

Transformation of Madrasah Teachers' Scientific Writing Competence: Integration of Artificial Intelligence, Self-Efficacy, and Demystification of Online Journal Systems Through Sustainable Publication Clinics

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ABSTRACT. Teachers' scientific publication competence remains a major challenge in implementing Sustainable Professional Development (*Pengembangan Keprofesian Berkelanjutan*/PKB), particularly in madrasah education, where limited publication literacy, insufficient mentoring, and low digital scholarly competence often hinder publication outcomes. This study aimed to evaluate the effectiveness of a Sustainable Scientific Publication Clinic in improving madrasah teachers' scientific publication competence through continuous individualized mentoring and ethical integration of digital scholarly tools. The study employed a mixed-methods approach using an explanatory sequential design involving 30 teachers from Madrasah Tsanawiyah (MTs) and Madrasah Aliyah (MA). Quantitative data were collected using a pretest–posttest scientific publication competence questionnaire, while qualitative data were obtained through observations and semi-structured interviews with ten purposively selected participants. The intervention was implemented over three months through academic writing workshops, individualized coaching, ethical use of Generative Artificial Intelligence (AI), Mendeley training, and Open Journal System (OJS) publication mentoring. Paired Sample t-test results showed a significant increase in the mean competency score from 2.26 to 4.36 ($p < 0.001$), with a very large effect size (Cohen's $d = 2.91$) and an N-Gain of 77%. Furthermore, 73.33% of participants successfully submitted manuscripts, while 26.67% achieved article acceptance. Qualitative findings indicated that continuous mentoring, ethical AI utilization, and digital scholarly tools reduced writing barriers, strengthened self-efficacy, and improved participants' readiness to complete the publication process. These findings suggest that the Sustainable Scientific Publication Clinic provides an effective, technology-supported, and output-oriented mentoring model for strengthening teachers' scientific publication competence and supporting sustainable professional development.

Keywords: scientific publication; madrasah teachers; sustainable professional development; self-efficacy; generative artificial intelligence; Open Journal System.

ABSTRAK: *Kompetensi publikasi ilmiah guru masih menjadi tantangan dalam implementasi Pengembangan Keprofesian Berkelanjutan (PKB), khususnya di lingkungan madrasah, yang ditandai dengan rendahnya literasi publikasi, keterbatasan pendampingan, serta rendahnya kompetensi penggunaan teknologi pendukung publikasi ilmiah. Penelitian ini bertujuan mengevaluasi*

efektivitas Klinik Publikasi Ilmiah Berkelanjutan dalam meningkatkan kompetensi publikasi ilmiah guru madrasah melalui pendampingan individual berkelanjutan dan integrasi teknologi digital secara etis. Penelitian menggunakan metode campuran (mixed methods) dengan desain explanatory sequential yang melibatkan 30 guru Madrasah Tsanawiyah (MTs) dan Madrasah Aliyah (MA). Data kuantitatif diperoleh melalui angket kompetensi publikasi ilmiah dengan desain pretest–posttest, sedangkan data kualitatif dikumpulkan melalui observasi dan wawancara semi-terstruktur terhadap sepuluh peserta yang dipilih secara purposif. Program dilaksanakan selama tiga bulan melalui lokakarya penulisan artikel ilmiah, coaching clinic individual, pelatihan penggunaan Mendeley, pemanfaatan Generative Artificial Intelligence (AI) secara etis, serta pendampingan publikasi melalui Open Journal System (OJS). Hasil Paired Sample t-test menunjukkan peningkatan signifikan skor kompetensi dari 2,26 menjadi 4,36 ($p < 0,001$), dengan ukuran efek sangat besar (Cohen's $d = 2,91$) dan N-Gain sebesar 77%. Sebanyak 73,33% peserta berhasil melakukan submit naskah dan 26,67% memperoleh status accepted. Temuan kualitatif menunjukkan bahwa pendampingan berkelanjutan, pemanfaatan AI secara etis, serta penggunaan teknologi pendukung publikasi mampu mengurangi hambatan penulisan, meningkatkan efikasi diri, dan memperkuat kesiapan guru dalam menyelesaikan proses publikasi ilmiah. Dengan demikian, Klinik Publikasi Ilmiah Berkelanjutan merupakan model pendampingan yang efektif, berbasis teknologi, dan berorientasi pada luaran publikasi untuk mendukung peningkatan kompetensi publikasi ilmiah guru serta implementasi PKB secara berkelanjutan.

