PPI Pengabdian Pendidikan Indonesia
e-ISSN : 3026-3654
ITScience

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Community Service Initiative on Scientific Writing: Implementing Scaffolding to Enhance Academic Article Development

Muhammad Nurtanto[1)] | Rohmatulloh[2)] | Nur Kholifah[3)]
[1)]Politeknik Negeri Jakarta PSDKU Demak, Indonesia
[2)]Human Resources Development Agency for Energi and Mineral Reources, Indonesia
[3)]Yogyakarta State University, Yogyakarta, Indonesia
muhammad.nurtanto@mesin.pnj.ac.id | rohmatulloh@an-nur.ac.id | nur.kholifah@uny.ac.id

Abstract:
This community service program aimed to enhance the scientific writing skills of Ministry of Energy and Mineral Resources (MEMR) employees, enabling them to transform performance reports into academic publications. Using the Participatory Action Research (PAR) approach, the program identified challenges and implemented structured solutions through scaffolding techniques. Conducted at the Human Resource Development Agency for Energy and Mineral Resources (HRDA-EMR) in Bandung, the program involved 24 participants from eight divisions. The implementation consisted of three phases: preparation, execution, and evaluation. The preparation phase analyzed participants' characteristics to ensure equitable group distribution. The execution phase applied scaffolding across four stages: identifying relevant literature, understanding research methodologies, structuring article components, and developing detailed narratives. Each stage incorporated guidance, hands-on assignments, and peer discussions to support participants' learning process. The evaluation phase measured participants' competency improvements and the program's effectiveness. Results demonstrated a significant increase in participants' academic writing abilities, as evidenced by completed and submitted articles. The scaffolding approach effectively addressed individual challenges, promoted critical thinking, and facilitated gradual skill development. This program highlights the potential of scaffolding in enhancing academic writing skills across various professional fields. Future programs should consider integrating digital tools and emphasizing post-submission strategies to better prepare participants for global scientific engagement.

Key words: Academic Writing, Scaffolding, Participatory Action Research, Scientific Publication, Professional Development

Introduction

The Human Resource Development Agency for Energy and Mineral Resources (HRDA-EMR) is committed to enhancing employee competencies through structured training programs, including scientific writing workshops. These training sessions aim to strengthen employees' ability to develop scientific articles that meet the standards of both national and international journals, which are crucial for advancing the energy and mineral resources sector. Scientific publications serve as the primary medium for documenting and disseminating research findings and developments, not only as academic references but also as a foundation for evidence-based policymaking (Habibie, 2022). In the long term, this program fosters a sustainable knowledge ecosystem within HRDA-EMR, enriches theoretical perspectives, and promotes the practical application of innovative ideas (Rohmatulloh et al., 2023). Furthermore, strong academic writing skills enable employees to contribute more effectively to

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20
Doi: https://doi.org/10.47709/ppi.v2i03.5696

international scientific forums, expand professional networks, and enhance the institution's global reputation (Permana et al., 2023; West & Turnbull, 2023).

However, several challenges hinder employees of the Ministry of Energy and Mineral Resources (EMR) from producing scientific articles. These include a lack of familiarity with standardized scientific writing formats, limited hands-on experience in academic writing, restricted access to relevant journals, difficulty in structuring ideas and arguments within their professional context, limited time availability for article completion, and insufficient peer support from experienced academic writers. Addressing these challenges, a competency-building program focused on scientific writing training was deemed essential. This program is designed to equip participants with the necessary skills to transform workplace best practices into well-documented scientific articles that complement existing theories and serve as up-to-date references for academics, researchers, and practitioners in the EMR sector. The training provides an intensive learning experience covering article structuring, writing techniques, and access to journal resources, ensuring that participants can enhance their writing skills and contribute more significantly to scientific advancements and best practices in their field.

Scaffolding is a learning approach that provides temporary support to participants as they develop new skills and knowledge, allowing them to gradually achieve a higher level of understanding. It is particularly effective in scientific writing training, as it enables writers to guide readers through complex concepts in a structured manner, facilitating comprehension and integration of new information into critical thinking processes (Conradie, 2010; Wijayanti, 2020). Prior studies Krishnan (2019) have reported positive outcomes of scaffolding in educational and training settings, demonstrating its effectiveness in enhancing learning outcomes and participant engagement. Additionally, scaffolding has been shown to help learners overcome challenges, boost confidence, and develop autonomy in interacting with complex learning materials (Acosta-Gonzaga & Ramirez-Arellano, 2022; Rojas-Drummond & Mercer, 2003). Therefore, this community engagement program adopts a scaffolding approach, ensuring that participants face challenges in academic writing progressively while maintaining psychological resilience.

The primary objective of this community service initiative is to enhance participants' academic writing skills through structured guidance, enabling them to produce high-quality scientific articles relevant to their respective research fields. The training follows a scaffolding approach, where participants first grasp key concepts, then complete structured tasks, and ultimately receive ongoing mentorship and facilitation to prevent disorientation throughout the writing process.

Implementation Method

This community service initiative aimed to enhance the understanding and writing skills of professionals in the Energy and Mineral Resources (EMR) sector, enabling them to produce scientific articles suitable for journal publication. The primary focus was to convey recent findings that could strengthen professional practices within their respective fields. The training adopted a Participatory Action Research (PAR) approach (Torre, 2014), which emphasized problem identification and resolution within the EMR workforce, particularly in transforming performance reports into scientific publications. The program was conducted at the Human Resource Development Agency for Energy and Mineral Resources (HRDA-EMR), located at Jl. Cisitu Lama No. 37, Bandung, West Java. A total of 24 participants from eight different divisions within the Ministry of EMR attended the training. This location was chosen to ensure accessibility and provide adequate facilities to support the program's success.

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20
Doi: https://doi.org/10.47709/ppi.v2i03.5696

Participant engagement began at the planning stage, where the organizing team—consisting of instructors, curriculum developers, and evaluators—actively identified participants' needs through preliminary discussions. This process helped assess their strengths and weaknesses, as well as their prior experience and level of understanding regarding scientific writing. Based on this assessment, training groups were formed strategically to create an optimal learning dynamic and support system.

