Devotion : Jurnal Pengabdian Kepada Masyarakat
Vol.3, No.2, Juni 2026, hal.170-187
e-ISSN: 3031-5913
DOI: 10.62282/devotion.v3i2.170-187
https://jurnal.yayasanyutapendidikancerdas.com/index.php/devotion

Submitted on 17/05/2026;
Revised on 03/06/2026;
Accepted on 28/06/2026;

Enhancing Scientific Writing Competence through Participatory Academic Writing Training: A Community Engagement Program for University Students

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Abstract
Scientific writing competence is an essential academic skill that enables university students to communicate research findings effectively and contribute to scholarly knowledge. However, many students continue to experience difficulties in developing scientific manuscripts due to limited experience in academic writing, literature review development, citation management, and research organization. To address these challenges, a community engagement program was conducted to enhance the scientific writing competence of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban through participatory academic writing training. The program employed a participatory approach consisting of three stages: a needs assessment, participatory academic writing training, and guided writing practice with mentoring. Data were collected through observations, questionnaires, documentation, and participants' writing assignments and were analyzed using descriptive qualitative and quantitative approaches. The findings indicate that the training successfully improved students' understanding of scientific writing principles, research topic formulation, manuscript organization, literature review development, APA citation practices, and the use of reference management software. The mentoring and hands-on writing activities also increased participants' confidence, engagement, and ability to produce structured scientific manuscripts. Furthermore, the participatory learning approach fostered collaborative learning and encouraged students to actively exchange ideas and receive constructive feedback throughout the writing process. This community engagement program demonstrates that integrating interactive instruction, guided practice, and continuous mentoring provides an effective strategy for strengthening scientific writing competence and promoting academic literacy among university students. The program is expected to contribute to the development of a sustainable academic writing culture and support students' readiness for research and scientific publication.

Keywords: academic writing training; participatory learning; community engagement; academic literacy; higher education.

INTRODUCTION

Scientific writing competence has become one of the essential academic skills that university students must master in the twenty-first century. Beyond serving as a medium for communicating research findings, scientific writing reflects students' critical thinking, analytical reasoning, information literacy, and ability to synthesize evidence into coherent academic arguments. In higher education, these competencies are increasingly recognized as

fundamental learning outcomes because they prepare students to participate in scholarly communication, contribute to scientific knowledge, and respond to the growing demand for evidence-based decision-making across various professional fields (UNESCO, 2021; Lin et al., 2023). Recent studies further emphasize that well-designed scientific writing instruction significantly enhances students' ability to construct academic arguments, organize manuscripts systematically, and communicate research findings effectively.

Despite its importance, many university students continue to experience considerable difficulties in scientific writing. Previous studies have consistently reported that students struggle with identifying research problems, organizing ideas logically, conducting literature reviews, synthesizing previous studies, applying academic language conventions, and using appropriate citation and referencing styles. Difficulties are particularly evident in developing coherent arguments and integrating evidence from multiple scholarly sources. A recent survey involving Indonesian university students also found that while students generally possess adequate basic writing skills, many still experience weaknesses in higher-order academic writing, including critical synthesis of literature, manuscript organization, and correct implementation of APA referencing standards (Rizki et al., 2025). Similarly, Yelliza (2024) reported that insufficient instructional support and limited opportunities for guided practice remain major barriers to students' scientific writing development.

The challenge of improving scientific writing competence is particularly relevant in Indonesian higher education, where students are increasingly expected to produce scientific papers as course assignments, final projects, undergraduate theses, conference papers, and journal articles. Academic writing has become an important indicator of higher education quality because it reflects students' research competence and readiness to participate in scholarly communities. Nevertheless, many students remain unfamiliar with the complete scientific writing process, ranging from selecting appropriate research topics and constructing research arguments to applying ethical citation practices and avoiding plagiarism. These challenges indicate that scientific writing competence should be developed through systematic and continuous academic support rather than relying solely on independent learning.

Educational research has demonstrated that participatory and inquiry-based learning approaches provide effective strategies for improving academic writing competence. Rather

than relying exclusively on conventional lectures, participatory training encourages students to engage actively in discussions, collaborative learning, reflection, peer interaction, and practical writing exercises. Such learning environments enable students to develop not only technical writing skills but also critical thinking, self-efficacy, and academic confidence. A systematic review by Lin et al. (2023) concluded that inquiry-based writing instruction significantly supports the development of scientific writing competence by integrating authentic research activities with structured writing guidance. Likewise, intervention-based studies have shown that structured scientific writing training substantially improves students' writing performance, particularly in organizing manuscripts and applying academic writing conventions.