Kata kunci: *publikasi ilmiah; guru madrasah; pengembangan keprofesian berkelanjutan; efikasi diri; generative artificial intelligence; Open Journal System.*

A. INTRODUCTION

Improving the quality of education depends not only on teachers' pedagogical and subject-matter expertise but also on their capacity to engage in continuous professional learning through research, reflective practice, and scholarly publication. Contemporary perspectives on teacher professional development emphasize that teachers should function not merely as knowledge consumers but also as knowledge producers who contribute to educational innovation through scientific inquiry and publication (Professional Development in Education Editorial, 2024). In Indonesia, this expectation is institutionalized through the Sustainable Professional Development (*Pengembangan Keprofesian Berkelanjutan*/PKB) policy, which recognizes scientific publication as an essential component of teachers' career advancement and professional growth (KemenPAN, 2020). Nevertheless, many madrasah teachers continue to encounter difficulties in transforming classroom research into publishable scientific articles.

Previous studies consistently report that although many teachers have conducted Classroom Action Research (CAR), only a small proportion successfully publish their findings in accredited scientific journals. The major obstacles include limited understanding of the IMRAD structure, inadequate academic writing skills, difficulties in managing references, and insufficient familiarity with the Open Journal System (OJS), which remains

the primary platform for scholarly publication in Indonesia (Hanifah et al., 2024; Putra Perdana et al., 2024). These problems indicate that improving teachers' scientific publication competence requires a mentoring approach that is not only oriented toward material mastery but also toward achieving tangible publication outcomes.

A growing body of evidence indicates that academic writing workshops and mentoring programs can improve teachers' scientific writing competence. Mulyono et al. (2023), for example, reported that genre-analysis-based academic writing workshops significantly improved writing creativity and research self-efficacy among Indonesian TVET instructors. Similarly, Hanifah et al. (2024) demonstrated that structured mentoring effectively increased teachers' readiness to prepare manuscripts for SINTA-accredited journals, while Putra Perdana et al. (2024) showed that OJS training enhanced teachers' understanding of the journal submission process. Beyond the Indonesian context, mentoring-based professional development has been widely recognized as an effective strategy for improving teachers' professional competence through sustained feedback, collaborative learning, and reflective practice (Manderstedt et al., 2023; Dutton et al., 2024).

Despite these promising findings, several important gaps remain. Most existing interventions primarily focus on improving academic writing skills or introducing technical aspects of journal submission without providing continuous mentoring until publication outcomes are achieved. Furthermore, evaluation is generally limited to participants' satisfaction or immediate competency improvement, while indicators such as manuscript submission, editorial communication, peer-review revision, and article acceptance are rarely assessed. Consequently, evidence regarding the long-term effectiveness of publication mentoring programs remains limited. Recent advances in Generative Artificial Intelligence (Generative AI) also present new opportunities for supporting academic writing; however, studies increasingly emphasize that AI should function as a learning partner rather than a replacement for authorship, requiring ethical use and adequate AI literacy among teachers (Ardiyansah & Batubara, 2026; Sanz-Tejeda et al., 2026; Kasneci et al., 2023).

The conceptual framework of this study is grounded in Bandura's (1997) Social Cognitive Theory, which emphasizes self-efficacy as a determinant of individuals' persistence, motivation, and performance when completing challenging tasks. Recent studies have confirmed that self-efficacy plays a significant role in academic writing performance and can be strengthened through structured professional development, mentoring, and

authentic mastery experiences (Mulyono et al., 2023). In addition, Vygotsky's concept of the Zone of Proximal Development provides a pedagogical foundation for coaching clinics in which mentors provide scaffolding through individualized guidance and collaborative feedback (Manderstedt et al., 2023; Dutton et al., 2024).