The training program was structured into three main phases: Planning, Implementation, and Evaluation (see Figure 1). The planning phase focused on preparing participants and ensuring the program's effectiveness. First, participant profiling was conducted to assess their backgrounds, writing experience, and level of competence in scientific writing. Then, group assignments were arranged to ensure a balanced mix of experience levels, allowing for peer learning and collaboration. Additionally, the curriculum was developed to align with the participants' needs and to incorporate scaffolding techniques for progressive skill development.

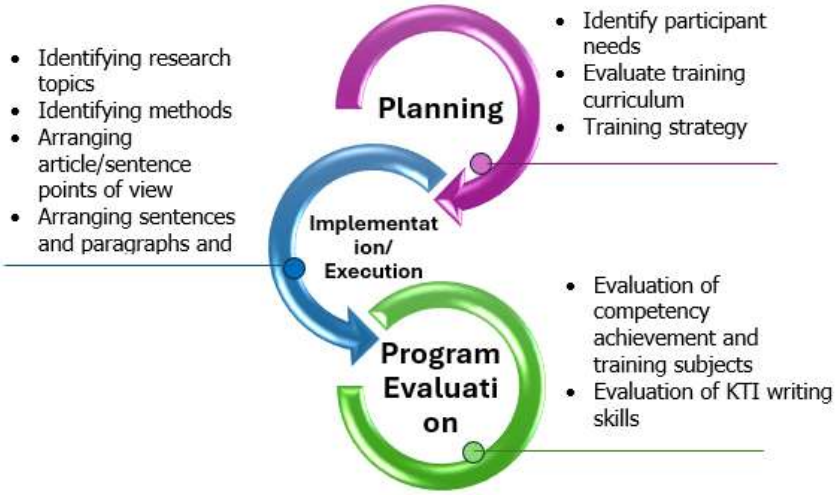

Figure 1. Community Service Implementation Flow

The implementation phase involved hands-on training sessions using a scaffolding approach, structured over 36 hours of instruction and practice. The training consisted of four progressive tasks to guide participants in writing scientific articles: Task 1: Identifying Relevant Literature -- Participants were instructed to find at least ten scientific articles relevant to their research topics. They analyzed the problem statements, methodologies, theoretical frameworks, and key findings to understand the structure of a high-quality scientific article. Task 2: Understanding Research Methodology -- Participants deepened their knowledge of research methodologies by examining variables, questionnaire design, data collection techniques, and data analysis methods. This step helped them align their research methods with academic standards and improve the credibility of their findings. Task 3: Structuring the Scientific Article -- Participants organized their research findings into a structured article format. They developed an outline following the IMRAD structure (Introduction, Methods, Results, and Discussion) under the guidance of instructors. This stage ensured that their manuscripts followed a logical flow, making them more suitable for journal submission. Task 4: Developing Coherent Narratives -- Participants converted their structured outlines into well-connected paragraphs, refining their writing style and argumentation. They received continuous feedback from instructors and peers to improve clarity, coherence, and academic rigor. Throughout these stages, participants were encouraged to express their ideas freely without excessive pressure. Instructors provided direct

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

guidance to address difficulties, while discussion sessions allowed participants to share challenges and solutions during the writing process.

The evaluation phase assessed the effectiveness of the training program based on participants' competency development, engagement, and overall learning outcomes. Evaluations focused on two main aspects: Competency and Training Effectiveness Assessment Participants were evaluated on their mastery of content, ability to respond to instructor queries, systematic presentation of ideas, clarity of writing, and application of research methods. The assessment also considered presentation skills, use of learning resources, motivation, time management, and instructional clarity throughout the training. Participant Performance Measurement Performance was measured through three criteria: (1) Attendance (5%) – Participants were required to maintain a high level of participation throughout the training sessions. (2) Academic Performance (75%) – This included task completion, engagement in discussions, relevance of responses, proper referencing, and overall writing structure. (3) Active Participation (20%) – These measured contributions in group work and discussions, ensuring that participants engaged actively in collaborative learning. Participants were considered successful if they achieved an overall score of ≥ 70 (on a scale of 100). The evaluation results provided valuable insights into the effectiveness of the scaffolding approach in scientific writing training, offering recommendations for future program improvements.

Results

Participant Profile

A total of 24 participants from eight different divisions within the Ministry of Energy and Mineral Resources (EMR) took part in the scientific writing training program. The participants came from various professional backgrounds, reflecting the broad interest in developing academic writing skills across multiple units within the ministry. The distribution of participants based on their respective divisions was as follows: 9 employees from the Human Resource Development Agency for Energy and Mineral Resources (HRDA-EMR), 8 employees from the Directorate General of Mineral and Coal, 3 employees from the Geological Agency, 2 employees from the Directorate General of Electricity, and 2 employees from the Directorate General of Oil and Gas. Additionally, one participant each represented the Secretariat General of the National Energy Council, the Secretariat General, and the Directorate General of New, Renewable Energy, and Energy Conservation.

