namely S10 and S11, who fall into the “High” category (Level 2 - Worthy). This indicates that they have significant competency gaps and urgently need training to improve their understanding and skills. Therefore, they should be a top priority in training programs designed to strengthen their competencies in relevant areas.

Meanwhile, most respondents, namely S1, S2, S3, S4, S5, S6, S7, S8, S9, S12, and S13, fall into the “Moderate” category (Level 3 - Competent). This indicates that they still have competency gaps, but they are still within reasonable limits. While they still require training to improve their skills, their needs are less urgent than the previous group. Therefore, training for this group is still recommended, but can be done in a later stage after the group with urgent needs has received intervention first. No respondents fell into the “Proficient” category (Level 4 - Proficient). This indicates that all respondents still have room for improvement and further development. Therefore, the training designed should consider the different levels of competency needs so that the results obtained can be more optimal and by the needs of each individual.

In general, teachers at MTs Inovatif Daarul Ihsan still face limitations in mastering pedagogical competencies. Skills that need to be improved in this aspect include innovation in the design and implementation of appropriate model-based learning and a deep understanding of the character of each learner. This gap is of particular concern, considering that this school has great potential to grow. Pedagogical competence is an essential skill, especially in shaping the character of adolescent learners and applying interactive learning methods that are relevant to their needs (Setiawan et al., 2025). This is all the more important as schools are integrated with boarding school, which presents complex challenges for learners' development, including potential negative impacts on their mental health. The boarding school and school environment often create their own dynamics that can potentially affect students' academic performance. In addition, some learners in this school come from less supportive family backgrounds, such as experiencing family breakdown, being orphaned, or not receiving adequate attention. These factors can hurt learners' behavior, especially in the adolescent development phase, which tends to be more difficult to control.

According to the view of the educational science development team of the Faculty of Education, University of Education Indonesia (FIP-UPI), improving pedagogical competence can be done through various teacher professional development programs, such as seminars, workshops, and small-scale training, including teacher working groups (KKG) and subject teacher meetings (MGMP) (Asrin et al., 2024). In addition, teachers can also participate in large-scale training programs organized by related institutions, such as the Education Quality Assurance Agency (LPMP), the Center for the

Development and Empowerment of Educators and Education Personnel (P4TK), and other institutions (Muzaffar et al., 2023b). In the school environment, various forms of training programs have been implemented, including workshops and In-House Training (IHT), as well as the participation of some teachers in the Continuing Professional Development (PKB) Program implemented through the subject MGMP. However, the evaluation results show that further training is still needed to optimally improve the pedagogical competence of educators. It is hoped that future training programs can have a more significant impact, especially for homeroom teachers, in managing learners effectively to ensure optimal learning processes and improved academic outcomes. Ganji & Rao (2024) state that training needs analysis includes a thorough evaluation of various activities to identify performance gaps and adjust to the latest technological developments. This process aims to understand the difference between current employee capabilities and expected standards, so that it becomes the basis for designing more targeted training programs. Thus, training needs analysis can be viewed as a systematic mechanism that includes various activities, including competency gap mapping. This analysis is conducted through data collection from various sources to identify problems. Find solutions and formulate policy recommendations. The results of the analysis are then used as a reference in designing training programs that are more effective and by the needs of educators.

Previous analysis shows that human resource development (HRD) design can be integrated with off-the-job training methods, where training and development are conducted separately from the workplace. This program aims to provide teachers with the necessary skills and knowledge to perform their duties more effectively. However, the methods used are still passive, as they mostly rely on one-way communication, such as through the presentation of information designed to convey attitudes, concepts, and skills to participants.

The recommendation used to develop the competence of teachers at MTs Inovatif Daarul Ihsan is training using a model approach, namely Content Knowledge (CK), Pedagogical Knowledge (PK), and Pedagogical Content Knowledge (PCK). CK refers to the teacher's understanding of the subject matter being taught, such as math, science, or language. PK includes teaching strategies, classroom management, evaluation methods, and general educational principles. Meanwhile, PCK is the teacher's ability to connect understanding of the content of the material with effective teaching strategies, so that students can understand concepts better. Training with this approach is conducted at MTs Inovatif Daarul Ihsan to improve teacher competence in developing pedagogical skills and adaptability to technological developments in learning.