Unlike previous studies, the present study proposes a Sustainable Scientific Publication Clinic that integrates three interrelated dimensions: (1) continuous individualized mentoring, (2) ethical utilization of Generative AI to support academic writing, and (3) output-oriented evaluation based on measurable publication achievements rather than solely on participants' perceptions or writing competence. The intervention extends beyond academic writing instruction by accompanying participants through manuscript preparation, OJS submission, editorial communication, and peer-review revision over a three-month mentoring period. Therefore, this study aims to evaluate the effectiveness of the Sustainable Scientific Publication Clinic in enhancing madrasah teachers' scientific publication competence and publication outcomes through sustainable, technology-supported, and evidence-based mentoring.

B. METHOD

a. Research Design

This study employed a mixed-methods approach using an explanatory sequential design, in which quantitative data were collected and analyzed first, followed by qualitative data collection to explain and enrich the quantitative findings (Creswell & Plano Clark, 2018; Creswell & Creswell, 2023). During the quantitative phase, teachers' scientific publication competence was measured before and after participation in the Sustainable Scientific Publication Clinic using a competency instrument developed from the literature on scholarly publication, teacher professional development, and academic writing. The quantitative findings subsequently informed the development of interview protocols and observation focus areas in the qualitative phase.

Accordingly, qualitative inquiry was directed toward explaining how mentoring experiences, ethical use of Generative Artificial Intelligence (Generative AI), utilization of Mendeley and the Open Journal System (OJS), and publication-related challenges contributed to changes in participants' competence. Finally, quantitative and qualitative

findings were integrated during the interpretation stage to provide a comprehensive evaluation of program effectiveness.

b. Participants and Research Context

This study involved 30 madrasah teachers from Madrasah Tsanawiyah (MTs) and Madrasah Aliyah (MA) Minhajul Haq Purwakarta. Participants were selected using purposive sampling because the study sought information-rich participants who shared similar professional development needs while representing diverse teaching backgrounds (Creswell & Creswell, 2023).

The inclusion criteria were: (1) active teachers at the MTs or MA level; (2) representation from various subject areas, including Mathematics and Natural Sciences, Social Sciences, Languages, and Islamic Religious Education; (3) teaching experience ranging from less than two years to more than five years; and (4) no previous publication experience in accredited national or international scientific journals. Although several participants had previously conducted Classroom Action Research (CAR) or institutional research projects, none had successfully transformed their research findings into published journal articles. These characteristics ensured relatively homogeneous mentoring needs while maintaining diversity in disciplinary backgrounds.

c. Publication Clinic Implementation Procedure

The Sustainable Scientific Publication Clinic was implemented over a three-month period through a structured mentoring program designed to strengthen teachers' scientific publication competence. This duration allowed participants to develop academic writing competence through iterative cycles of learning, practice, individualized feedback, reflection, and continuous improvement. The intervention was designed according to the principles of sustained professional learning, which emphasize authentic practice, mentoring, collaborative reflection, and continuous feedback as key mechanisms for professional competence development (Manderstedt et al., 2023; Dutton et al., 2024).



Figure 1. Initial workshop and needs assessment activities of the Sustainable Scientific Publication Clinic program.

The program consisted of seven sequential stages:

- 1) Needs analysis, including a pretest, identification of participants' publication barriers, and inventory of Classroom Action Research (CAR) reports or research ideas.
- 2) Scientific article writing workshop, covering the IMRAD structure, title formulation, abstract writing, research methodology, presentation of results, and discussion development based on recent literature.
- 3) Individual mentoring (coaching clinic), during which each participant received continuous guidance to develop, revise, and improve manuscripts until they met the standards of scientific journal publication.
- 4) Peer review, where participants evaluated each other's manuscripts using an assessment rubric adapted from scientific journal review criteria.
- 5) Technology utilization training, including the use of Mendeley for reference management, plagiarism similarity checking, and the ethical utilization of Generative Artificial Intelligence (Generative AI) to support idea generation, language refinement, manuscript organization, and academic editing while ensuring that participants maintained full responsibility for authorship, originality, and scientific integrity (Kasneci et al., 2023; Ardiyansah & Batubara, 2026).
- 6) Publication mentoring through the Open Journal System (OJS), including target journal selection, manuscript preparation, metadata completion, online submission, cover letter preparation, and communication with journal editors throughout the review process.