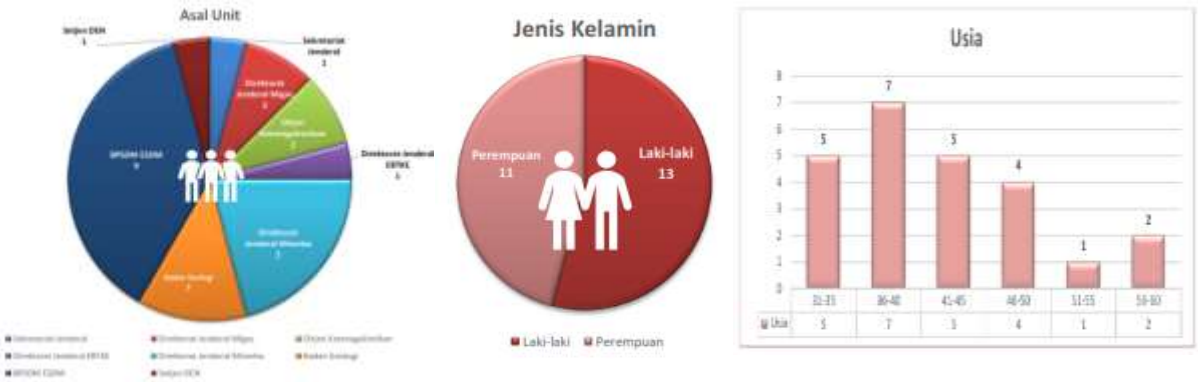

Figure 2. Participant Profile Based on Unit Affiliation, Gender, and Age

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

In terms of gender distribution, 13 participants were male and 11 were female, indicating a relatively balanced representation in the training program. The participants also varied in age, ranging from 31 to 60 years old, with the following distribution: 7 participants aged 36–40 years, 5 participants aged 31–35 years, 5 participants aged 41–45 years, 4 participants aged 46–50 years, 1 participant aged 51–55 years, and 2 participants aged 56–60 years. The diversity in participants' backgrounds, gender, and age suggests a strong and widespread interest in academic writing across different professional levels. This indicates that employees across various divisions within the EMR sector recognize the importance of scientific writing for knowledge dissemination, research documentation, and professional development. A detailed breakdown of participants based on unit affiliation, gender, and age is presented in Figure 2.

Implementation of the Scientific Writing Training Program Using the Scaffolding Approach

The implementation of the scientific writing training program (KTI) at HRDA-EMR Bandung created a dynamic and engaging learning atmosphere. Participants demonstrated a strong commitment to the training, actively engaging in classroom sessions and discussions. This dedication is illustrated in Figure 3(a), which captures the delivery of instructional materials, and Figure 3(b), which showcases one of the participants presenting their progress on assigned tasks.

Figure 3. Training Implementation: (a) Material Delivery; and (b) Participant's Progress Presentation

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

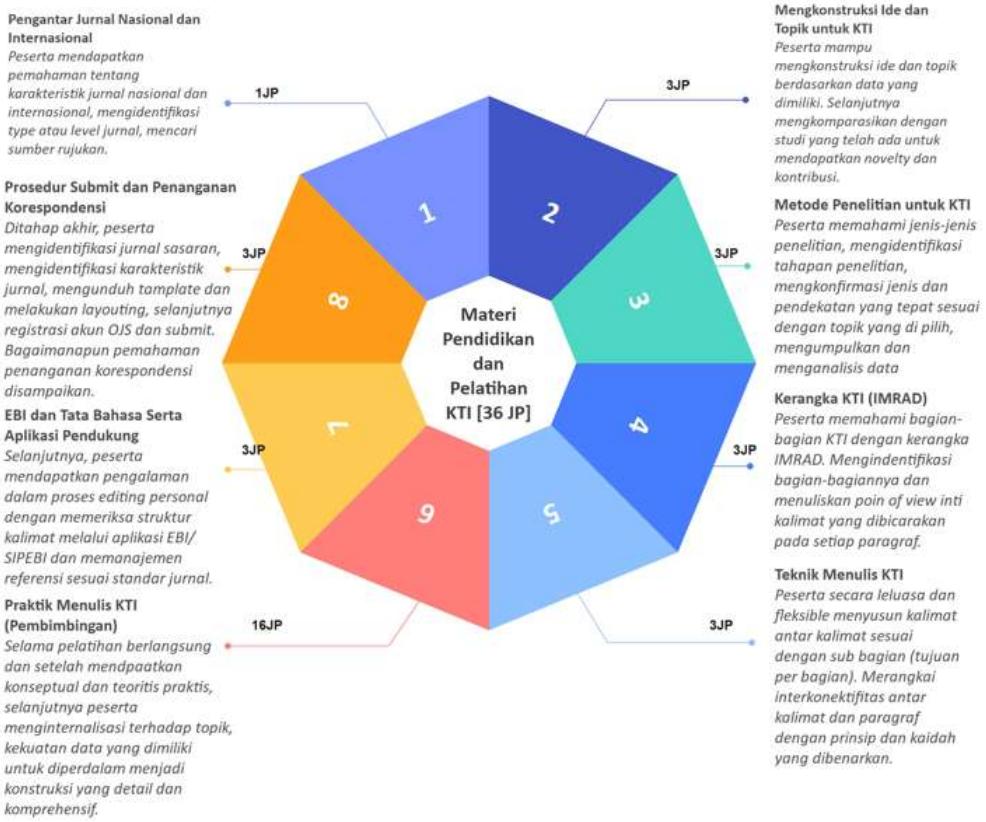

Figure 4. Scientific Writing Training Curriculum Using the Scaffolding Approach

The training program comprised eight instructional modules delivered over a total of 36 contact hours. The sessions included a combination of theoretical instruction and hands-on practice, where participants systematically developed their scientific articles based on the materials provided. A detailed conceptual overview of the training curriculum and scaffolding approach is presented in Figure 4.

Scaffolding Stage 1: Identifying Research Ideas and Topics

In this stage, participants identified at least 10 scientific articles with topics or keywords similar to the study they intended to develop into a research article. They conducted searches using various sources, including Google Scholar, Knowledge Maps, ScienceDirect, Publish or Perish, and other relevant databases. Once the articles were collected, participants analyzed their content by examining key elements such as author, title, publication year, research problem, methodology, theoretical framework, and findings. The primary objective of this stage was to enable participants to identify research problems from previous studies and recognize existing knowledge gaps. Additionally, participants gained insights into empirical methods and theories that had been applied in past research. The findings from this analysis were then categorized and synthesized to establish the state of the art in the respective field. This process also helped participants identify research gaps and construct the novelty of their planned scientific articles.