Recognizing these challenges, the Retail Management Study Program of Institut Teknologi dan Bisnis Tuban identified the need to strengthen students' scientific writing competence through a structured community engagement program. Many students in the program are required to complete research-based assignments and final projects; however, preliminary observations conducted by the community service team indicated that they encountered difficulties in formulating research ideas, developing coherent scientific arguments, conducting literature searches, applying proper citation techniques, and organizing manuscripts according to accepted academic standards. These challenges highlight the necessity of practical training that combines conceptual understanding with intensive writing practice and constructive feedback.

In response to these needs, a participatory academic writing training program was organized for students of the Retail Management Study Program at Institut Teknologi dan Bisnis Tuban. The program was designed not merely to introduce the principles of scientific writing but also to provide hands-on experience in identifying research topics, developing research outlines, organizing scientific manuscripts, applying APA citation standards, utilizing reference management tools, and understanding publication ethics. Through interactive discussions, collaborative learning, guided writing exercises, and direct mentoring, participants were expected to strengthen both their academic writing competence and their confidence in producing high-quality scientific papers.

Previous studies have consistently demonstrated the effectiveness of scientific writing training in improving university students' academic writing competence. A systematic review by Lin et al. (2023) identified inquiry-based writing instruction as an effective pedagogical approach for strengthening students' scientific writing, particularly when writing activities are integrated with authentic research experiences. Similarly, Zhang et al. (2022) reported that structured writing interventions, including guided practice, collaborative learning, and instructor feedback, significantly improve students' writing competence across higher education settings. Furthermore, Nurkamto et al. (2024) revealed that many university students experience academic writing apprehension due to insufficient writing support, unfamiliarity with academic conventions, and limited feedback opportunities, highlighting the importance of structured instructional interventions. Collectively, these studies suggest that scientific writing competence is more effectively developed through systematic training that combines active learning, guided practice, collaborative interaction, and continuous feedback.

Despite these encouraging findings, most previous studies have primarily focused on evaluating writing instruction in general higher education contexts or examining writing competence from pedagogical perspectives. Community engagement programs have likewise tended to emphasize general scientific writing literacy without addressing the specific academic needs of students within particular disciplines. Limited attention has been given to participatory academic writing training that combines needs assessment, interactive instruction, guided writing practice, mentoring, and reference management skills within the context of retail management education. Furthermore, few community engagement studies have documented how such an integrated training model contributes to improving students' readiness to undertake research projects and produce scientific manuscripts. Therefore, this community engagement program seeks to address these gaps by implementing a participatory academic writing training model specifically designed for students of the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban, with the expectation of strengthening their scientific writing competence and supporting a sustainable culture of research and scientific publication.

METHODS

This community engagement program employed a participatory training approach to enhance the scientific writing competence of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban. The program was designed to strengthen students' academic writing skills through interactive learning, guided practice, and collaborative mentoring. A participatory approach was adopted to encourage active involvement throughout the learning process, allowing participants to engage in discussions, exchange ideas, and apply scientific writing concepts directly through practical exercises.

The participants were undergraduate students from the Retail Management Study Program at ITB Tuban who were preparing research proposals, course assignments, and final projects. Scientific writing competency is considered an essential skill for these students, as it supports research-based learning, academic communication, and future scholarly publication.

The implementation of the program consisted of three sequential stages. The first stage was a needs assessment, which aimed to identify students' prior knowledge and the main challenges they encountered in scientific writing. This stage was conducted through informal discussions and a preliminary questionnaire focusing on participants' experiences in selecting research topics, formulating research problems, organizing scientific manuscripts, conducting literature reviews, applying citation and referencing styles, and using reference management software. The results of this assessment were used to determine the scope and emphasis of the training materials.

The second stage involved the implementation of participatory academic writing training. The training was delivered through interactive lectures, group discussions, demonstrations, and guided practice. The learning materials included the characteristics of scientific writing, the structure of academic manuscripts, formulation of research problems and objectives, literature review techniques, academic integrity, plagiarism prevention, citation and referencing using the American Psychological Association (APA) style, and the use of reference management software such as Mendeley. Throughout the sessions, participants were encouraged to ask questions, discuss common writing challenges, and analyze examples of published scientific articles to strengthen their understanding of academic writing standards.