- 7) Program evaluation, consisting of posttest administration, documentation of publication outputs, and participant reflection on the overall mentoring experience.

d. Instruments and Data Collection

Quantitative data were collected using a scientific publication competence questionnaire based on a five-point Likert scale (1 = very low to 5 = very high). The instrument consisted of eight indicators: (1) Understanding of scientific article structure; (2) Ability to search scientific literature; (3) Ability to prepare citations and bibliographies; (4) Competence in using Mendeley; (5) Ethical utilization of Generative Artificial Intelligence; (6) Ability to select appropriate target journals; (7) Self-efficacy in scientific article writing; (8) Ability to submit manuscripts through the Open Journal System (OJS).

The self-efficacy indicator was adapted from Bandura's (1997) concept of self-efficacy and contextualized for scientific publication competence, while the remaining indicators were developed from previous studies on teacher professional development, academic writing, and scholarly publication (Mulyono et al., 2023).

Prior to data collection, the questionnaire was reviewed by three experts in educational research and scientific publication to establish content validity. A pilot test involving teachers outside the research sample demonstrated satisfactory internal consistency (Cronbach's $\alpha > 0.80$), indicating that the instrument was sufficiently reliable for research purposes.

Pretest and posttest measurements were administered before and after program implementation. In addition, publication outputs—including the number of completed manuscripts, similarity index, manuscript submission status, and article acceptance status—were documented as objective indicators of program achievement.

Qualitative data were collected through observation and semi-structured interviews. Observations focused on participants' engagement, mentoring interactions, technology utilization, and challenges encountered throughout the publication process.

Semi-structured interviews were conducted with ten participants selected through maximum variation sampling to represent different publication outcomes, including participants whose manuscripts had been accepted, successfully submitted, or had not yet reached the submission stage. This strategy enabled the study to capture diverse mentoring experiences and factors influencing publication success.

e. Data Analysis

Quantitative data were analyzed using statistical software. Data normality was first examined using the Shapiro–Wilk test because of the relatively small sample size. After confirming the normality assumption, differences between pretest and posttest scores were analyzed using the Paired Sample t-test. Following hypothesis testing, effect size was calculated using Cohen’s d to estimate the practical magnitude of the intervention, while the level of competence improvement was assessed using the Normalized Gain (N-Gain).

Qualitative data were analyzed using the six-phase thematic analysis proposed by Braun and Clarke (2006), consisting of (1) familiarization with the data, (2) initial coding, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the final report. The identified themes were used to explain participants’ mentoring experiences, utilization of digital technologies, and factors influencing changes in scientific publication competence.

Finally, qualitative findings were integrated with quantitative results during the interpretation stage in accordance with the explanatory sequential mixed-methods design (Creswell & Plano Clark, 2018), allowing the effectiveness of the Sustainable Scientific Publication Clinic to be interpreted from both statistical outcomes and participants’ lived experiences.

f. Research Ethics

Participation in this study was voluntary. All participants provided informed consent before data collection commenced. Participant anonymity and confidentiality were maintained throughout the research process, and all collected data were used exclusively for academic and research purposes.

C. RESULTS

a. Changes in Scientific Publication Competence

To evaluate the effectiveness of the Sustainable Scientific Publication Clinic, participants’ scientific publication competence was measured before and after the three-month mentoring program. Eight competency indicators representing essential components of scientific publication were assessed using a five-point Likert scale. Descriptive statistics

are presented in Table 1 to illustrate changes in participants' competency levels following the intervention.

Table 1. Comparison of Participant Competency Scores Before and After Program

Competency Aspect	Pretest	Posttest	Difference
Scientific article structure	2.61	4.48	1.87
Scientific reference searching	2.84	4.43	1.59
Scientific citation techniques	2.33	4.39	2.06
Mendeley usage	1.87	4.31	2.44
Ethical AI utilization	2.08	4.27	2.19
Target journal selection	2.29	4.41	2.12
Writing self-confidence	2.55	4.44	1.89
OJS submission process	1.48	4.18	2.70

Source: Researcher's analysis (2026)

As presented in Table 1, substantial improvement was observed across all competency indicators following participation in the mentoring program. Overall, the mean competency score increased from 2.26 before the intervention to 4.36 after the intervention, indicating a transition from a relatively low level of scientific publication competence to a high level of proficiency.