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

PPI Pengabdian Pendidikan Indonesia
e-ISSN : 3026-3654
ITScience
Diterbitkan oleh: Information Technology and Science (ITScience)

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

No.	Penulis	Judul	Tahun	Masalah penelitian	Metode	Teori	Temuan penelitian
1	Katsuyuki Nakano, Ken Yamagishi	Impact of Carbon Tax Increase on Product Price in Japan	2021	Dampak kenaikan pajak karbon terhadap harga barang	Kuantitatif	- Tax exemption and refund - Energy tax	Perubahan harga sangat bervariasi menurut sektor industri dan produk, bahkan dalam sektor industri yang sama.
2	Juris Justitio Hakim Putra, Nabilla, Fidelia Yemima	Comparing "Carbon Tax" and "Cap and Trade" as Mechanism to Reduce Emission in Indonesia	2021	Mekanisme karbon yang paling efektif diimplementasikan di Indonesia	Kualitatif	- Carbon Tax - Cap and Trade	Efektivitas antara Cap and trade serta Karbon Tax relatif sama yaitu antara 2% dan 4%. Namun, pajak karbon lebih mudah diterapkan
3	Andriansyah, Seung Hyun Hog	Carbon Pricing in ASEAN+3 Economies: Progress and Challenges	2022	Tantangan penerapan harga karbon di negara ASEAN+3	Kualitatif	- Emission trading System scheme - Carbon Tax scheme - Carbon Credit Mechanism	Pertimbangan perubahan kebijakan untuk mengatasi tantangan
4	Phandy Pandey, Yanif Dwi Kuntjoro, Arifuddin Uksan, Sri Sundari	The Carbon Tax Implementation in Indonesia	2022	Distorsi ekonomi dan pengaruh terhadap Masyarakat	Kualitatif	- Carbon Footprint (Life Cycle Assessment)	Penerapan pajak karbon di Indonesia terkait dengan implementasi Pigouvian Tax namun harus dilakukan

Figure 5. Identifying Previous Studies on the Research Topic

Scaffolding Stage 2: Identifying Research Methods for Scientific Writing

In this stage, participants continued the identification process based on the articles analyzed in the previous phase. The primary focus of Stage 2 was to examine research strategies, data collection methods, data analysis techniques, and data interpretation approaches. The expected outcome of this stage was for participants to determine the most suitable research approach, data collection techniques, and data analysis methods for their study. Additionally, this stage aimed to help participants identify appropriate research instruments and select relevant variables or indicators that aligned with their chosen research focus.

Pertanyaan:
1. Tentukan metode penelitian KTI yang akan ditulis menggunakan teknik literature review.
2. Rangkum isi artikel meliputi beberapa aspek menggunakan matriks sintesis khusus bagian metode (terlampir).
3. Metode apa yang akan digunakan dalam tulisan KTI anda?

No.	Penulis	Judul	Tahun	Strategi atau pendekatan penelitian	Metode penelitian		Keterangan
					Pengumpulan data	Analisis dan interpretasi data	
1	Katsuyuki Nakano, Ken Yamagishi	Impact of Carbon Tax Increase on Product Price in Japan	2021	kuantitatif	- Process based LCA database Secondary data: - Database of materials, energy consumption, and GHG emissions at the product level. - Database of tax exemption/refund	the price changes of products associated with the introduction of a stronger carbon tax (agriculture, livestock, energy, plastics, other materials, transportation, services)	
2	Juris Justitio Hakim Putra, Nabilla, Fidelia Yemima	Comparing "Carbon Tax" and "Cap and Trade" as Mechanism	2021	Kualitatif status approach	- literature study on legal materials (secondary data) - Interview energy expert and tax expert (primary data)	- Quantitative Effectiveness on the Implementation on	

Figure 6. Identifying Research Methods from Previous Studies

Scaffolding Stage 3: Structuring Key Points of Article Components

At this stage, participants were guided in structuring their scientific articles using the IMRAD framework (Introduction, Methods, Results, and Discussion), which serves as the standard format for academic publications. The goal was to help participants develop a well-organized and logically structured manuscript by identifying key points that would shape each section of their article. The process began with the Introduction section, where participants identified and formulated essential research components. First, they defined the research topic by explaining its relevance and significance within the academic and professional context. This step ensured that the study was grounded in a meaningful issue that merited investigation. Next, participants articulated the research problem, clearly outlining the specific issue their study aimed to address. They were encouraged to frame the problem in a way that demonstrated its complexity and the necessity for further exploration.

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

PPI Pengabdian Pendidikan Indonesia
e-ISSN : 3026-3654
ITScience
Doi: https://doi.org/10.47709/ppi.v2i03.5696

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Following this, they provided problem justification, emphasizing why the issue needed academic attention. This involved linking the problem to practical or theoretical gaps and highlighting its implications for research and practice. To strengthen their argument, participants then identified research gaps by reviewing existing literature. They analyzed previous studies to pinpoint limitations, inconsistencies, or areas that had not yet been explored in depth, ensuring their research would contribute new insights. After recognizing the gaps, participants established the novelty of their study, highlighting the unique contribution their research would make to the field. This step was essential in demonstrating the study's originality and its potential impact on academic and professional discourse.

Finally, they defined the research objectives, outlining the specific goals their study aimed to achieve. These objectives provided a clear direction for the research process, ensuring that every aspect of the study aligned with its intended contributions. Throughout this process, participants used insights from Stage 1, where they had analyzed previous studies, to reinforce their problem justification and develop a strong foundation for their article. With structured guidance from instructors, they refined their key points into coherent and academically sound statements, preparing their manuscripts for the next stages of development.

Nama : Gita Ramaniya
Unit kerja : LEMIGAS – Ditjen Migas

Komponen	Pointer data yang ditulis
1. PENDAHULUAN	
▪ Topik	Pendalaman Rencana Implementasi Kebijakan Pungutan dan Perdagangan Karbon dalam Lingkup ESDM di Indonesia
▪ Masalah penelitian	Indonesia termasuk dalam 10 negara terbesar penghasil emisi karbon sebesar 615 juta ton CO2 dari aktivitas masyarakat. Hal ini menjadi tanggung jawab pemerintah khususnya ESDM untuk menurunkan produksi karbon dalam rangka mendukung konsensus dunia dalam menghadapi perubahan iklim
▪ Justifikasi masalah penelitian kepana masalah tersebut penting ?	Telah terbitnya UU 7/2021 dan Perpres 98/2021 namun implementasinya masih berjalan lambat
▪ Kesenjangan pengetahuan	1. Penelitian yang ada saat ini: - Formulasi Penerapan Kebijakan Pajak Karbon Indonesia (Yudhana, 2022) - Implementasi pajak karbon di Indonesia (Kuntjoro, 2022) - Perbandingan pajak karbon dan "cap and trade" sebagai mekanisme pengurangan emisi di Indonesia (putra, 2021)

Figure 7. Formulating Key Writing Points Using the IMRAD Approach

Scaffolding Stage 4: Constructing Comprehensive Sentences and Paragraphs

At this stage, participants focused on developing well-structured sentences and interconnected paragraphs based on the key points formulated in Stage 3. They expanded their initial outlines into complex and coherent sentences, ensuring logical flow and clarity in their scientific writing. As illustrated in Figure 8(a), participants described their research topics in detail, emphasizing clarity, depth, and academic rigor. This phase required sustained focus and experience, as crafting structured academic writing is a skill that develops over time.

