Al-Jabar: Jurnal Pendidikan Matematika
Volume 15, Number 2, 2024, Pages 323 – 332
DOI: 10.24042/ajpm.v15i2.20891

Quality management of mathematics learning in realizing professional teachers in madrasah

Nurul Hidayah*, Nuryadin Ali Mustofa, Purwiro Harjati, Agus Pahrudin
UIN Raden Intan Lampung, Lampung, Indonesia
✉ nurul.hidayah@radenintan.ac.id*

Article Information
Submitted March 12, 2024
Revised May 03, 2024
Accepted Dec 12, 2024

Keywords
Mathematics,
Professional teachers,
Quality management.

Abstract

Background: The quality of education is a crucial indicator of a teacher's professionalism, especially in complex subjects like mathematics. Improving the quality of mathematics education requires structured initiatives aimed at developing teacher professionalism through effective changes.
Aim: This study aims to analyze and identify quality management practices in mathematics education and how these practices contribute to the development of teacher professionalism in madrasah.
Method: This research employs a qualitative descriptive approach. The objects of the study include quality management in education, mathematics learning, and professional teachers, while the subjects are mathematics teachers teaching in madrasas. Data were collected through observation and interviews. Data analysis was conducted which involves data reduction, data presentation, data display, and conclusion.
Results: The research findings indicate that during the planning stage, teachers design lessons by considering the existing curriculum, lesson plans (RPP), and innovative teaching methods and media, adapting to technological and communication advancements. Teachers are selected based on their educational qualifications and mathematical skills. Organization involves preparing teachers to manage learning activities, including providing assistance to students in need. Leadership training and development are also provided to enhance classroom management. The implementation of learning consists of introductory, core, and closing stages, focusing on developing teachers' creativity and work ethic. Evaluation is conducted after the learning process to identify and address deficiencies in mathematics teaching and assessment.
Conclusion: The quality of mathematics education in fostering professional teachers in madrasas is based on management functions, namely planning, organizing, implementing, and evaluating.

INTRODUCTION

Madrasah as educational institutions grounded in Islamic values, face the challenge of integrating abstract and logical mathematics education with a curriculum that also emphasizes spiritual and moral values (Didham & Ofei-Manu, 2020; Mappaenre et al., 2022). According to Nurdin (2020) and Nurdani et al. (2021), effective integration of these values requires a comprehensive quality management approach that includes input, process, output, and outcome, as defined by Nasser et al. (2021). This approach must

How to cite Hidayah, N., Nuryadin., Mustofa, A., Harjati, P., & Pahrudin, A. (2024). Quality management of mathematics learning in realizing professional teachers in madrasah. *Al-Jabar: Pendidikan Matematika*, *15*(2), 323-332.
E-ISSN 2540-7562
Published by Mathematics Education Department, UIN Raden Intan Lampung

reflect the dynamic and diverse needs of the madrasah community, distinguishing it from secular education.

Quality in education encompasses the goodness or badness of objects, skills, or levels (Pettersson, 2021). In the context of madrasah education, quality is perceived as both an absolute and relative concept, depending on specific needs and environmental dynamics. The application of Total Quality Management (TQM) assists educational institutions in adapting the philosophy of continuous improvement to meet the ever-evolving educational expectations (Abaimuhtar & Yasin, 2024; Girmanová et al., 2022). This is particularly relevant for enhancing teacher professionalism and improving student learning outcomes, where teachers play a pivotal role in achieving these high standards.

Teachers play a crucial role in achieving high-quality education in madrasahs. As the main stakeholders in educational programs, teachers not only support components such as teaching materials and learning media but also provide adequate facilities and infrastructure (Ikhsannudin & Pakpahan, 2021; Mulay & Khanna, 2020; Nogueiro et al., 2022). Professional teachers are those who possess broad knowledge (Sanusi et al., 2022), specific skills (Byrd & Alexander, 2020), and maturity in lesson planning (Zhumash et al., 2021). They must be independent, committed, visionary, creative, and innovative—traits that set high standards in educational professionalism and are reflected in their planning and execution of lessons (Asiyah et al., 2021; Pribudhiana et al., 2021). Effective mathematics instruction is key to developing students' intellectual capabilities (Arisoy & Aybek, 2021).

