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AN EVALUATION OF THE MADRASAH TEACHER QUALITY IMPROVEMENT PROGRAM THROUGH PROFESSIONALISM TRAINING BASED ON INDUSTRY 4.0

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ABSTRACT
This study evaluates the Madrasah Teacher Quality Improvement Program through Industry 4.0-based professionalism training at MI Babul Ilmi Lemo Ape, Bone Regency, South Sulawesi, using the Context, Input, Process, Product (CIPP) evaluation model. Data were collected through interviews and observations. The findings indicate that the training was implemented based on teachers' needs and aligned with the demands of Industry 4.0. Training resources, including materials, instructors, and budget, were adequately prepared, and implementation generally proceeded well, though more practical sessions and follow-up mentoring were needed. The program improved teachers' ability to utilize digital learning applications such as Kahoot, Quizizz, Canva, and TikTok. However, challenges, including limited student access to mobile devices and unstable internet connectivity, hindered optimal implementation. Teachers addressed these constraints by using PowerPoint and Canva, while further policy support and improved internet infrastructure are needed to enhance program effectiveness.

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INTRODUCTION

Industry 4.0, often referred to as the Fourth Industrial Revolution, is an era of fundamental change across sectors, particularly in technology,

manufacturing, and education (Dito & Pujiastuti, 2021). Increasingly sophisticated digital technologies — including the Internet of Things (IoT), artificial intelligence (AI), and automation — have transformed working practices, communication patterns, and social interactions, influencing nearly every aspect of human life. In the field of education, these technological advancements demand profound changes in curriculum design, teaching methodologies, and the quality of human resources involved in the teaching and learning process (Suradi, A. (2018)). In Indonesia, particularly in madrasah institutions, the educational system must transform to produce graduates who are equipped not only with knowledge but also with skills relevant to technological developments and the increasingly global demands of the workforce (Hidayat & Sukari, 2025).

In practice, religious education in Indonesia is implemented through various formal educational institutions such as pesantren, schools, and *madrasah.* (Tomia et al., 2025). *Madrasah* — educational institutions that integrate religious knowledge with general sciences — hold a key role in shaping the character and competence of the nation's future generations. (Riadi, 2016). Beyond teaching religious sciences, *madrasahs* are also responsible for preparing students to compete in an increasingly interconnected, automated, and technology-based world of work. Therefore, the quality of education provided by *madrasah* must be continuously improved, particularly regarding teacher professionalism and teachers' capacity to integrate technology into the learning process. Without sustained improvement in teacher quality, it will be difficult for the *madrasah* to achieve these objectives. (Anas, 2024).

Numerous studies have been conducted on programs aimed at improving the quality of *madrasah* teachers, as well as on Professionalism Training Based on Industry 4.0 Needs. For instance, Maranting and Halik proposed research on the role of Islamic religious education supervisors in improving teacher quality. One of the objectives of educational supervision is to monitor the quality of classroom instruction to enhance student learning. The efforts undertaken by supervisors include conducting meetings between supervisors and *madrasah* administrators, holding sessions within the Teacher Working Group (*Kelompok Kerja Guru*/KKG), and providing guidance to subject teachers (Maranting, 2020). Meanwhile, Yiyin Susanti et al., in their research, proposed implementing academic supervision by madrasah principals to improve the quality of teacher

performance. In their supervisory approach, the *madrasah* principal employed traditional, scientific, and clinical models, which were found to enhance teacher performance in terms of improved teacher discipline, renewal of teaching and learning services — including delivery of materials, methods, and strategies — more conducive classroom management, and improved assessment and evaluation of student achievement (Susanti, 2022). Furthermore, research by Rismawati et al. addressed strategies employed by *madrasah ibtidaiyah* (Islamic Elementary School) to enhance professionalism in the era of Industrial Revolution 4.0. The findings indicated that the strategies adopted included IT-based training, educational seminars, workshops on learning in the era of Industrial Revolution 4.0, educational practicum sessions in the digital era, supervision by the *madrasah ibtidaiyah* principal, technical guidance (*bimtek*) organized by the *madrasah*, encouraging and motivating teachers to participate in the Teacher Working Group (KKG), conducting comparative studies with higher-quality institutions, organizing social service activities for the *madrasah* community and surrounding society, holding *sarasehan* (community dialogues) with local *kyai* (Moslem Scholar) to strengthen shared commitment, and conducting *ngaji bareng* (collective Quranic study) in collaboration between the *madrasah ibtidaiyah* and LP Ma'arif NU Driyorejo (Rismawati et al., 2021). These studies collectively demonstrate that the roles of supervisors, *madrasah* principals, and the institution itself have had highly positive impacts on improving teacher quality and professionalism in *madrasah*.