Once all essential components were completed, participants proceeded with article formatting and layout adjustments according to the target journal's guidelines. They identified appropriate journals through Sinta or recommendations from relevant sources and formatted their manuscripts accordingly. As depicted in Figure 8(b), participants structured their articles to align with the submission requirements of their chosen journals. Throughout this process, participants actively engaged in discussions and peer-sharing sessions to address common challenges. One of the primary difficulties encountered was maintaining focus and coherence throughout the manuscript. However, with

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

continuous guidance and alignment with research objectives, participants successfully refined their writing, ensuring clarity, relevance, and adherence to academic conventions.

PENDAHULUAN

Topik:

Dalam rangka mendukung pencapaian target dalam mengurangi emisi karbon yang tertuang dalam Paris Agreement COP 21 pada tahun 2015, Indonesia telah menerbitkan Undang-Undang Nomor 7 Tahun 2021 tentang Harmonisasi Peraturan Perpajakan, dan Peraturan Presiden Nomor 98 tahun 2021 tentang Penyelenggaraan Nilai Ekonomi Karbon untuk Pencapaian Target Kontribusi yang Ditetapkan Secara Nasional dan Pengendalian Emisi Gas Rumah Kaca dalam Pembangunan Nasional. Sektor ESDM sebagai salah satu sektor yang berkontribusi besar terhadap produksi emisi karbon, memiliki tanggung jawab dan peran penting dalam implementasi peraturan tersebut. Di sisi lain, sektor ESDM juga memiliki peran besar dalam proses transisi menuju energi bersih. Berdasarkan data Kementerian ESDM, penyumbang emisi terbesar secara berturut-turut antara lain industri produsen energi (46,35%), transportasi (26,39%), industri manufaktur dan konstruksi (17,75%), sektor lainnya (4,63%). Di dalam kategori industri produsen energi, terdapat subkategori pembangkit listrik sebagai penghasil emisi terbesar (Kementerian ESDM, 2019). Dalam mengawal transisi ke energi bersih, Kementerian ESDM akan menerbitkan sejumlah peraturan, antara lain undang-undang tentang Energi Baru Terbarukan (EBT), melakukan pensiun dini pembangkit listrik tenaga uap (PLTU), memperluas co-firing di PLTU, dan mengubah pembangkit listrik tenaga diesel menjadi gas dan pembangkit listrik EBT (Kementerian ESDM, 2022).

Contents lists available at https://ttrpplus.com/journal/index.php/

International Journal of Multidisciplinary Studies (IJOMYS)

Peran serta ESDM dalam Road Map Pungutan dan Perdagangan Karbon Indonesia: Implementasi UU Harmonisasi Peraturan Perpajakan dan Perpres Nomor 98/2021

Gita Ramaniya[1*]
[1] Kementerian ESDM, Indonesia

[*]Correspondence: E-mail: gita.ramaniya@esdm.go.id

INFO ARTIKEL

Article History:
Received 6 October 2023
Revised
Accepted

Keywords:
Emisi GRK, energi, lembaga, perdagangan karbon, pungutan karbon

ABSTRAK

Indonesia telah menerbitkan Undang-Undang Nomor 7 Tahun 2021 dan Peraturan Presiden Nomor 98 tahun 2021 terkait pengelolaan karbon. Sektor ESDM sebagai salah satu sektor yang berkontribusi besar terhadap produksi emisi karbon, memiliki tanggung jawab dan peran penting dalam implementasi peraturan tersebut. Di sisi lain, sektor ESDM juga memiliki peran besar dalam proses transisi menuju energi bersih. Oleh karena itu, pembentukan lembaga baru dalam skema Badan Layanan Umum yang khusus mengelola dana pungutan karbon dan perdagangan karbon di bawah Kementerian ESDM diperlukan sebagai bentuk keseriusan pemerintah dalam pencapaian target pengurangan emisi GRK dan menjaga keberlanjutan (sustainability) dalam proses transisi menuju energi bersih.

Figure 8. (a) Constructing Sentences and Paragraphs; and (b) Formatting According to the Target Journal

Evaluation of Program Implementation on Competency and Training Modules

The evaluation results were based on the stages of learning and the scientific writing training modules. A radar plot was generated to illustrate performance comparisons across different evaluation criteria, with each criterion represented in distinct colors. Overall, the criteria for "Mastery of Material" and "Presentation Skills" received the highest scores in nearly all training modules, with an average score exceeding 91, indicating a strong level of competency acquisition. However, criteria such as "Utilization of Teaching Methods and Learning Resources" and "Quality of Instructional Materials" received the lowest scores, though they still fell within a good performance category, suggesting room for improvement in technical aspects and supporting media. The overall average score for all training modules was close to 92, demonstrating that the training program and evaluation process successfully met the expected standards (see Figure 9).