Mathematics education in madrasahs often presents a significant challenge due to the abstract nature of the subject matter. Teaching approaches need to progress from simple to complex and from concrete to abstract to facilitate better understanding (Moein et al., 2023). Intense mental activity is required to grasp mathematical concepts, which can then be applied in various practical situations. Professional teachers must be able to adapt and manage learning effectively in accordance with current educational regulations (Wulandari & Nurhaliza, 2023), ensuring that mathematics instruction not only meets academic standards but also supports the intellectual development of students.

Setyo et al. (2021) state that quality management in madrasahs encompasses planning, implementation, and evaluation. These steps are necessary to achieve high-quality education in line with contemporary developments. During the planning phase, the vision, mission, and quality guidelines set by the government form the foundation for formulating the curriculum and the unique characteristics of madrasahs. The implementation of this curriculum involves teachers and educational staff utilizing facilities and infrastructure to build effective community relationships. Evaluation is conducted through end-of-semester assessments and activity reports, which are critical for continuous improvement. Nashihah (2020) in her research asserts that mathematics learning management has a significant impact on increasing students' interest in learning. Teachers play a central role in fostering positive attitudes and designing effective learning experiences. Teachers are required to optimally plan instructional goals and materials, methods, media, and learning resources, as well as conduct comprehensive

evaluations, both formative and summative, to continuously measure and enhance learning effectiveness (Ford & Hewitt, 2020; Hanefar et al., 2022).

Several previous studies have explored quality management in madrasah education. Research by Muflihah & Haqiqi (2019) investigates the role of school principals in enhancing quality management in madrasahs, highlighting how principals can create a supportive learning environment for teachers. Malikah et al. (2022) focus on the aspects of planning, implementation, and evaluation of mathematics instruction within the context of a new curriculum, providing insights into curriculum adaptation to support teacher professionalism. Muniroh et al. (2022) also examine the influence of managerial capabilities and supervision by madrasah principals on teacher performance, emphasizing the importance of effective supervision in improving the quality of mathematics education.

From existing research, it can be concluded that quality management of mathematics instruction in madrasahs to achieve professional teachers requires effective supervision of teacher performance. However, no studies have yet measured quality management by integrating professional development for teachers in madrasahs. This study adds to the existing literature by focusing on the application of quality instruction to produce more professional mathematics teachers. Based on the issues outlined, the primary objective of this study is to analyze and identify aspects of quality management in mathematics instruction that can directly influence teacher professionalism. This includes developing new strategies for integrating quality management with ongoing professional development for mathematics teachers in madrasahs, aimed at enhancing their pedagogical and methodological skills within the framework of Islamic values.

METHODS

Design

This study employs a qualitative approach with a descriptive qualitative type. This approach is chosen to gain an in-depth understanding of quality management in mathematics instruction and teacher professionalism in madrasah ibtidaiyah (Islamic elementary schools).

Participants

The objects of this research are the quality management process of mathematics instruction and teacher professionalism in madrasah ibtidaiyah. The subjects of the study involve mathematics teachers teaching at madrasah ibtidaiyah. The selection of subjects is carried out using purposive sampling, choosing those who are considered to have the most knowledge and direct involvement in the implementation of quality management in education at the research location (Gabarre & Gabarre, 2020).

Data Analysis

Data analysis is conducted using the Miles and Huberman model, which includes four main steps (Miles & Huberman, 1994). The flow of data analysis techniques is presented in Figure

