Relationship between Self-Efficacy and Pedagogical Content Knowledge (PCK) of Madrasah

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Abstract: This study reveals a significant relationship between self-efficacy and pedagogical content knowledge (PCK) among madrasah teachers. Teachers with high self-efficacy are generally more capable of implementing PCK effectively in the learning process, which in turn enhances the quality and outcomes of student learning. Therefore, simultaneous efforts to strengthen both self-efficacy and PCK through integrated training programs, professional development, and reflective teaching practices are crucial strategies for improving the quality of education in madrasahs. Urgent Areas for Future Research Future studies should investigate the effectiveness of integrated training models that simultaneously develop teachers' self-efficacy and PCK. In addition, longitudinal research evaluating the long-term impact of the self-efficacy–PCK relationship on student performance in madrasahs is essential to support evidence-based, quality-oriented education policy.

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A. INTRODUCTION

Self-efficacy, or an individual's belief in his or her ability to perform a particular task, is a concept introduced by Bandura (1997) and has become a major focus in educational studies. In the context of education, teacher self-efficacy plays an important role in influencing teaching effectiveness and student learning outcomes (Bandura, 1997). Meanwhile, Pedagogical Content Knowledge (PCK) is the integration of understanding of teaching materials and effective pedagogical strategies, as proposed by Shulman (1986). PCK enables teachers to deliver material in a way that students can understand, becoming in effective teaching practice a key component.

Research by Daud and Hasri (2023) showed that students of Madrasah Ibtidaiyah Teacher Education Study Program (PGMI) have positive self-efficacy in facing limited face-to-face learning, especially in the MI / SD curriculum review course. Aspects such as magnitude, generality, and strength of self-efficacy are seen to develop along with adaptation to information technology-based learning methods. Another study by Rambe et al. (2024) found that self-efficacy, along with social support, significantly contributed to the resilience of PGMI students, showing the importance of self-belief in facing academic challenges. In addition, Nurani (2023) identified teachers' strategies in fostering students' self-efficacy, emphasizing the role of teachers in shaping students' keyaki through appropriate pedagogical approaches.

The study by Novikasari et al. (2024) examined the relationship between self-efficacy and PCK among MI teachers, finding that although there was a correlation, the relationship was relatively weak, indicating the need to strengthen both aspects separately. Research by Nurmatin (2024) highlighted MI teachers' abilities in digital literacy through the TPACK (Technological Pedagogical Content Knowledge) approach, which reflects the integration of technology in PCK practices. Meanwhile, research by Gultom and Mampouw (2024) emphasized the importance of PCK development in mathematics learning, showing that a deep understanding of teaching materials and effective teaching strategies are indispensable for MI education..

Research by Novikasari et al. (2024) showed that although there was a relationship between self-efficaoy and PCK among MI teachers, the correlation was weak, indicating that increasing self-efficacy does not automatically improve PCK. The study by Wahyuni and Pratiwi (2019) found that self-efficacy in technology integration contributed to the development of TPACK, which is an extension of the concept of PCK. In addition, research by Rambe et al. (2024) showed that self-efficacy plays a role in increasing resilience, which can affect teachers' ability to develop PCK through experience and adaptation to teaching challenges.

The study by Nurmatin (2024) showed that MI teachers with high self-efficacy in technology use tend to have better TPACK skills, reflecting the influence of self-efficacy on PCK development. Research by Wahyuni and Pratiwi (2019) also supports this finding, showing that self-efficacy in technology integration contributes to TPACK development. In addition, a study by Rambe et al. (2024) showed that self-efficacy plays a role in increasing resilience, which can affect teachers' ability to develop PCK through experience and adaptation to teaching challenges.

From the studies reviewed, it appears that self-efficacy and PCK are two important aspects of MI teachers' professional development. However, the relationship between the two is still not fully understood, with some studies showing weak correlations. This gap suggests the need for further research to understand how self-efficacy can effectively support the development of PCK. The novelty of this study lies in the comprehensive approach that examines the relationship between self-efficacy and PCK in the context of MI teachers, taking into account factors such as technology integration and resilience, which have not previously been widely discussed in the literature.

B. METHOD

This study uses a library research approach with an integrative literature review method. This method allows researchers to systematically integrate previous research results to understand the relationship between self-efficacy and pedagogical content knowledge (PCK) in Madrasah Ibtidaiyah (MI) teachers. This approach was chosen because it provides space to conduct an in-depth analysis of trends, findings, and scientific contributions from various relevant literatures (Snyder, 2019). The purpose of this method is to synthesize knowledge critically so as to obtain a complete and comprehensive understanding of the issues studied.

The data sources in this study were obtained from several reputable scientific databases such as Google Scholar, Scispace, Directory of Open Access Journals (DOAJ), and Scopus. The literature used includes national and international journal articles published from 2015 to 2024. The inclusion criteria included: (1) articles that discuss teacher self-efficacy, pedagogical content knowledge, or the relationship between the two; (2) peer-reviewed articles; and (3) articles available in full text. Meanwhile, the exclusion criteria included: (1) non-scientific articles such as opinions or essays; (2) articles not available in full text; and (3) articles outside the specified publication timeframe.