Although programs aimed at improving teacher quality through professionalism training have been implemented, significant challenges remain. As noted by Gusmana et al., the primary challenges faced by *madrasah* teachers include limited infrastructure and facilities, insufficient digital competence, resistance to change, and a lack of sustained professional training. Inadequate skills in operating technological devices and using digital learning platforms are the main obstacles to implementing technology-based teaching methods. These challenges are further compounded by limited access to technological equipment and internet connectivity in some *madrasahs*, particularly those located in remote areas (Gusmana & Syamzaimar, 2025). Additionally, based on the research of Mulajimatul Fitria, the obstacles encountered in enhancing teacher professionalism include insufficient human resource support aligned with

subject-area expertise, a lack of teacher awareness and commitment, changes in policy and curriculum, and budget constraints that hinder teachers from participating in training and self-development activities (Fitria, 2024).

Based on the gaps identified above, it is evident that improving madrasah teacher quality continues to face a range of challenges, particularly regarding infrastructure and facilities. A comprehensive evaluation of teacher quality improvement programs is therefore essential for the government in developing future *madrasah* teacher quality improvement initiatives. Moreover, research employing the Context, Input, Process, Product (CIPP) model to evaluate teacher quality improvement programs through Industry 4.0-based training remains scarce, making a comprehensive investigation timely and significant.

A *madrasah* teacher quality improvement program, based on Professionalism Training aligned with Industry 4.0 Needs, has been implemented at MI Babul Ilmi Lemo Ape; therefore, a comprehensive evaluation of the stages involved in its implementation is necessary.

This study aims to bridge the gap in the existing literature, particularly regarding the evaluation of the *madrasah* teacher quality improvement program through Professionalism Training Based on Industry 4.0 Needs. Accordingly, this study seeks to address the following research question: How is the evaluation of the *madrasah* teacher quality improvement program, titled "Professionalism Training Based on Industry 4.0 Needs," carried out at MI Babul Ilmi Lemo Ape, Bone Regency?

METHOD

This evaluation study employs the *Context, Input, Process, and Product* (CIPP) evaluation model with a descriptive qualitative approach. The study aimed to evaluate the *madrasah* teacher quality improvement program through Professionalism Training Based on Industry 4.0 Needs at MI Babul Ilmi Lemo Ape, Bone Regency.

The CIPP evaluation model is a decision-oriented model in which each type of evaluation is linked to a decision-making framework concerning the planning and operational aspects of a program, thereby yielding comprehensive data from each stage as a basis for program improvement (Oktariani et al., 2025). The research subjects consisted of the school principal and teachers at MI Babul Ilmi

Lemo Ape. Data were collected through interviews and observation. This study employed the interactive data analysis technique developed by Miles and Huberman (2014), comprising data reduction, data presentation, and conclusion drawing (Qomaruddin & Sa'diyah, 2024).

RESULTS AND DISCUSSION

RESULTS

1. Context Evaluation

The context evaluation aims to understand the background and underlying needs that prompted the implementation of the technology training program at MI Babul Ilmi Lemo Ape. Based on interviews with the madrasah principal, teachers, and students, as well as field observations, several challenges in implementing technology in learning were identified.

This *madrasah* faces significant challenges in enhancing teachers' understanding and skills in using instructional technology relevant to contemporary developments. With the rapid advancement of technology in the Industry 4.0 era, the demand for digital skills has become increasingly urgent. Teachers at MI Babul Ilmi Lemo Ape encounter difficulties in maximizing the use of technology in the learning process, which consequently affects the quality of instruction.

In response to these challenges, the teachers proposed training focused on digital learning applications, including Canva, Quizizz, Kahoot, CapCut, and TikTok as instructional media. According to the teachers, these applications are highly relevant to the madrasah's needs, as they can help improve student engagement in learning and facilitate more interactive and creative delivery of instructional content. The teachers at this institution recognize that the use of these technologies would be highly beneficial in improving the quality of instructional media employed.