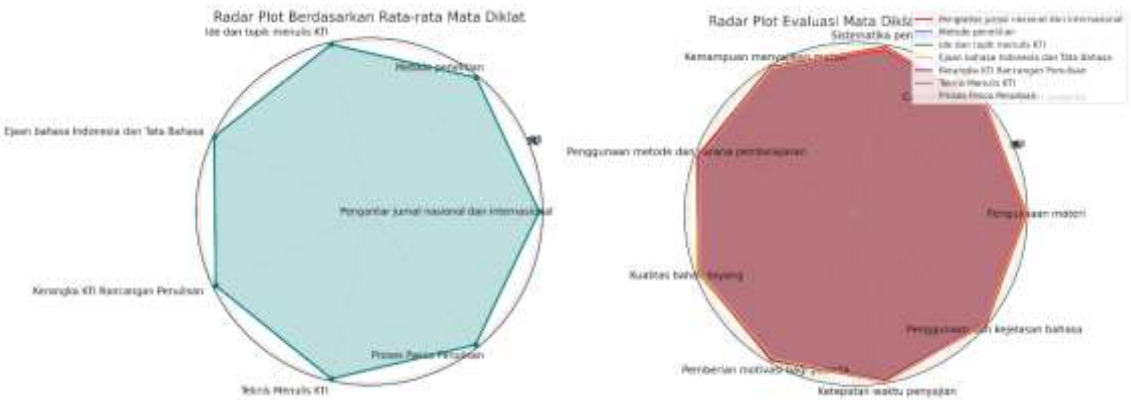

Figure 9. Evaluation of Program Implementation on Competency and Training Module Achievements

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

The radar plot comparing the average scores across training modules provided a clear visualization of performance variations. The module on "Indonesian Language Rules and Grammar" achieved the highest average score, reflecting strong material comprehension in this area. Meanwhile, the overall performance across all modules remained consistently high, with most evaluation criteria achieving satisfactory results. However, some modules, such as "Scientific Writing Framework and Article Structuring," showed areas for further improvement, particularly in the application of teaching methods and the utilization of learning resources. Based on these findings, it can be concluded that the scientific writing training and evaluation process successfully met its objectives. Moving forward, further efforts should focus on enhancing technical aspects and optimizing learning resources to achieve even higher levels of competency development and training effectiveness.

Evaluation of Participants' Competency Achievement in Scientific Writing Training

The competency evaluation chart illustrates the progressive development of participants' writing skills across four scaffolding stages: Idea Identification, Methodology Understanding, Article Structuring, and Narrative Development (see Figure 10). The assessment was based on four key parameters, namely Concept Understanding, Analytical Skills, Writing Independence, and Final Output Quality, each rated on a 0-100 scale. At the initial stage, Concept Understanding was moderate (70%), while Writing Independence (60%) and Final Output Quality (55%) were at their lowest. This result indicates that participants faced early challenges in structuring their professional insights into academic writing. As they progressed, their Methodology Understanding (80%) and Article Structuring (75%) showed significant improvement, reflecting enhanced mastery of research techniques and logical structuring of articles. In the final stage, Writing Independence (85%) and Final Output Quality (82%) reached their highest levels, demonstrating participants' readiness to produce well-structured, publishable scientific articles. These findings confirm that the scaffolding approach effectively supports gradual skill acquisition, minimizes psychological barriers, and enhances writing competency. Therefore, this method proves to be a valuable framework for professional training in community service programs, particularly in fostering academic writing proficiency.

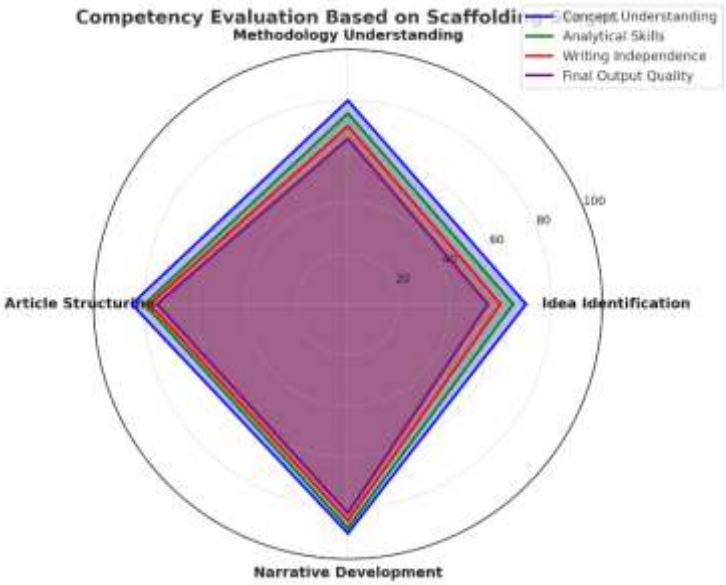

Figure 10. Competency Evaluation Based on Scaffolding

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Critical Analysis of Activity Implementation

The scientific writing training program implemented a scaffolding approach, which proved to be highly effective in providing structured support to participants. This approach allowed them to gradually build their academic writing skills and confidence, ultimately enabling them to produce high-quality scientific articles. Participants learned in stages, starting with analyzing relevant research articles related to their chosen topics. They then moved on to understanding research methodologies, followed by structuring their manuscripts using the IMRAD format (Introduction, Methods, Results, and Discussion). This step-by-step process ensured that participants acquired not only theoretical knowledge but also the practical skills necessary to compose and present their research findings effectively.

Each section of the article was developed through guided exercises, where participants identified key points for the introduction, literature review, methodology, results, discussion, and conclusion. They also explored how to select appropriate journals through the Sinta database, using keywords to find suitable publication outlets. The final step involved adjusting their manuscripts to fit the journal templates, ensuring compliance with formatting requirements. This structured process made it easier for participants to gradually construct their articles, enabling them to develop cohesive and comprehensive sentences while refining their academic writing style.

Participants benefited greatly from learning from the experiences of others, applying insights from previous research, projects, and reports they had worked on. This process not only enhanced their academic writing abilities but also boosted their confidence in presenting their research findings to the scientific community (Cahusac de Caux & Pretorius, 2024; Marzuki et al., 2023). However, some participants faced difficulties in maintaining focus, particularly when identifying research topics, articulating research problems, and extracting theoretical frameworks and findings from the articles they reviewed. Some encountered articles that lacked explicit information, making it challenging to extract key insights. Others struggled to determine where to locate relevant information within an article. Despite these challenges, participants eventually grasped the fundamental structure of a scientific article, gained a better understanding of academic writing characteristics, and developed the ability to identify appropriate references. Importantly, they realized that building a strong introduction requires a well-supported state of the art and identification of knowledge gaps.