Figure 2. Individual coaching clinic during scientific manuscript development.

The greatest improvement occurred in the OJS submission process, which increased by 2.70 points, suggesting that intensive hands-on mentoring effectively reduced participants' technological barriers and strengthened their ability to complete online journal submission procedures independently. Similarly, considerable gains were found in Mendeley usage (+2.44) and ethical utilization of Generative Artificial Intelligence (+2.19), indicating that participants became increasingly competent in employing digital scholarly tools to support academic writing.

Improvements were also evident in scientific citation techniques, target journal selection, writing self-confidence, and understanding of scientific article structure. Although scientific reference searching exhibited the smallest increase (+1.59), this indicator recorded the highest baseline score during the pretest, suggesting that participants already possessed

basic information-searching skills prior to the intervention. Consequently, the observed improvement primarily reflected refinement of existing competencies rather than the acquisition of entirely new skills.

Taken together, these findings indicate that the Sustainable Scientific Publication Clinic contributed not only to improvements in academic writing competence but also to the development of digital scholarly literacy and publication readiness, which are essential for successful scientific publication.

b. Inferential Statistical Analysis

Before testing the effectiveness of the intervention, the distribution of competency scores was examined using the Shapiro–Wilk normality test because the study involved a relatively small sample ($n = 30$). The results are presented in Table 2.

Table 2. Shapiro-Wilk Normality Test Results

Variable	Statistic	Sig. (p)
Pretest	0.962	0.164
Posttest	0.954	0.087
Source: Researcher's analysis (2026)		

As shown in Table 2, the significance values for both the pretest ($p = 0.164$) and posttest ($p = 0.087$) exceeded the 0.05 significance level, indicating that the competency scores were normally distributed. Therefore, the assumption of normality was satisfied, and a parametric paired-sample t-test was considered appropriate for examining changes in participants' competency following the intervention.

After confirming the normality assumption, a paired-sample t-test was conducted to determine whether the observed improvement in competency scores was statistically significant. The results are summarized in Table 3.

Table 3. Paired Sample t-test Results

Variable	Mean	SD	t	Sig. (2-tailed)
Pretest	2.26	0.34	-31.84	< 0.001
Posttest	4.36	0.22	-31.84	< 0.001
Source: Researcher's analysis (2026)				

The paired-sample t-test revealed a statistically significant improvement in participants' scientific publication competence following the implementation of the Sustainable Scientific Publication Clinic ($t = -31.84$, $p < 0.001$). This finding indicates that the observed increase

in competency scores was unlikely to have occurred by chance and reflects the positive effect of the mentoring intervention.

To determine the practical magnitude of the intervention, effect size analysis was performed using Cohen's *d*. The analysis yielded a value of 2.91, indicating a very large practical effect. Furthermore, the calculated N-Gain score of 0.77 (77%) demonstrates that participants achieved a high level of learning improvement throughout the intervention period. Collectively, these findings provide strong statistical evidence that the Sustainable Scientific Publication Clinic substantially enhanced teachers' scientific publication competence.

c. Publication Outcomes

Beyond improvements in scientific publication competence, the effectiveness of the Sustainable Scientific Publication Clinic was also evaluated through measurable publication outputs achieved during the three-month mentoring period. These outcomes provide objective evidence that the intervention contributed not only to participants' knowledge and skills but also to tangible scholarly productivity. The publication achievements are presented in Table 4.

Table 4. Publication Clinic Program Output Achievements

Output	Number	Percentage of Total
Participants following program	30	100%
Initial article drafts	28	93.33%
Complete article drafts	26	86.67%
Articles with similarity <20%	24	80.00%
Articles using Mendeley	30	100%
Successfully submitted articles	22	73.33%
Articles receiving editor review	17	56.67%
Accepted articles (during mentoring period)	8	26.67%

Source: Researcher's analysis (2026)

As presented in Table 4, the mentoring program generated encouraging publication outcomes. Nearly all participants (93.33%) successfully transformed their research ideas into initial article drafts, while 86.67% completed full manuscripts that met the minimum structural requirements for journal submission.