The need for this training does not stem solely from the teachers themselves but is also fully supported by the *madrasah* principal. The involvement and support of the *madrasah* principal are critical to the realization of the training program, as the principal holds a strategic role in facilitating human resource development within the *madrasah* environment. This teacher-driven training program is expected to yield a significant improvement in the

quality of learning at the *madrasah*, as well as to prepare teachers for the development of Islamic religious education-based learning in meeting the demands of education in the digital and Industry 4.0 era.

Based on the interview findings presented above, this madrasah faces significant challenges in enhancing teachers' understanding and skills in using instructional technology. Teachers at MI Babul Ilmi Lemo Ape continue to encounter difficulties in maximizing the use of technology in the learning process, which adversely affects the quality of instruction. In light of these conditions, teachers have proposed training focused on digital applications such as Canva, Quizizz, Kahoot, CapCut, and TikTok — tools considered highly relevant for increasing student engagement and facilitating the delivery of creative, interactive content. This training need has received the full support of the *madrasah* principal, who holds a strategic role in facilitating the development of teachers' skills. The training program designed for this purpose is expected to make a significant contribution to improving the quality of learning and to preparing teachers to meet the demands of education in the digital era. With support from all relevant stakeholders, this training initiative is anticipated to optimize the use of technology in learning and to enhance the overall quality of education at MI Babul Ilmi Lemo Ape.

2. Input Evaluation

The input evaluation focuses on the resources utilized in the training, including training materials, instructors, and available facilities. The training program organized by the *madrasah* aligned its materials with instructional technology needs, incorporating applications such as Canva, Quizizz, and Kahoot, as well as TikTok as an instructional medium.

Training materials were tailored to the participating teachers' conditions and needs, with content adjusted to their level of technological understanding. The qualifications of training instructors were considered in terms of competence and relevant capabilities in accordance with the material to be delivered, with presenters sourced externally—namely, teachers from other *madrasah* institutions.

The facilities available at the *madrasah* were reasonably adequate for conducting the training, including LCD projectors, internet access, and a sufficiently reliable electrical supply. Nevertheless, improvements are still

required, particularly regarding the stability of internet connectivity and the adequacy of electrical capacity, to ensure that training sessions and the implementation of technology-based learning can proceed without interruption.

In terms of strategy, the *madrasah* principal took steps to implement training aligned with teachers' needs by communicating with relevant parties and coordinating with the Teacher Working Group (Kelompok Kerja Guru/KKG). This organization provides opportunities for each *madrasah* to propose activities tailored to its needs to enhance teachers' capacity to use applications in the learning process. Additionally, the *madrasah* principal devised a strategy of allocating budget through the School Operational Assistance Fund (Dana BOS) to conduct training aligned with Industry 4.0 needs or technology-based learning. Another strategy involves establishing collaboration with other educational institutions, particularly higher education institutions, to support improvements in teacher quality at the *madrasah*.

Based on the interview findings above, it can be understood that the *madrasah* has developed concrete strategies and plans to realize training programs aligned with Industry 4.0 needs. These strategies include need-based training planning, the selection of instructors based on competence, facility readiness for training implementation, ongoing communication and support from the Teacher Professional Education (PPG) organization for all planned training activities, the allocation of dedicated funding through the Dana BOS for need-based training, and the establishment of collaborative partnerships with other educational institutions — particularly higher education institutions — to support the improvement of teacher quality within the *madrasah*.

3. Process Evaluation

The process evaluation examines how the training was conducted, the obstacles encountered, the degree of teacher engagement in the program, and the feedback mechanisms available to improve the program.

Based on interviews with the *madrasah* principal and teachers regarding the implementation of training in relation to KKG activities, the *madrasah* was assigned the role of training host by mutual agreement. In addition, the *madrasah* also independently implemented training programs based on the needs of teachers at MI Babul Ilmi Lemo Ape, financed through the Dana BOS as part of efforts to deliver technology-based training.

The training sessions held at MI Babul Ilmi Lemo Ape proceeded well, with most participating teachers showing strong enthusiasm. The instructors who delivered the training material were regarded as highly competent, employing a methodology comprising formal material presentation followed by question-and-answer sessions to reinforce understanding. Teachers acknowledged that the material delivered was of good quality and appropriately tailored to their needs.

However, teachers also expressed the view that even high-quality material would be insufficiently effective without direct hands-on practice. This was identified as a significant obstacle. One reason hands-on practice was not incorporated during the training sessions was the limited time available. As a consequence, teachers who had participated in training frequently forgot how to use the applications they had been trained on.