The literature search process was conducted using keywords such as: "self-efficacy of teachers", "pedagogical content knowledge", "PCK in Islamic primary education", and "relationship between self-efficacy and PCK" in English and Indonesian. The search process began with an initial search to map the most relevant keywords, then filtering by title and abstract. After that, a selection was made based on the full content of the article to ensure compatibility with the research objectives. All articles that met the criteria were then classified and thematically analyzed to identify patterns, relationships, and research gaps.

The data analysis method used is thematic analysis by grouping research results based on similar themes or focuses, such as the direct relationship between self-efficacy and PCK, supporting factors, and their impact on teaching practice. Validity and reliability were maintained through source triangulation (from various databases), inter-author verification, and the use of articles from reputable and indexed journals. In addition, the data recording process was carried out systematically using reference management software such as Zotero and Mendeley to keep the documentation and article searches accurate and transparent (Booth, Sutton, & Papaioannou, 2016).

C. RESULTS AND DISCUSSION

1. Madrasah Teachers' Self-Efficacy Level in Learning Practices

The level of madrasah teachers' self-efficacy in learning practices is an important factor that can affect the quality of education in Islamic education institutions. Self-efficacy, or individuals' beliefs about their ability to achieve certain outcomes, plays a crucial role in how teachers manage their teaching practices and interact with students. Research shows that there is a positive relationship between teachers' self-efficacy and the effectiveness of the teaching strategies they use, as well as student learning outcomes (Dzul et al., 2023), Wilson et al., 2018).

In the context of Islamic education, research by Dzul et al. highlights that improving teachers' self-efficacy can be achieved through creating a trusting school climate and enhancing teachers' knowledge and skills through professional learning communities (Dzul et al., 2023). This means that a positive and collaborative work environment not only improves teachers' competencies but also their confidence in teaching. In addition, the nature of leadership in a school, as in the study by Aloka and Odanga, is seen to influence teachers' self-efficacy, where support from management greatly contributes to teachers' perceptions of their own abilities (Aloka & Odanga, 2022).

Another study by Özdemir and Hastürk showed that teachers who have high levels of self-efficacy tend to use student-centered teaching techniques and are able to adapt to students'

needs more effectively (Özdemir & HASTÜRK, 2021). This aspect is particularly relevant in the madrasa context, where an inclusive and responsive teaching approach to students' needs is essential. In addition, a study by Qureshi showed that a positive school climate, which includes support and trust among teachers and management, can act as a mediator in reducing burnout levels among teachers, which in turn can increase their self-efficacy (Qureshi, 2024).

In addition to external factors, there are also internal variables that influence teachers' self-efficacy. Other research suggests that individuals' beliefs about their capacity to manage situations can contribute to better self-management practices in education, potentially improving their performance, although not specifically in the context of teachers (Dwa & Panthee, 2021). This suggests that the development of teachers' self-efficacy is not only related to external support, but also to self-management and personal reflection.

In order to improve learning outcomes in madrasahs, it is important for education stakeholders to pay attention to developing teachers' self-efficacy. This includes relevant training, professional community development and coaching that can strengthen teachers' confidence in implementing effective and inclusive education practices. By doing so, madrasah teachers will not only improve their knowledge and skills but also be able to better inspire and facilitate student success.

2. Characteristics and Implementation of Pedagogical Content Knowledge (PCK) in Madrasahsub Title

Characterizing and implementing pedagogical content knowledge (PCK) in madrasahs is a fundamental aspect of improving the quality of education. PCK, first introduced by Shulman, is a blend of content knowledge and pedagogical knowledge. It encompasses an understanding of how to deliver specific material in an effective way to facilitate student learning, as well as how content can be adapted and presented to suit learners' needs (Suprapto, 2019; , Solihin et al., 2021; , (Sutamrin et al., 2022).

PCK characteristics in the madrasah context include knowledge of how students understand the material, how best to explain concepts, and effective pedagogical approaches. According to research by Barut et al., there is a significant relationship between the level of PCK of mathematics teachers and student learning achievement, indicating that teachers who have strong PCK are able to manage the teaching and learning process more effectively, which has a positive impact on student learning outcomes (Barut et al., 2021). This is also corroborated by Sutamrin et al., who explained that PCK is a key element to improve teachers' instructional quality (Sutamrin et al., 2022).

The implementation of PCK in madrasah can be seen in the way teachers design and implement learning. Teachers who have good pedagogical knowledge not only understand the content being taught, but are also able to adapt teaching methods to make them more relevant and interesting for students. Pratiwi et al. emphasized the importance of adequate content knowledge for teachers, because the lack of such knowledge can cause fear in teaching (Pratiwi et al., 2022). This suggests the need for special attention in the development of Content Pedagogical Competence among madrasah teachers.