At MTs Inovatif Daarul Ihsan, the integration of digital technology in learning is an important element in improving teaching effectiveness. Research (Lestarinigrum et al., 2024) shows that the utilization of technology can increase student engagement in their understanding of the material. Therefore, training for teachers needs to include the utilization of technology in learning, such as blended learning, flipped classrooms, and the use of relevant educational software. With this approach, teachers can deliver materials more interactively and engagingly for students.

The recommended training model covers three aspects. First, CK training, which aims to improve the quality of teaching materials through workshops, research-based seminars, case studies, and scientific discussions to deepen teaching understanding (Kshetree, 2023). Second, PK training which is designed to equip educators with skills in managing classroom dynamics and conducive learning environments (Hollenstein & Brühwiler, 2024). Third, PCK training, which focuses on intervention strategies proven to improve learning outcomes, where the use of workshops and seminars contributes positively to teachers' instructional effectiveness (Fukaya et al., 2024).

The implementation of this training can be done through various methods, including

workshops, seminars, online training, and direct assistance in the classroom. Periodic evaluation of the effectiveness of the training is also needed so that teacher competence continues to develop following technological advances and student needs. Zou's model of CK, PK, and PCK relies only on mastery of digital tools (Zou et al., 2024), but also on the teacher's ability to integrate technology with a pedagogical approach and understanding of teaching material (Zhao & Wang, 2024). Success in implementing technology in learning depends on the balance between these elements (Thi et al., 2024). Therefore, teachers not only need to understand how technology works, but also be able to use it effectively to enhance students' learning experience.

Considering the importance of integrating CK, PK, and PCK in learning at MTs Inovatif Daarul Ihsan, blended learning-based training is a recommended solution to improve teachers' pedagogical competence. This training aims to equip teachers with digital technology, so that learning becomes more flexible and adaptive to the times. Thus, teachers can create a learning environment that is interesting, interactive, and in line with students' developmental needs. In addition, this training also broadens teachers' horizons, not only in the technical aspects of using digital devices, but also in the strategy of utilizing them to improve the overall quality of learning.

To achieve these goals, a structured training program with clear objectives, expected outcomes, and curriculum is needed. This thoroughly designed program is expected to improve teachers' competence in integrating technology into the learning process optimally. The following is the design of the proposed training activities:

1. name of activity:

Pedagogical Competence Improvement Training for Teachers at MTs Inovatif Daarul Ihsan

2. activity objectives:

- a. Provide training and knowledge to educators about effective pedagogy.
- b. Improve teachers' understanding of the characteristics of adolescent students.
- c. Develop skills in applying learning methods that are by students' characters.

3. expected results:

- a. Teachers have better pedagogical skills in designing and implementing lessons.
- b. Teachers better understand learners' characters and can adapt teaching methods to their needs.
- c. Teachers can apply more comprehensive learning evaluation techniques.

4. material/curriculum structure:

- a. Basic theory of pedagogy and its application in learning.
- b. Innovative strategies in model-based learning design.
- c. Application of learning methods that are by the characteristics of students.
- d. Evaluation of learning and assessment of student learning outcomes.

5. activity implementation stages

Table 5. *Activity implementation stages*

No	Activity Stage	Activity	Result	Person in Charge	Lesson Hours
1.	Preparation	Apply for approval from the head of the foundation for training implementation	Obtain approval for training implementation	Facilitator	
		Identify training needs through observation and interviews	Knowing the need for training to develop teachers' pedagogical competence	Facilitator	
		Training plan design (TNA)	Training design is ready for implementation	Facilitator	
		TNS distribution to teachers	Obtained information that teachers need pedagogical competency development training	Facilitator	
		Data and information collection	Data is complete and ready for processing	Facilitator	
		Formation of the training organizing committee	Formation of the training organizing committee	Facilitator	
		Preparation of training materials related to pedagogical competence and supporting tools	Training materials and supporting tools are ready for use	Facilitator & Organizer	
		Final meeting: Briefing and coordination with resource persons	Resource persons and training program overview finalized	Principal, Facilitator, Organizer, Resource Person	
2.	Implementation	Opening by the Head of the Foundation and Principal	Opening ceremony and briefing from the Head of the Foundation and Principal	Organizer	
		Material 1: Basic theories of pedagogy and their application in learning	Participants understand the basic concepts and urgency of developing pedagogical competence	Resource Person	7 LH
		Reflection: Answering questions about the value gained from the training	Participants reflect on the material that has been presented	Resource Person	1 LH
		Material 2: Innovative strategies in model-based learning design	Participants understand the importance of innovative Strategies in model-based learning design	Resource Person	6 LH
		Reflection: Make a personal summary and answer questions	Participants reflect on the material and identify implementation steps	Resource Person	1 LH