Furthermore, several teachers reported that no follow-up mentoring was provided after the training regarding the use of the applications, resulting in the knowledge acquired failing to develop or be sustained. In some cases, teachers forgot how to use the applications altogether.

In response to these obstacles, the *madrasah* has made efforts to ensure that future training sessions are conducted with thorough planning and sufficient time allocation, so that participants can receive not only instructional content but also opportunities for hands-on practice during the training, as well as potential follow-up mentoring by invited instructors to reinforce application skills.

Based on the interview findings above, the training implementation has proceeded well. Instructors delivered material aligned with participants' needs; however, instructional explanation alone was found to be insufficient. Hands-on practice is necessary for deeper learning and mastery of the application, and post-training mentoring would further strengthen outcomes.

4. Product Evaluation

The product evaluation focuses on the impact of the training on teachers' skills in using technology. The evaluation results indicate an improvement in teachers' skills in utilizing digital applications and platforms for instructional purposes. Teachers who participated in the training reported greater confidence in using applications such as Canva, Quizizz, Kahoot, and TikTok to support instruction. Despite improvements in technical skills, the major challenge that

persists is consistency in applying technology in the classroom. Applications such as Quizizz and Kahoot are rarely used in instruction for two primary reasons: first, not all students own mobile phones; and second, network connectivity is at times unstable. Interactive applications are therefore rarely utilized at this *madrasah*. According to teachers, given these limitations, the instructional media most frequently used in the learning process are PowerPoint presentations (PPT), with occasional use of Canva for creating instructional materials.

As a solution to these challenges, students without mobile phones will be subject to a designated-day policy that permits them to bring mobile phones to the madrasah for technology-based learning. Regarding unstable network connectivity, teachers may use independent network access while awaiting improvements and network stabilization at the *madrasah*.

DISCUSSION

The role of a teacher as a profession demands that teachers continuously develop their professional competence in line with advances in knowledge and technology. Educating, instructing, and training students constitute the fundamental duties of teachers as professionals (Sulaeman, 2019). Furthermore, as elaborated in Sancar's article, teachers in the exercise of their duties are guided by the following principles of professionalism: (a) possessing aptitude, interest, professional calling, and idealism; (b) maintaining a commitment to improving the quality of education, faith, piety, and noble character; (c) holding academic qualifications and an educational background commensurate with their area of responsibility; (d) possessing the competencies required for their area of responsibility; (e) bearing responsibility for the professional execution of their duties; (f) receiving remuneration determined in accordance with work performance; (g) having opportunities for continuous professional development through lifelong learning; (h) being entitled to legal protection in the performance of their professional duties; and (i) belonging to a professional organisation with the authority to regulate matters about teacher professional duties (Sancar, 2021). Based on the evaluation results from the context dimension, teachers have demonstrated initiative in participating in training to improve their quality through professionalism training aligned with technology-based learning needs,

thereby strengthening and fulfilling their professional responsibilities by adapting to the use of technology in instruction. Professional teachers are expected to maintain a commitment to improving educational quality, one dimension of which is enhancing teachers' capacity to use technology in learning.

From an input evaluation perspective, regarding resource readiness, MI Babul Ilmi Lemo Ape has prepared and coordinated with relevant parties — particularly through the KKG community — to ensure alignment between training materials and instructors' training needs. This is consistent with previous research demonstrating that KKG plays a vital role in developing teacher professionalism in instruction. The role of KKG in this development includes providing guidance, such as technical training (*bimtek*) and professional development sessions for all *madrasah* teachers to enable them to achieve professionalism commensurate with their respective fields and expertise. (Indriawati et al., 2023). Additionally, available facilities are reasonably adequate, although improvements remain necessary, particularly regarding internet network stability and the enhancement of electrical capacity to ensure that training implementation and technology-based learning do not encounter disruptions. Furthermore, the *madrasah* principal has devised strategies to support the implementation of training at the *madrasah*, including providing opportunities for teachers to attend need-based training through KKG Forum-organized activities. When teachers require additional training beyond the KKG Program, the *madrasah* principal supports these activities through the *Dana BOS* as part of efforts to improve teacher quality. This is particularly important, as the absence of such training would — as Esmi et al. argue — result in a widening gap between teachers' competence and the demands of the digital era. (Esmi, 2025). The role of the *madrasah* principal is therefore critical in ensuring the presence and development of professional human resources, through educational supervision and training, sustained motivation, and the transformation of the institutional work culture. (Baharun, 2017).