Furthermore, research by Ningsih and Siagian shows that PCK can be accessed through collaborative learning and practical field experience, which in turn helps prospective teachers understand the importance of integrating content and pedagogical knowledge in the classroom (Ayuningtyas & Apriandi, 2020). Interactive and project-based approaches can significantly improve PCK and other teaching skills. Emphasis on developing TPACK (Technological Pedagogical and Content Knowledge) is also important, especially in the digital learning era, where teachers must be able to utilize technology in content teaching (Hariati et al., 2022).

PCK development should be a priority in madrasah teacher education programs. Torres and other stakeholders need to create an enabling environment, including providing ongoing training and opportunities for collaboration among teachers. In this way, madrasahs will not only strengthen teachers' pedagogical competence but also improve students' learning experiences, ultimately contributing to better academic outcomes. In conclusion, PCK in madrasas greatly affects the quality of learning. A good understanding of content learning accompanied by effective teaching strategies will lead to better learning experiences for students. Therefore, improving PCK among teachers should be the main focus of efforts to improve the quality of education in madrasah.

3. Analysis of the Relationship Between Self-Efficacy and Madrasah Teachers' PCK

Analyzing the relationship between madrasah teachers' self-efficacy and pedagogical content knowledge (PCK) is an important aspect in understanding how these two concepts can contribute to improving learning quality. Self-efficacy, defined as an individual's belief in their ability to succeed in a given situation, is closely related to PCK which includes teachers' knowledge of teaching materials and effective teaching strategies Wang & Zhan (2023).

Research shows that teachers with high levels of self-efficacy tend to have better PCK. According to Younas et al., teachers who have strong PCK are better able to face challenges in teaching and adapt to the needs of students in the classroom (Younas et al., 2024). This suggests that an increase in PCK can contribute to an increase in teachers' confidence in teaching, so they feel more confident to apply various effective teaching methods. Similar research by Krijan et al. supports that teachers who understand content and teaching strategies have a tendency to use a more inquiry-based and student-centered approach, thus creating a more dynamic learning environment (Krijan et al., 2018).

Conversely, low self-efficacy can negatively impact PCK implementation. For example, Lewis et al. note that support in teacher education should focus on improving their self-efficacy as educators, as this will impact on how they apply pedagogical and content knowledge in the classroom (Lewis et al., 2021). When teachers feel inadequate, they are likely to be anxious and uncertain in their use of PCK, which can ultimately affect student learning outcomes.

Furthermore, experience also plays a role in the relationship between self-efficacy and PCK. Azgın and Şenler found that more experienced teachers demonstrated better PCK compared to less experienced teachers. This experience, in many cases, contributes to increased self-efficacy, as more experienced teachers are usually more comfortable and

confident in applying their pedagogical knowledge (Azgın & Şenler, 2018). Thus, increasing experience and adequate training for teachers in madrasah could be a strategic step to improve both self-efficacy and PCK.

In addition, Kaya explained that technological pedagogical knowledge (TPACK) also affects teacher self-efficacy, especially in the context of learning in the current digital era. Teachers who are skilled in integrating technology into learning tend to have higher self-efficacy as they feel more prepared to face the challenges of classroom teaching (Kaya, 2019). This shows that the development of PCK, especially in the aspect of technology, is very important to help madrasah teachers in managing students' learning experience. Finally, in the madrasah context, it is important to support teachers in building the link between self-efficacy and PCK. Training that focuses on developing pedagogical and content competencies, as well as enhancing practical experience, should be conducted to build teachers' confidence in implementing PCK effectively. This will create a more positive learning environment and support student success.

D. CONCLUSIONS AND SUGGESTIONS

Self-efficacy is an important element in madrasah teachers' professional practice, as it directly affects their confidence in designing, implementing and evaluating learning. Teachers with high levels of self-efficacy tend to be more proactive, innovative and resilient in facing learning challenges. Increased self-efficacy can be realized through relevant training, professional community support and ongoing coaching to enable teachers to implement effective and inclusive learning approaches.

Meanwhile, Pedagogical Content Knowledge (PCK) is the main foundation for quality teaching. PCK reflects the teacher's ability to combine understanding of material content with pedagogical strategies that are in accordance with student characteristics. In madrasah, a good mastery of PCK has been proven to support the creation of contextualized, meaningful learning and encourage active student involvement. Therefore, improving the quality of PCK among madrasah teachers is a strategic priority in efforts to improve the quality of education.

Based on these findings, it can be concluded that there is a close relationship between madrasah teachers' self-efficacy and PCK. Both support each other in creating optimal learning and have a positive impact on student learning outcomes. Future research should focus on developing an integrated training model that can simultaneously improve these two aspects, as well as longitudinal studies to evaluate the long-term impact on student learning performance and the quality of teacher teaching in madrasah.

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