The third stage focused on guided writing practice and mentoring. During this stage, participants applied the knowledge gained from the training by developing their own scientific writing projects. They were guided to identify research topics relevant to retail management, prepare manuscript outlines, formulate research questions, organize literature reviews, and develop initial drafts of scientific papers. Facilitators provided continuous feedback on the organization of ideas, academic language, logical coherence, citation accuracy, and overall manuscript quality. Peer discussions were also incorporated to promote collaborative learning and allow participants to exchange constructive feedback on their writing.

RESULTS AND DISCUSSION

Initial Assessment of Students' Scientific Writing Competence

The community engagement program commenced with an initial needs assessment to identify the scientific writing competencies of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban. This preliminary assessment was intended to provide a comprehensive understanding of students' prior knowledge, learning needs, and challenges in academic writing. The assessment was conducted through informal discussions, classroom observations, and a preliminary questionnaire administered before the training program. Information gathered during this stage served as the foundation for designing the training materials and determining the instructional strategies most appropriate for participants' needs.

The findings revealed that most students recognized the importance of scientific writing as an essential component of their academic development. Participants understood that scientific writing skills were necessary for completing research-based course assignments, preparing undergraduate theses, and producing publishable scientific papers. However, despite this awareness, many students reported limited confidence in their ability to independently prepare scientific manuscripts that met academic standards. Several participants acknowledged that they had little prior experience in writing scientific papers beyond completing classroom assignments and had not received structured training in academic writing.

One of the primary challenges identified during the assessment was students' difficulty in selecting appropriate research topics and formulating clear research problems. Many participants expressed uncertainty in narrowing broad research ideas into specific, researchable questions. They also experienced challenges in developing logical relationships between research backgrounds, problem statements, objectives, and research significance. These findings indicate that although students possessed general knowledge of research procedures, they required additional guidance in transforming ideas into well-structured scientific investigations.

The assessment further demonstrated that literature review development remained another major challenge. Many participants relied heavily on internet searches without applying systematic strategies for identifying relevant scholarly literature. Students reported limited familiarity with searching academic databases, evaluating the credibility of scientific sources, synthesizing findings from previous studies, and identifying research gaps. Consequently, literature reviews often consisted of descriptive summaries rather than critical analyses capable of supporting well-developed research arguments.

Difficulties were also observed in applying academic writing conventions. Participants indicated that they were unfamiliar with organizing scientific manuscripts according to internationally recognized structures, particularly in preparing coherent introductions, developing logically connected discussions, and presenting conclusions that reflected research findings. Furthermore, many students experienced uncertainty regarding the use of formal academic language, paragraph organization, coherence between sections, and appropriate presentation of tables, figures, and supporting evidence.

Another important finding concerned students' understanding of citation practices and academic integrity. Most participants were aware of plagiarism as an unethical academic practice; however, many admitted experiencing difficulties in applying proper in-text citations and compiling reference lists according to the American Psychological Association (APA) style. In addition, only a limited number of participants had previous experience using reference management software such as Mendeley. As a result, citations and reference lists were frequently prepared manually, increasing the possibility of formatting inconsistencies and citation errors.

The preliminary assessment also highlighted students' strong motivation to improve their scientific writing competence. During group discussions, participants expressed considerable interest in receiving practical guidance on developing research ideas, organizing scientific manuscripts, conducting effective literature searches, utilizing reference management software, and understanding publication ethics. They emphasized the need for hands-on practice accompanied by direct mentoring rather than conventional lecture-based instruction. This finding suggests that participants expected a learning environment that emphasized interaction, practice, and continuous feedback throughout the writing process.

Implementation of Participatory Academic Writing Training

Following the initial needs assessment, the community engagement program proceeded with the implementation of participatory academic writing training designed to strengthen the scientific writing competence of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban. The training was developed based on the challenges identified during the preliminary assessment, ensuring that the learning materials and activities addressed the actual academic needs of the participants. Rather than adopting a conventional lecture-based approach, the program emphasized active participation through interactive discussions, collaborative learning, guided practice, demonstrations, and direct mentoring.

Figure 1. The Author Delivered the Material about Scientific Writing

The training was delivered in several interconnected sessions covering the fundamental principles of scientific writing. The materials included the characteristics of scientific writing, the structure of scientific manuscripts, formulation of research topics and research problems, development of research objectives, preparation of literature reviews, academic integrity, plagiarism prevention, citation and referencing using the American Psychological Association (APA) style, and the utilization of reference management software, particularly Mendeley. Examples of published journal articles were presented to illustrate the organization of high-quality scientific manuscripts and to familiarize participants with accepted academic writing standards.