No	Activity Stage	Activity	Result	Person in Charge	Lesson Hours
		Material 3: Application of learning methods that are by the characteristics of students	Participants understand learning evaluation techniques that support the development of pedagogical competencies	Resource Person	7 LH
		Reflection: answer questions about the application of learning methods based on the characteristics of students	Participants reflect on the material and plan for implementation at school	Resource Person	1 LH
		Material 4: Evaluation of learning and assessment of student learning outcomes	Participants understand learning evaluation and assessment of student learning outcomes	Resource Person	6 LH
		Reflection: answer questions about the learning evaluation	Participants reflect on the material and plan for implementation at school	Resource Person	1 LH
		Evaluation: Provide feedback and discussion on training materials	Participants and facilitators discuss materials to improve future trainings.	Facilitator & Organizer	2 LH
		Evaluation meeting: Identify shortcomings for evaluation	Identify training shortcomings for future improvement	Principal, Facilitator, Organizer, Resource Person	
		Reflection: measuring the ability of participants related to pedagogical competence	Participants measure their understanding and skills after the training	Facilitator & Organizer	
		Follow-up plan: Develop a pedagogical competency development plan	Participants develop an implementation plan at school based on the training results	Facilitator & Organizer	
		Reporting: Compile a report on the results of the training implementation	A report on the implementation of the training is submitted to the principal	Facilitator & Organizer	
Total LH					32 LH

As illustrated in the Training Needs Analysis (TNA) table, a comprehensive overview of the key activities undertaken at each stage of the training program has been presented. The table details the specific tasks, responsible parties, and expected outcomes to ensure effective training planning, implementation, and evaluation. By systematically identifying training needs, preparing relevant materials, and engaging competent facilitators, the program aims to improve teachers' pedagogical competencies, thereby creating impactful learning experiences and long-term professional development.

1. Target Participants

- a. MTs Inovatif Daarul Ihsan Teacher;
- b. Teachers who have a role in improving pedagogical competence to improve the quality of learning.

2. Resource Persons/Instructors/Mentors/Trainers/Facilitators

The following individuals have relevant expertise and experience in pedagogy and teacher competency development, providing insights and strategies that apply to teaching.

- a. Source (Interviewee)
 - 1) CH, S.Pd. (Class 2 Empowering teacher)
 - 2) KH, S.Pd. Gr. (Class 2 Empowering teacher)
- c. Facilitator
 - 1) Head of MTs Inovatif Daarul Ihsan
 - 2) Deputy Head of Madrasah for Curriculum
- d. Organizers
School Development Team
- e. Time and Place
 - 1) Days: Monday - Wednesday
 - 2) Date: May 12 - 14, 2025
 - 3) Place: MTs Inovatif Daarul Ihsan

The source of funding for training for MTs teachers can come from the BOS Fund as well as funding support from foundations, which is allocated following applicable regulations to improve the quality of education and teacher professionalism. The use of BOS funds for teacher training is based on Permendikbudristek Number 63 of 2022 concerning Technical Guidelines for the Management of BOS Funds, which stipulates that these funds can be used to improve the competence of educators (Permendikbudristek, 2023). In addition, the Decree of the Director General of Islamic Education, Ministry of Religion, concerning the Technical Instructions for BOS Madrasah in 2024, also stipulates that BOS Madrasah can be used for teacher professional development activities (Dirjen Pendis Kemenag, 2024). Meanwhile, funds from foundations can be used following the provisions in PMA Number 90 of 2013 concerning the Implementation of Madrasah Education and Law Number 20 of 2003 concerning the National Education System, which states that education funding is a shared responsibility between the government, the community, and education providers, including foundations (PMA RI, 2013).

In the management of BOS funds and foundation funds, the principles of effectiveness, efficiency, and accountability must be the main guidelines to ensure that the budget is used optimally to support improving the quality of education. By the provisions of applicable regulations, these funds can be used for various programs that improve the quality of education services, including training for teachers to improve professional competence and support improving the quality of learning in educational units. With adequate financial support, the implementation of CK (Content Knowledge), PK (Pedagogical Knowledge), and PCK (Pedagogical Content Knowledge)-based training at MTs Inovatif Daarul Ihsan can run optimally and sustainably, to create more professional and competitive educators.