To strengthen their research foundations, participants explored research methodologies in the second phase of the training. This step was designed to help them understand data collection and analysis techniques, ensuring they could identify, manage, and interpret data effectively. Many participants drew upon workplace reports and prior research projects, reinforcing the practical relevance of their scientific writing efforts. The training also emphasized the need for proper data management, ensuring alignment with the chosen research methodology. Furthermore, participants were guided on how to analyze data using both conventional and software-based approaches (Perifanis & Kitsios, 2023). This phase enabled them to identify patterns and draw meaningful conclusions, strengthening their ability to interpret research findings effectively.

A key aspect of the training was understanding the IMRAD and non-IMRAD structures, which are widely used in academic writing. Participants received detailed explanations of how to construct each section of their manuscript, ensuring clarity and coherence. For the introduction, they followed a logical structure from general to specific, resembling an inverted triangle. This approach ensured that they addressed the importance of the topic, research problems, justification, state of the art, knowledge gaps, novelty, objectives, and contributions. Participants were encouraged to create key points for each section, which were later developed into well-structured paragraphs. They also examined examples

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20
Doi: https://doi.org/10.47709/ppi.v2i03.5696

from previous studies, using them as models for constructing their own arguments and discussions. This structured approach helped participants produce articles that were not only informative but also well-organized, making it easier for readers to follow the research narrative.

The final stage of scaffolding involved developing detailed, well-connected sentences and paragraphs. Participants expanded their initial key points into comprehensive, logically structured content. One of the main challenges they faced was staying focused on the research topic without veering off track. Additionally, they found it difficult to synthesize information from multiple sources without becoming overwhelmed by irrelevant details. The training addressed these challenges by reinforcing techniques for maintaining focus, structuring paragraphs effectively, and ensuring logical transitions between sections. The use of appropriate transition words and connectors was emphasized to enhance coherence and readability. Participants were also encouraged to plan their writing carefully, ensuring that each paragraph served a clear purpose and maintained relevance to the main research theme.

A critical component of the training was choosing the right journal and formatting the manuscript accordingly. Participants learned to search for journals using Sinta and other indexing platforms, entering keywords related to their topics to find suitable publication venues. They then evaluated target journals based on factors such as ranking, processing time, and publication fees. Once they identified a suitable journal, participants downloaded the template and formatted their articles accordingly. This step also involved language refinement, plagiarism checking (Turnitin), and reference verification, ensuring that their manuscripts met academic integrity and quality standards. After finalizing their drafts, participants prepared the necessary submission documents, including cover letters, plagiarism reports, and author details (Ecarnot et al., 2015). Understanding the submission and review process was essential, as it prepared participants for potential revisions and feedback from editors and peer reviewers. They also received guidance on journal registration and submission procedures, ensuring they could navigate the publishing process independently.

The scientific writing training program at HRDA-EMR Bandung resulted in participants successfully completing and submitting their scientific articles to their target journals. Their achievements were influenced by prior work experience and the availability of workplace reports, which they refined into publishable academic articles. However, their success was also driven by the structured support provided through scaffolding, which helped them overcome challenges and produce high-quality manuscripts. Academic writing is an ongoing learning process, requiring continuous practice, refinement, and adaptation to editorial feedback.

The scaffolding approach played a crucial role in guiding participants through the various stages of writing, from initial planning to final submission. The key benefits of this approach included: (1) enhancing participants' understanding of scientific article structure; (2) facilitating peer collaboration and knowledge sharing; (3) providing structured support to overcome writing challenges; and (4) encouraging critical thinking and self-evaluation. By implementing scaffolding, participants felt less pressured and were able to develop their academic writing skills progressively. The success of this method suggests that similar training programs can adopt scaffolding techniques, allowing participants to build their competencies at their own pace. Furthermore, applying this approach in different educational and professional contexts can help enhance critical thinking, analytical reasoning, and overall academic proficiency, which are essential for long-term success in scientific writing and research dissemination.

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Conclusion

This community service program aimed to enhance the scientific writing skills of professionals in the Energy and Mineral Resources (EMR) sector, ensuring that they could produce high-quality scientific articles that meet national and international journal publication standards. The training was designed to address the need for scientific writing competencies, which are essential for professional development, knowledge dissemination, and practical advancements in the EMR field. The results of this program indicate a significant improvement in participants' understanding and writing abilities, as evidenced by the completion of several scientific articles ready for journal submission. The scaffolding approach applied in this training proved to be effective, as it provided structured and gradual support, enabling participants to grasp academic writing structures, systematically organize their ideas, and overcome various writing challenges. Overall, this initiative had a positive impact, not only in terms of enhancing technical writing skills but also in boosting participants' confidence to engage in academic forums. Additionally, the program contributed to strengthening the knowledge ecosystem within the Ministry of EMR, enriching participants' theoretical perspectives, and fostering innovation in their professional responsibilities. However, there were several limitations that should be considered for future programs. These include the relatively short duration of the training for such complex subject matter and limited access to comprehensive reference materials. To improve similar programs in the future, it is recommended to extend the training duration, provide continuous mentorship, and integrate digital tools to facilitate easier access to journals and scientific literature.

Acknowledgments

We express our deepest gratitude to the Head of the Human Resource Development Agency for Energy and Mineral Resources (HRDA-EMR) for organizing and supporting this training program. The comprehensive support provided, including facilities, curriculum development, and intensive mentoring, played a crucial role in the successful implementation of this initiative. The commitment of the organizing team in facilitating the competency development of professionals in the EMR sector is highly commendable and serves as an inspiration for future programs.