Digital scholarly competence was also consistently demonstrated throughout the program. All participants used Mendeley to manage citations and references, and four-fifths of the completed manuscripts achieved similarity scores below 20%, indicating satisfactory compliance with academic integrity standards prior to submission.

Most importantly, the mentoring program successfully translated writing competence into actual publication performance. More than two-thirds of participants (73.33%) completed manuscript submission through the Open Journal System (OJS), over half received editorial or peer-review responses, and eight manuscripts (26.67%) had already been accepted for publication during the mentoring period. These findings suggest that sustained individualized mentoring effectively bridges the gap between scientific writing competence and successful scholarly publication.

d. Observation Findings

Classroom observations conducted throughout the three-month intervention revealed progressive changes in participants' learning behaviour, technological confidence, and engagement with scientific writing activities. Rather than occurring immediately, these changes emerged gradually as participants moved through successive stages of mentoring, practice, and feedback.



Figure 3. Participants practicing Mendeley, Generative AI, and Open Journal System (OJS) during the mentoring sessions.

During the initial phase of the program, many participants experienced difficulties organizing research findings into scientific articles. Common challenges included understanding the IMRAD structure, operating Mendeley, completing citation management, and navigating the Open Journal System. Several participants also demonstrated hesitation toward using Generative Artificial Intelligence because of concerns regarding plagiarism and academic ethics.

As the mentoring sessions progressed, participants became increasingly confident in organizing manuscripts, revising drafts based on mentor feedback, and utilizing digital scholarly tools appropriately. Individual coaching encouraged active dialogue between

mentors and participants, enabling teachers to resolve writing difficulties immediately while gradually developing greater autonomy in academic writing.

Toward the end of the intervention, collaborative learning behaviours became increasingly evident. Participants independently exchanged feedback, assisted colleagues in resolving technical OJS issues, discussed journal selection strategies, and shared experiences related to manuscript revision. These observations suggest that the mentoring program not only strengthened individual competence but also fostered a collaborative learning culture that supported sustainable professional development.

e. Interview Findings

Semi-structured interviews with ten purposively selected participants generated four interrelated themes explaining how the mentoring program influenced teachers' scientific publication competence.

Theme 1. Transforming Classroom Research into Publishable Scientific Articles

Most participants acknowledged that conducting Classroom Action Research (CAR) was not their primary difficulty. Instead, they struggled to transform classroom research reports into manuscripts that satisfied the conventions of scientific journals. The mentoring program helped participants understand how classroom evidence could be systematically organized into the IMRAD structure, thereby increasing their confidence in developing publishable manuscripts.

As one participant explained:

“I had conducted Classroom Action Research several times, but the reports remained school documents because I did not know how to convert them into journal articles. Through this program, I realized that the problem was not my research, but how to present it scientifically.” (P05, Science Teacher)

Theme 2. Individual Mentoring as a Source of Writing Self-Efficacy

Participants consistently emphasized that individualized mentoring distinguished this program from previous writing workshops. Continuous feedback, regular manuscript review, and direct interaction with mentors reduced participants' anxiety toward academic writing while strengthening their confidence to complete and submit manuscripts.

One participant stated:

“The one-on-one mentoring made a significant difference. Every revision received constructive feedback, which gradually increased my confidence until I finally submitted my article to a journal.” (P18, Mathematics Teacher)

Theme 3. Ethical Integration of Digital Scholarly Tools

Interview findings further revealed substantial changes in participants’ perceptions of digital technologies. Initially, Generative Artificial Intelligence was viewed with considerable skepticism because it was associated with plagiarism and academic misconduct. Following structured guidance, however, participants began to perceive AI as a supportive tool for language refinement, idea organization, and academic editing rather than a replacement for scholarly thinking. The simultaneous use of Mendeley further reduced administrative workload associated with citation management.