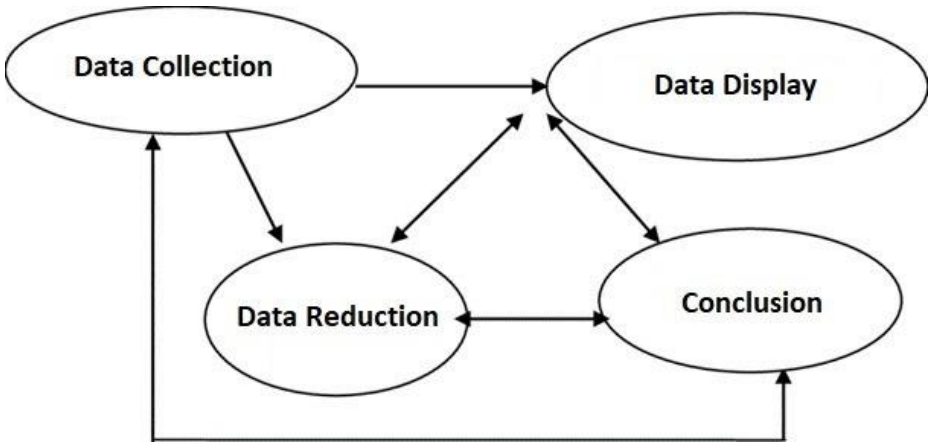

Figure 1. Miles and Huberman Analysis Steps (Sam & Qohar, 2016)

1. Data Collection: Data in this study are collected using three primary methods is observation and interviews. Direct observation is conducted in classrooms and the madrasah environment to observe interactions between teachers and students and the teaching practices applied. In-depth interviews are held with mathematics teachers to gain a comprehensive understanding of their views and experiences related to quality management and professionalism in teaching.
2. Data Reduction: Summarizing and simplifying data relevant to the research objectives.
3. Data Display: Organizing the reduced data into narrative form.
4. Conclusion: Formulating conclusions from the presented data and verifying them to ensure the findings are accurate.

RESULTS AND DISCUSSION

Result

Data Collection

The data in this research was collected using two methods: observation and interviews. Observations were conducted in classrooms and within the school environment to examine the interactions between teachers and students, as well as the teaching practices implemented. In addition, interviews were carried out with mathematics teachers to gain a comprehensive understanding of their perspectives and experiences related to quality management and professionalism in teaching.

Data Reduction

1. **Planning**: The school has adopted a dynamic approach to align with educational advancements. The establishment of educational standards is a collaborative effort involving the principal, vice principals, and teaching staff. These standards serve as guidelines for the systematic planning of learning activities, which include curriculum needs analysis, setting the direction for changes, and preparing official documents related to curriculum modifications. An example from an interview

states, "We have revised the curriculum to incorporate more relevant learning tools following the COVID-19 pandemic."

2. **Organizing**: Teachers selected to teach mathematics must possess specific qualifications and expertise in the subject. Preference is given to those with a Bachelor's degree in mathematics education. This ensures that teachers can deliver the material effectively and engagingly. Additionally, organizing includes providing individual assistance to students struggling with mathematical concepts. Teachers often hold extra sessions for students needing additional help, which has proven to enhance student understanding. One teacher noted, "We frequently hold extra sessions for students who need additional help, significantly improving their comprehension."
3. **Implementing**: The implementation of learning activities at the school focuses on applying interactive teaching methodologies. Teachers arrange classrooms to facilitate group discussions and interactive activities, increasing student engagement in the learning process. For instance, students sit in circles to promote peer learning and discussions. This approach helps create a collaborative and supportive learning environment where students can share ideas and work together to solve mathematical problems.
4. **Evaluating**: Evaluation is carried out continuously through formative and summative assessments and regular feedback sessions. Monthly meetings are held to review teaching methods and student progress. Teachers use evaluation results to identify learning gaps and refine teaching strategies. This ongoing evaluation ensures that the teaching approaches employed remain relevant and effective in improving student learning outcomes. A senior teacher mentioned, "We hold monthly evaluations to discuss what works and what doesn't, helping us continually improve our teaching methods."

Data Display

The reduced data is organized into a narrative format as follows:

1. **Planning:** The school collaboratively establishes educational standards that guide the systematic planning of learning activities. This process includes curriculum needs analysis, determining the direction for changes, and preparing official documents related to curriculum modifications. These steps are taken to ensure that the curriculum remains relevant and up-to-date with educational developments and student needs.
2. **Organizing:** The organization of learning includes selecting qualified and experienced mathematics teachers and providing individual assistance to students in need. This organization ensures effective learning and that each student receives the necessary attention to understand the material thoroughly.
3. **Implementing:** The use of innovative and interactive teaching methodologies has enhanced student engagement. Teachers arrange classrooms in ways that facilitate group discussions and interactive activities, helping to create a collaborative and

supportive learning environment where students can share ideas and work together to solve mathematical problems.