References

Acosta-Gonzaga, E., & Ramirez-Arellano, A. (2022). Scaffolding Matters? Investigating Its Role in Motivation, Engagement and Learning Achievements in Higher Education. *Sustainability (Switzerland)*, *14*(20). https://doi.org/10.3390/su142013419

Cahusac de Caux, B., & Pretorius, L. (2024). Learning together through collaborative writing: The power of peer feedback and discussion in doctoral writing groups. *Studies in Educational Evaluation*, *83*, 101379. https://doi.org/https://doi.org/10.1016/j.stueduc.2024.101379

Conradie, T. (2010). Scaffolding an intervention for essay writing. *Journal for Language Teaching*, *43*(2), 37–49. https://doi.org/10.4314/jlt.v43i2.56970

Ecarnot, F., Seronde, M. F., Chopard, R., Schiele, F., & Meneveau, N. (2015). Writing a scientific article: A step-by-step guide for beginners. *European Geriatric Medicine*, *6*(6), 573–579. https://doi.org/10.1016/j.eurger.2015.08.005

Habibie, P. (2022). Writing for scholarly publication in an interconnected disjunctured world. *Journal of Second Language Writing*, *58*, 100933. https://doi.org/https://doi.org/10.1016/j.jslw.2022.100933

Krishnan, S. (2019). Scaffolding to Improve Learners' Understanding. *International Journal of Academic Research in Business and Social Sciences*, *9*(3), 809–814.

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

Doi: https://doi.org/10.47709/ppi.v2i03.5696

https://doi.org/10.6007/ijarbss/v9-i3/5747

Marzuki, , Widiati, U., Rusdin, D., Darwin, , & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education*, *10*(2), 2236469. https://doi.org/10.1080/2331186X.2023.2236469

Perifanis, N.-A., & Kitsios, F. (2023). Investigating the Influence of Artificial Intelligence on Business Value in the Digital Era of Strategy: A Literature Review. In *Information* (Vol. 14, Issue 2). https://doi.org/10.3390/info14020085

Permana, T. I., Fatmawati, D., Nuryady, M. M., Fahlevy, I. R., & Ardiansyah, I. (2023). Scientific writing: A way to improve students' information literacy and reasoning ability. *Journal of Community Service and Empowerment*, *4*(2), 319–325. https://doi.org/10.22219/jcse.v4i2.25167

Rohmatulloh, R., Nasrullah, R., Nurtanto, M., Bekmurzayeva, S., & Abduldayev, Y. (2023). Competency in scientific writing training for beginner researchers: NVIVO analysis. *Bulletin of Kazakh Leading Academy of Architecture and Construction*, *88*(2), 284–296. https://doi.org/10.51488/1680-080x/2023.2-28

Rojas-Drummond, S., & Mercer, N. (2003). Scaffolding the development of effective collaboration and learning. *International Journal of Educational Research*, *39*(1), 99–111. https://doi.org/https://doi.org/10.1016/S0883-0355(03)00075-2

West, S., & Turnbull, L. (2023). Writing as an Essential Research Skill. In S. West & L. Turnbull (Eds.), *Scientific Papers Made Easy: How to Write with Clarity and Impact in the Life Sciences* (p. 0). Oxford University Press. https://doi.org/10.1093/oso/9780192862785.003.0001

Wijayanti, E. Y. (2020). Scaffolding in teaching Writing. *Al-Tatbiyah: Jurnal Pendidikan (The Educational Journal)*, *30*(1), 48–58. https://doi.org/10.24235/ath.v

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

PPI Pengabdian Pendidikan Indonesia
e-ISSN : 3026-3654
ITScience
Diterbitkan oleh: Information Technology and Science (ITScience)

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

KEMENTERIAN ENERGI DAN SUMBER DAYA MINERAL
REPUBLIK INDONESIA
BADAN PENGEMBANGAN SUMBER DAYA MANUSIA
ENERGI DAN SUMBER DAYA MINERAL
PUSAT PENGEMBANGAN SUMBER DAYA MANUSIA APARATUR
JALAN CISITU LAMA NOMOR 37 BANDUNG

TELEPON : (022) 2502428 FAKSIMILE (022) 2506224 email: info.ppsdma@esdm.go.id

Nomor : B-1559/DL.09/BPA/2024 11 November 2024
Sifat : Biasa
Lampiran : Satu Lembar
Hal : Permintaan Narasumber

Yang terhormat,
Dr. Ir. Muhammad Nurtanto, M.Pd., IPM.
Dosen Politeknik Negeri Jakarta
di
Tempat

Dengan ini kami informasikan bahwa Pusat Pengembangan Sumber Daya Manusia Aparatur akan menyelenggarakan kegiatan Penyusunan Karya Tulis Ilmiah (KTI) Bidang Administrasi, Manajemen dan Kepemimpinan.

Sehubungan dengan hal tersebut, kami mohon kiranya Saudara dapat menjadi Narasumber berikut melakukan pembimbingan terkait kegiatan tersebut sesuai jadwal terlampir

Atas perhatian dan kerja sama Saudara, kami ucapkan terima kasih.

Kepala

Ditandatangani secara elektronik
Bambang Utoro

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).

PPI Pengabdian Pendidikan Indonesia
e-ISSN : 3026-3654
ITScience
Diterbitkan oleh Information Technology and Science (ITScience)

Doi: https://doi.org/10.47709/ppi.v2i03.5696

Pengabdian Pendidikan Indonesia (PPI)
Vol 2 No 03, Desember 2024
Submitted : 2024-12-03
Accepted : 2024-12-11
Published : 2024-12-20

KEMENTERIAN ENERGI DAN SUMBER DAYA MINERAL
REPUBLIK INDONESIA
BADAN PENGEMBANGAN SUMBER DAYA MANUSIA
ENERGI DAN SUMBER DAYA MINERAL
PUSAT PENGEMBANGAN SUMBER DAYA MANUSIA
APARATUR
JALAN CISITU LAMA NOMOR 37 BANDUNG

TELEPON : (022) 2502428 FAKSIMILE (022) 2506224 email: info.ppsdma@esdm.go.id

Lampiran Surat
Nomor : B-1559/DL.09/BPA/2024
Tanggal : 11 November 2024

JADWAL PEMBAHASAN KARYA TULIS ILMIAH

No	Tanggal	Materi
1	25 November 2024	Metoda Penelitian
2	26 November 2024	Proposal dan Instrument Penelitian
3	27 November 2024	Pembahasan Draft Tulisan
4	28 November 2024	Finalisasi Penelitian

Pengabdian Pendidikan Indonesia (PPI) is licensed under a Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0).