Figure 2. The Title of Material Given during the Training

Throughout the training sessions, participants were encouraged to actively engage in discussions rather than passively receive information. Facilitators initiated discussions by presenting common issues encountered in academic writing and inviting participants to share their own experiences and difficulties. This interactive learning environment enabled students to exchange ideas, ask questions, and collaboratively explore solutions to the challenges they faced in preparing scientific papers. The diversity of questions raised during the sessions reflected participants' strong interest in improving their academic writing competence and demonstrated the relevance of the training materials to their academic needs.

Figure 3. Part of the Material Given during the Training Session

To reinforce conceptual understanding, the training incorporated practical exercises in which participants directly applied the concepts introduced during each session. Students practiced formulating research titles, identifying research gaps, developing research problems, preparing manuscript outlines, and organizing literature reviews using relevant scholarly sources. Facilitators provided step-by-step guidance throughout these activities, allowing participants to receive immediate clarification and feedback whenever difficulties arose. This practice-oriented approach enabled students to develop a clearer understanding of the scientific writing process while simultaneously improving their confidence in applying newly acquired knowledge.

A significant component of the training involved demonstrating the use of Mendeley as a reference management tool. Participants were guided through the processes of installing the software, creating personal libraries, importing scholarly references, organizing literature, generating in-text citations, and automatically formatting reference lists according to APA style. For many participants, this was their first experience using reference management software. The hands-on demonstration significantly increased their understanding of efficient citation management and highlighted the importance of maintaining academic integrity through accurate referencing practices.

The participatory nature of the program also fostered collaborative learning among participants. During group discussions and writing exercises, students exchanged feedback on

research ideas, evaluated manuscript outlines, and discussed strategies for improving the clarity and coherence of their academic writing. This peer interaction created a supportive learning environment in which participants learned not only from the facilitators but also from one another. Such collaborative engagement encouraged active learning, strengthened communication skills, and promoted greater confidence in expressing academic ideas.

Observations conducted throughout the implementation indicated a high level of participant engagement. Students consistently demonstrated enthusiasm by actively participating in discussions, asking questions related to scientific writing techniques, and contributing ideas during collaborative activities. The practical writing exercises generated particularly strong participation, as students showed considerable interest in receiving direct feedback on their work. This active involvement suggests that participatory learning methods were effective in maintaining students' motivation and facilitating deeper understanding of academic writing concepts.

Improvement in Students' Scientific Writing Competence

The guided writing practice and mentoring sessions demonstrated positive outcomes in enhancing participants' scientific writing competence. Based on observations during the training, participants showed noticeable improvements in understanding the fundamental components of scientific writing and in applying the concepts introduced throughout the program. The combination of theoretical instruction, practical exercises, and continuous feedback enabled students to progressively develop the knowledge and skills required to produce more systematic and academically appropriate scientific manuscripts.

One of the most significant improvements was observed in participants' ability to formulate research topics and research problems. At the beginning of the program, many students proposed research topics that were overly broad and lacked a clear research focus. Following the mentoring sessions, participants were better able to refine their research ideas into more specific, feasible, and researchable topics. They also demonstrated improved competence in formulating research questions that were logically aligned with the background of the study, research objectives, and expected contributions. This improvement indicates that participants developed a stronger understanding of the logical structure underlying scientific

research.

Participants also demonstrated progress in organizing scientific manuscripts according to accepted academic conventions. During the guided writing exercises, students were able to prepare manuscript outlines that reflected a clearer sequence of ideas, including the introduction, literature review, methodology, findings, and conclusion. Their writing became more coherent, with stronger connections between paragraphs and better organization of supporting arguments. Facilitators observed that participants increasingly applied formal academic language and demonstrated greater awareness of the importance of clarity, consistency, and logical flow in scientific writing.

Another notable outcome was the improvement in participants' ability to conduct literature reviews. Students became more capable of identifying relevant scholarly references, distinguishing between credible and non-academic sources, and integrating previous studies into their own research backgrounds. Rather than merely summarizing individual references, participants gradually demonstrated the ability to synthesize findings from multiple sources to support their research arguments and identify research gaps. This development represents an important step toward strengthening students' academic literacy and critical engagement with scientific literature.