4. **Evaluating:** Evaluations are conducted regularly through monthly meetings and both formative and summative assessments. These evaluations are used to identify and address learning gaps and to refine the teaching strategies employed.

Discussion

The findings of this study highlight the significance of implementing management functions to enhance the quality of mathematics instruction and teacher professionalism in madrasahs. Systematic planning, effective organization, interactive teaching methodologies, and continuous evaluation are the key components in achieving this goal. In terms of planning, collaboration between the head of the madrasah, vice principals, and teaching staff in setting educational standards has facilitated the development of a curriculum that meets the students' needs. This collaborative approach ensures that any curriculum changes are collectively agreed upon and align with current educational developments.

Effective organization also plays a crucial role in quality management of learning. Selecting qualified and experienced mathematics teachers and providing individual assistance to students in need ensure that the learning process runs smoothly. Regular supplementary sessions for students requiring extra help have proven effective in enhancing their understanding of the material taught. This demonstrates that good organization can bridge learning gaps and provide the necessary support for students to achieve academic success.

The implementation of interactive teaching has also had a positive impact on student engagement in the learning process. Teachers who manage their classrooms to facilitate group discussions and interactive activities successfully create a collaborative and supportive learning environment. Regular evaluations through formative and summative assessments, along with monthly meetings, help identify and address learning gaps. These continuous evaluations ensure that teaching strategies remain relevant and effective, providing constructive feedback for ongoing improvement. Overall, this study offers valuable insights for other madrasahs aiming to enhance the quality of their teaching and teacher professionalism.

Furthermore, this research highlights that effective communication between teachers and students is a crucial factor in enhancing the quality of learning. Teachers who can communicate well can explain mathematical concepts in a way that is easier for students to understand. This not only improves students' comprehension of the material but also boosts their motivation and interest in learning mathematics. Good communication also enables teachers to provide constructive feedback, which is essential in helping students identify and correct their weaknesses.

To improve the quality management of mathematics learning in madrasas and develop professional teachers, systematic planning, effective organization, and innovative implementation are vital (Spitzer & Musslick, 2021). Strict educational standards and professional development training for teachers play a significant role in

achieving these goals. Teachers' communication skills are also crucial in making the learning process enjoyable and facilitating the application of mathematics in everyday problem-solving (Spitzer & Musslick, 2021). Additionally, ongoing professional development that focuses on teachers' professional enthusiasm can align teachers' perceptions and practices, thereby enhancing teaching quality (Mustafa & Paçarizi, 2021).

The research also underscores the significance of the principal's leadership style and strategies in enhancing teacher professionalism, identified as an effective approach to improving educational quality (Devi & Subiyantoro, 2021). Thus, the combination of effective leadership, a supportive work environment, and a commitment to change management is crucial for elevating teacher professionalism and the quality of mathematics education in madrasas (Nugroho et al., 2022). Overall, these findings emphasize the importance of implementing effective management functions to achieve educational goals. By adopting a holistic and collaborative approach, focusing on good communication, and creating a learning environment that supports professional development for teachers and improves student learning outcomes, these insights provide valuable guidance for education administrators aiming to enhance learning quality and prepare students for future challenges.

CONCLUSIONS

This research demonstrates that the quality of mathematics education in madrasas can be significantly enhanced through effective management functions, which include systematic planning, efficient organization, innovative implementation without relying on technology, and continuous evaluation. Strict educational standards and professional development training for teachers are crucial in achieving these objectives. Moreover, teachers' ability to communicate effectively, make the learning process enjoyable, and facilitate the application of mathematics in everyday problem-solving are key factors. Creativity and innovation in utilizing media and facilities also contribute to improving the quality of education in madrasas.

AUTHOR CONTRIBUTIONS STATEMENT

NH authors analyze the introduction and discussion, NAM and PH collect data and abstracts, AP writes conclusions and bibliography.

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