The process evaluation of the training implemented at MI Babul Ilmi Lemo Ape indicates that the sessions proceeded well, with teachers demonstrating high enthusiasm. Instructors were regarded as highly competent, and the material delivered was considered good and appropriate to teachers' needs. However,

several obstacles were identified through the process evaluation, spanning the period from training implementation to its conclusion. First, teachers felt that even high-quality material would be insufficiently effective without hands-on practice during the training session itself. Second, teachers indicated that no post-training mentoring was provided regarding application use, resulting in the knowledge acquired failing to develop or be sustained over time.

In response to these obstacles, the *madrasah* is committed to ensuring that future training is conducted with thorough planning and sufficient time allocation, so that, following content instruction, participants also have the opportunity to engage in hands-on practice, and so that follow-up mentoring can be arranged by inviting instructors to reinforce competence in application use.

The educational challenge of this era lies in preparing teachers to effectively use contemporary technology and maximize their capacity to operate the latest tools. Indonesia must therefore urgently prepare professional educators — those capable of utilizing e-learning — as teachers' proficiency with technology constitutes a key solution for developing a generation of competent digital natives. (Luo et al, 2024). Teacher professionalism training thus serves as a critical solution for strengthening teachers' capacity to leverage technology effectively in the learning process.

The product evaluation focuses on the impact of training on teachers' skills in using technology. The evaluation results demonstrate an improvement in teachers' ability to use digital applications and platforms for instruction. Teachers who participated in the training reported greater confidence in using applications such as Canva, Quizizz, Kahoot, and TikTok to support their teaching. Despite improvements in technical skills, the overriding challenge that persists is consistency in applying technology in the classroom.

Regarding students who do not own mobile phones, a policy will be introduced, designating specific days, by mutual agreement among teachers, on which students may bring mobile phones to the madrasah to use certain applications in learning. Regarding unstable network connectivity, teachers may use independent network access while the madrasah's network infrastructure stabilizes.

As the era of Industrial Revolution 4.0 progresses, the demands placed upon teachers continue to grow. At a minimum, teachers must effectively develop

their competencies to meet the requirements of this era. Accordingly, teachers should enhance their academic and scholarly qualifications, move beyond instructional approaches rooted in classical patterns, improve their conduct in the presence of students, and remain aware of the rapid pace of technological development (Lou et al, 2024).

CONCLUSION

Based on the research on the Evaluation of the *Madrasah* Teacher Quality Improvement Program through Professionalism Training Based on Industry 4.0, conducted at MI Babul Ilmi Lemo Ape, Bone Regency, the following conclusions may be drawn: The context evaluation reveals that training is carried out at the *madrasah* based on teachers' needs and aligned with Industry 4.0 requirements. The input evaluation demonstrates that resources were well prepared, particularly in terms of the training materials to be delivered, the instructors, and the budget allocations for training. The process evaluation shows that training implementation proceeded smoothly; however, obstacles arose concerning the depth of material coverage — teachers require hands-on practice and expressed a need for follow-up mentoring. The product evaluation reveals that the various training sessions yielded highly positive outcomes, with the majority of teachers now able to use learning applications such as Kahoot, Quizizz, Canva, and TikTok for instructional purposes. Nevertheless, the application of these tools has not been fully smooth due to constraints such as some students not owning mobile phones and unstable network connectivity. The solutions adopted by teachers include utilizing media such as PowerPoint presentations (PPT) and the Canva application. Furthermore, policy measures are required regarding designated days for students to bring mobile phones and improvements to the internet network infrastructure.

Penelitian ini berkontribusi terhadap evaluasi program peningkatan kualitas guru madrasah melalui pelatihan profesionalisme berbasis kebutuhan industri 4.0. Hasil penelitian menunjukkan bahwa pemberian materi tidak cukup hanya dengan penjelasan saja, namun dibutuhkan praktik langsung untuk pendalaman materi, dan akan jauh lebih bagus jika ada proses tindak lanjut dan pengembangan hasil pelatihan. Masih dibutuhkan peran madrasah

dalam menyiapkan fasilitas yang memadai dalam mendukung proses pembelajaran berbasis teknologi.

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