Study Limitations

The current study provides valuable insights into teacher competencies and training needs at MTs Inovatif Daarul Ihsan; however, several limitations should be acknowledged. First, regarding participant selection, the study included only 13 teachers from a single madrasah, which limits the generalizability of findings to broader Islamic educational contexts (Merriam & Tisdell, 2022). While purposive sampling was appropriate for the research aims, the relatively small sample size constrains the statistical power of quantitative analyses and may not fully represent the diversity of teacher experiences in similar institutions.

Second, the scope of the research focused specifically on pedagogical competencies while not fully exploring other dimensions of teacher professionalism, such as personality competence, social competence, and professional competence as outlined in Permendiknas No. 16 Year 2007 (Darling-Hammond et al., 2022). This narrow focus, while allowing for depth in examining pedagogical aspects, limits understanding of how these competencies interact with other professional attributes.

Third, temporal and locational constraints affected the study's implementation. Data collection was conducted over a relatively short period (two months), which may not have captured developmental changes in teacher competencies over time. A longitudinal approach would have provided more insights into how competencies evolve through ongoing professional development (Desimone & Garet, 2020). Additionally, the research was limited to a single geographic location with its unique socio-cultural context, potentially affecting the transferability of findings to Islamic educational institutions in different regions.

Fourth, methodological limitations include the reliance on self-assessment measures, which may introduce bias through social desirability effects, where respondents potentially overestimate their competencies (Podsakoff et al., 2023). While triangulation measures were employed to mitigate this concern, direct classroom observations were limited and could have provided more objective assessment of actual teaching practices. Additionally, the Training Needs Survey (TNS), though validated, primarily assessed theoretical understanding rather than practical application of pedagogical knowledge in authentic classroom settings (Baran & AlZoubi, 2023).

Finally, the study focused primarily on identifying current competencies and designing a training model without implementing and evaluating the effectiveness of the proposed interventions. A more comprehensive research design would include implementation and assessment of training outcomes to validate the proposed model's efficacy in addressing the identified competency gaps (Darling-Hammond et al., 2022). These limitations suggest opportunities for future research, including longitudinal studies with larger, more diverse samples, mixed-methods approaches incorporating extensive classroom observations, and intervention studies that evaluate the impact of the proposed training model on teacher practice and student outcomes.

Conclusion and Recommendations/Implications

This study analyzing teacher training needs at MTs Inovatif Daarul Ihsan revealed that the majority of teachers (84.6%) are at Level 3 (Competent) with an average score of 34.31, below the proficiency standard of 39, with no teachers reaching Level 4 (Proficient). Domain-specific analysis identified Pedagogical Knowledge as the area with the most significant deficiencies (mean score 10.08), particularly in implementing classroom action research (2.62), differentiated instruction strategies (2.85), and utilizing educational technology (3.00). Content Knowledge emerged as the

relative strength (mean score 12.77), while Pedagogical Content Knowledge showed intermediate gaps (mean score 11.46). Demographic factors, particularly teaching experience and prior training exposure, significantly influenced competency levels, with early-career teachers demonstrating greater needs for professional development.

Based on these findings, we recommend implementing a comprehensive training model grounded in the three-component framework of Content Knowledge, Pedagogical Knowledge, and Pedagogical Content Knowledge. This integrated approach should prioritize enhancement of pedagogical knowledge through hands-on workshops in classroom action research, differentiated instruction, and educational technology integration—areas where deficiencies were most pronounced. A tiered implementation strategy is advised, with immediate interventions for the two teachers at Level 2 (Worthy), followed by tailored professional development for the larger group at Level 3 (Competent). The program design should incorporate both theoretical foundations and practical application opportunities, with particular attention to the unique challenges presented by the Islamic boarding school environment and the predominantly young teaching staff profile.

This research contributes to understanding teacher professional development needs in Islamic educational contexts and demonstrates the effectiveness of systematic Training Needs Analysis in designing targeted interventions. The findings suggest that addressing pedagogical competency gaps requires consideration of both domain-specific knowledge deficiencies and teacher demographic characteristics when designing professional development programs. Future research should evaluate the effectiveness of the proposed training program through longitudinal studies, explore the integration of all four teacher competency domains, and investigate the direct impact of enhanced teacher competencies on student learning outcomes in Islamic boarding school settings. By implementing these recommendations, MTs Inovatif Daarul Ihsan can enhance teacher pedagogical competence, ultimately improving educational quality and student outcomes in alignment with both Islamic educational values and national professional standards.

Disclosure statement

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