One participant reflected:

“I now understand that AI helps improve language rather than generate my ideas. Combined with Mendeley, it allows me to focus more on analysing my research findings instead of spending time formatting references.” (P07, Social Sciences Teacher)

Theme 4. Developing Confidence in the Open Journal System

Another recurring theme concerned participants’ changing perceptions of the Open Journal System. Prior to the intervention, OJS was widely perceived as technically difficult and intimidating. Through repeated hands-on practice and mentor assistance, participants gradually developed confidence in completing each stage of manuscript submission independently.

As one participant explained:

“Previously, I always stopped halfway because I was confused about the submission process. After practicing each step with my mentor, I realized that OJS is manageable once you understand the procedure.” (P25, Islamic Religious Education Teacher)

Overall, the qualitative findings complement the quantitative results by demonstrating that improvements in scientific publication competence were supported by increased writing self-efficacy, ethical use of digital technologies, collaborative learning experiences, and greater confidence in navigating scholarly publication systems.

D. DISCUSSION

The findings of this study demonstrate that the Sustainable Scientific Publication Clinic effectively improved madrasah teachers' scientific publication competence. Quantitative analysis revealed a substantial increase in the mean competence score from 2.26 before the intervention to 4.36 after the intervention, accompanied by a very large effect size (Cohen's $d = 2.91$). These results indicate that the observed improvement was not only statistically significant but also educationally meaningful. In addition, qualitative findings revealed that continuous mentoring, individualized feedback, ethical integration of digital technologies, and structured publication guidance collectively contributed to participants' increased confidence, competence, and publication performance. These findings support contemporary perspectives on sustained professional learning, which emphasize that teacher professional competence develops through iterative practice, collaborative reflection, and continuous feedback rather than through isolated training activities (Professional Development in Education Editorial, 2024; Dutton et al., 2024).

a. Strengthening Teachers' Scientific Publication Competence through Sustained Mentoring

One of the most important findings of this study is that sustained mentoring produced improvements across all dimensions of scientific publication competence. Unlike conventional short-term workshops that primarily focus on knowledge transfer, the Sustainable Scientific Publication Clinic accompanied participants throughout the entire publication process—from identifying research ideas to manuscript preparation, journal submission, and communication with editors. This continuous assistance enabled participants to apply newly acquired knowledge directly while receiving timely feedback from mentors.

These findings are consistent with previous studies demonstrating that sustained professional development is more effective than one-time training because it allows teachers to engage in repeated practice, reflection, and gradual competence development (Professional Development in Education Editorial, 2024). Similarly, Dutton et al. (2024) emphasized that individualized mentoring facilitates professional learning by creating opportunities for authentic practice and constructive feedback. Within the present study, participants repeatedly revised their manuscripts during mentoring sessions, enabling them to progressively improve both the quality of their academic writing and their understanding of scholarly publication standards.

Qualitative findings further confirmed that participants perceived individualized mentoring as the most valuable component of the intervention. Many participants reported that they previously lacked confidence because they had no opportunity to consult experienced mentors during the publication process. Continuous coaching reduced uncertainty, clarified publication procedures, and enabled participants to overcome difficulties that previously prevented them from submitting manuscripts to scientific journals.

b. Reconstructing Self-Efficacy through Individualized Coaching

The substantial improvement observed in participants' writing self-efficacy supports Bandura's (1997) Social Cognitive Theory, which argues that self-efficacy develops through mastery experiences, social persuasion, observational learning, and constructive feedback. Throughout the mentoring program, participants completed progressively challenging writing tasks while receiving continuous guidance from mentors. These experiences gradually strengthened their confidence in planning, writing, revising, and submitting scientific articles.

This finding is consistent with Mulyono et al. (2023), who reported that structured academic writing interventions significantly improved writing self-efficacy among Indonesian vocational education instructors. Furthermore, Dutton et al. (2024) emphasized that sustained coaching facilitates professional learning by combining individualized feedback, reflective practice, and authentic task completion, thereby strengthening participants' confidence to perform complex professional activities.

The coaching clinic approach implemented in this study also reflects Vygotsky's concept of the Zone of Proximal Development (ZPD), whereby mentors provide scaffolding that enables learners to accomplish tasks beyond their initial capability (Manderstedt et al., 2023). Rather than simply delivering lectures, mentors continuously guided participants through manuscript revision, journal selection, reviewer responses, and editorial communication. Consequently, participants gradually developed independent publication competence while reducing dependence on external assistance.