The training also substantially improved participants' understanding of academic integrity and citation practices. During the initial assessment, many students were unfamiliar with APA citation standards and relied on manual methods for preparing references. Through demonstrations and hands-on practice using Mendeley, participants learned to organize reference libraries, insert in-text citations, and automatically generate reference lists in accordance with APA guidelines. By the end of the mentoring sessions, most participants were able to apply these techniques correctly, reducing common citation errors and increasing their awareness of ethical academic writing practices.

In addition to technical writing skills, the mentoring process contributed to participants' confidence in producing scientific papers. Students became more willing to express research ideas, discuss methodological considerations, and seek feedback on their writing. The interactive nature of the mentoring sessions encouraged participants to view writing as a developmental process involving continuous revision and improvement rather

than as a one-time academic task. Peer discussions further supported this process by allowing participants to exchange constructive feedback and learn from one another's experiences.

The writing outputs produced during the program provided tangible evidence of participants' learning progress. By the end of the training, participants had successfully developed preliminary manuscript components, including research titles, problem statements, manuscript outlines, literature review sections, and properly formatted citations and reference lists. Although these manuscripts represented initial drafts requiring further refinement, they demonstrated participants' ability to apply the concepts and techniques introduced during the training. The quality of these outputs suggests that the participatory training approach effectively bridged the gap between theoretical understanding and practical application.

Overall, the results indicate that the participatory academic writing training successfully enhanced students' scientific writing competence in multiple dimensions, including research planning, academic writing organization, literature review development, citation management, academic integrity, and writing confidence. The integration of guided practice, mentoring, and collaborative learning created an effective learning environment that enabled participants to acquire practical academic writing skills while fostering greater readiness to undertake research projects, complete undergraduate theses, and prepare scientific manuscripts for publication.

Discussion

The findings of this community engagement program demonstrate that participatory academic writing training effectively enhanced the scientific writing competence of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban. The improvement was reflected not only in participants' understanding of the fundamental principles of scientific writing but also in their ability to formulate research topics, develop research problems, organize manuscript structures, conduct literature reviews, and apply appropriate citation and referencing practices. These findings indicate that scientific writing competence can be developed more effectively through learning environments that actively engage students in practical writing activities rather than relying solely on theoretical instruction.

The positive outcomes observed in this program are consistent with previous studies emphasizing that scientific writing is a complex competency requiring the integration of critical thinking, information literacy, academic communication, and research skills. According to Graham (2019), effective writing instruction should combine explicit guidance, continuous practice, and constructive feedback to improve students' writing performance. Similarly, Lin et al. (2023) concluded in their systematic review that inquiry-based writing instruction significantly improves students' scientific writing ability because it encourages learners to actively construct knowledge while engaging in authentic research activities. Rather than functioning merely as passive recipients of information, students become active participants who continuously develop and refine their academic writing skills.

One of the key strengths of the present program lies in its participatory learning approach. Throughout the training sessions, students were encouraged to discuss research ideas, identify writing challenges, and collaboratively develop solutions under the guidance of facilitators. Such an approach is closely aligned with Kolb's (1984) Experiential Learning Theory, which proposes that meaningful learning occurs through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the context of this program, participants did not simply receive explanations regarding scientific writing principles but immediately applied them through writing exercises and mentoring sessions. This integration of theory and practice enabled participants to develop a deeper understanding of academic writing while simultaneously increasing their confidence in producing scientific manuscripts.

The collaborative nature of the training also reflects the principles of social constructivism proposed by Vygotsky (1978), which emphasizes that learning is socially constructed through interaction, discussion, and collaborative problem-solving. During the mentoring sessions, participants actively exchanged ideas, reviewed one another's work, and discussed difficulties encountered in preparing research proposals and scientific papers. These collaborative activities created opportunities for peer learning, allowing participants to benefit not only from facilitator feedback but also from interactions with fellow students. Previous studies have similarly demonstrated that collaborative writing activities improve students' academic writing quality, critical thinking, and self-confidence (Storch, 2019; Zhang et al.,

2022).

Another important finding concerns participants' improved ability to conduct literature reviews and utilize scholarly references. Before participating in the training, many students relied primarily on general internet searches and experienced difficulties identifying credible academic sources. Following the training, participants demonstrated greater awareness of scholarly databases, the importance of synthesizing previous research, and the identification of research gaps as the foundation for scientific inquiry. This improvement is particularly important because literature review competence has been recognized as one of the strongest predictors of successful academic writing (Cargill & O'Connor, 2021). Furthermore, effective literature searching contributes to students' research literacy and enables them to develop evidence-based academic arguments (Machi & McEvoy, 2022).

The training also strengthened participants' understanding of academic integrity and citation management. Practical sessions introducing APA Style and Mendeley significantly improved participants' ability to organize references, generate in-text citations, and prepare reference lists accurately. Similar findings have been reported by Basri et al. (2022), who found that reference management training reduced citation errors and improved students' confidence in preparing scientific manuscripts. Likewise, community engagement programs conducted by Hidayat et al. (2023) and Prasetyo et al. (2024) demonstrated that integrating Mendeley training into scientific writing workshops enhanced students' academic writing efficiency while promoting ethical citation practices and reducing the risk of plagiarism.

The mentoring component also played a significant role in the success of the program. Continuous guidance enabled participants to receive immediate feedback regarding manuscript organization, research problem formulation, coherence of arguments, and academic language. Previous research has consistently shown that formative feedback is one of the most influential factors affecting writing development because it allows learners to identify weaknesses and improve subsequent drafts (Hyland & Hyland, 2019; Carless & Boud, 2018). Rather than viewing writing as a one-time task, participants gradually understood that scientific writing is a recursive process involving planning, drafting, revising, and refining academic ideas.

The findings further demonstrate that participatory training contributes not only to

technical writing competence but also to students' academic self-efficacy. Many participants reported greater confidence in developing research proposals and scientific manuscripts after completing the program. This finding is consistent with Bandura's (1997) Social Cognitive Theory, which emphasizes that mastery experiences and supportive learning environments enhance individuals' confidence in performing complex tasks. Increased writing self-efficacy has also been associated with greater motivation to engage in academic research and higher-quality writing performance (Pajares, 2003; Bruning et al., 2013).

From the perspective of community engagement, this program illustrates that universities play an important role in strengthening students' academic capacity through community service activities that directly address educational needs. Unlike conventional classroom instruction, community engagement programs provide greater flexibility for contextual learning, intensive mentoring, and collaborative knowledge sharing. Similar community service initiatives reported by Sari et al. (2023), Nurhayati et al. (2024), and Wibowo et al. (2022) likewise concluded that structured scientific writing training significantly improves students' readiness to conduct research and prepare scientific publications. These findings collectively suggest that community-based academic capacity-building programs can complement formal classroom learning by providing practical experiences that are often difficult to achieve through conventional teaching methods alone.

The results of this program confirm that participatory academic writing training represents an effective approach to strengthening scientific writing competence among university students. The integration of interactive lectures, collaborative discussions, guided writing practice, mentoring, and reference management training created a comprehensive learning environment that supported both cognitive and practical skill development. Beyond improving students' ability to prepare scientific manuscripts, the program also fostered greater confidence, academic integrity, and research literacy, all of which are essential competencies for higher education students. Consequently, similar training programs should be implemented continuously and integrated into academic development initiatives to cultivate a sustainable culture of scientific writing and research productivity among university students.

CONCLUSION

This community engagement program demonstrates that participatory academic writing training is an effective approach to enhancing the scientific writing competence of students in the Retail Management Study Program at Institut Teknologi dan Bisnis (ITB) Tuban. Through a combination of needs assessment, interactive training sessions, guided writing practice, and mentoring, participants showed improved competence in formulating research topics, organizing scientific manuscripts, conducting literature reviews, applying APA citation standards, and utilizing reference management software. The participatory learning approach also fostered greater confidence, active engagement, and collaboration among students throughout the writing process.

The findings highlight that scientific writing competence can be strengthened when theoretical instruction is integrated with practical experience and continuous mentoring. Beyond improving technical writing skills, the program contributed to the development of academic literacy, research communication, and ethical writing practices, which are essential for students' academic success and future research productivity. Therefore, similar training programs should be implemented regularly and integrated into academic development initiatives within higher education institutions to cultivate a sustainable culture of scientific writing and encourage greater student participation in research and scientific publication.

Acknowledgement

The authors would like to express their sincere gratitude to the Institut Teknologi dan Bisnis (ITB) Tuban for its continuous support in facilitating the implementation of this community engagement program. Special appreciation is extended to the Head of the Retail Management Study Program and all students of the Retail Management Study Program who actively participated in the academic writing training and contributed enthusiastically throughout the learning activities. The authors also acknowledge the valuable contributions of the organizing committee, facilitators, and all individuals involved in the planning and implementation of the program. Their commitment, collaboration, and support were instrumental in the successful execution of the training. It is hoped that this initiative will contribute to strengthening students' scientific writing competence and fostering a sustainable

culture of research and scientific publication within the academic community.

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