Interview findings supported these quantitative results. Participants consistently stated that individualized mentoring helped reduce anxiety associated with scientific writing and encouraged them to complete manuscripts that had previously remained unfinished. These findings indicate that strengthening self-efficacy constitutes one of the principal mechanisms through which sustained mentoring improves teachers' scientific publication competence.

c. Ethical Integration of Generative Artificial Intelligence and Digital Scholarly Tools

Another important finding concerns the integration of Generative Artificial Intelligence (Generative AI) and digital scholarly tools within the publication mentoring process. Participants demonstrated considerable improvement in their ability to utilize Mendeley, manage scientific references, operate the Open Journal System (OJS), and employ Generative AI ethically during manuscript preparation.

Rather than replacing human authorship, Generative AI was introduced as a cognitive support tool for language refinement, idea organization, manuscript structuring, and academic editing. Participants were continuously reminded that responsibility for originality, interpretation, critical analysis, and scientific conclusions remained entirely with the authors. This mentoring strategy aligns with recent literature emphasizing that AI should complement rather than substitute human intellectual work (Kasneci et al., 2023; Ardiyansah & Batubara, 2026; Sanz-Tejeda et al., 2026).

The improvement in participants' digital literacy also demonstrates the importance of integrating technological competence into teacher professional development. Efficient reference management through Mendeley and systematic manuscript submission through OJS reduced participants' administrative workload, allowing greater attention to be devoted to research interpretation and scholarly argumentation. This finding supports the growing consensus that digital technologies can enhance academic productivity when accompanied by adequate AI literacy and ethical guidance (Kasneci et al., 2023).

Qualitative evidence further showed that participants gradually shifted their perception of Generative AI from a technology associated with academic misconduct to a legitimate learning assistant that supports academic writing under appropriate ethical standards. Consequently, technology became an enabler of scholarly productivity rather than a source of academic concern.

d. Implications for Sustainable Professional Development

Beyond improving individual competence, this study demonstrates that the Sustainable Scientific Publication Clinic has broader implications for teacher professional development. The intervention established a collaborative learning environment in which participants exchanged feedback, shared publication experiences, and gradually developed a community of scholarly practice. Such collaborative environments are recognized as essential

components of sustainable professional learning because they encourage continuous knowledge sharing beyond the duration of formal training programs (Professional Development in Education Editorial, 2024).

The publication outputs achieved during the intervention—including completed manuscripts, successful OJS submissions, and accepted journal articles—indicate that professional development should be evaluated not only by participants' satisfaction or immediate knowledge acquisition but also by measurable scholarly outcomes. This output-oriented approach represents an important contribution of the present study because many previous interventions have primarily measured short-term competency improvement without examining publication achievements.

Furthermore, the integration of continuous mentoring, ethical AI utilization, reference management, and publication assistance provides an evidence-based mentoring model that may be adapted by madrasah, schools, universities, and teacher professional development institutions seeking to strengthen teachers' research and publication capacity. Therefore, this study extends previous teacher professional development research by demonstrating that sustained mentoring supported by appropriate digital technologies can generate meaningful improvements in both competence and publication outcomes.

E. CONCLUSION

This study demonstrates that the Sustainable Scientific Publication Clinic is an effective mentoring model for improving madrasah teachers' scientific publication competence. Significant improvements across all competency indicators, supported by a very large effect size (Cohen's $d = 2.91$), indicate that sustained individualized mentoring effectively strengthens teachers' academic writing skills, self-efficacy, digital scholarly competence, and readiness to publish in scientific journals.

The findings suggest that integrating ethical use of Generative Artificial Intelligence, Mendeley, and the Open Journal System into continuous mentoring provides a practical and evidence-based approach to enhancing teachers' publication performance while maintaining academic integrity. Therefore, teacher professional development programs should move beyond conventional short-term training toward sustained, outcome-oriented mentoring that emphasizes measurable publication achievements.

This study was limited to a single institutional context with a relatively small sample. Future research is recommended to evaluate the effectiveness of this mentoring model in broader educational settings and to examine its long-term impact on teachers' research productivity and professional development.

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