# UNVEILING THE CHALLENGE OF STUDENT SCIENTIFIC WRITING: A NEED ANALYSIS

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**A B S T R A C T S**

This study addresses the pressing need for customized instructional materials aimed at improving students' competence in writing scientific articles. Despite the crucial role of this skill in academia, there is a noticeable scarcity of dedicated teaching resources, especially for research article writing. By investigating specific shortcomings faced by students and aligning them with tailored instructional strategies, this research aims to enhance students' academic writing abilities. Using a case study design, this research involved 72 students from the English Education Study Program at Universitas PGRI West Sumatera. Data collection utilized questionnaires adapted from existing literature, focusing on students' perceived shortcomings in writing scientific articles. Through this method, specific challenges encountered by students in the writing process were identified and analyzed. The analysis revealed that students' lack of writing scientific articles format research articles is in the high category, with an average of 4.28 (85.53%). From the data, nine statements are in the very high category, and 13 are in the high category. The statements in the very high category were 'creating research gap' (M=4.54), 'Describing the data collection procedure' (M=4.50), 'Describing data analysis procedures' (M=4.33), 'presenting meta-textual information' (M=4.38), 'presenting results' (M=4.50), 'providing background information (M=3.58), 'Commenting on results or findings' (M=4.50),'Restating the research objectives and approach' (M=4.63) and 'evaluating research contributions' (M=4.33). These findings underscore the importance of tailored instructional approaches to enhance students' scientific writing skills, ultimately improving the quality of education in preparing students for future academic endeavors.

## INTRODUCTION

Writing is a crucial skill that students need to learn when they are studying languages. It is not just about jotting down words; it is a way to share their ideas and experiences with others by putting them into writing (Cai, 2013). Think of it like using words to have a conversation with someone, except it is on paper or a screen. In addition,  it is not just about knowing words; it is also about organizing their thoughts in a way that makes sense to others. In simple terms, when students write, they are basically expressing their thoughts and feelings about something, picking out what is important to share, and putting it into words so that others can easily understand. So, writing is like an art where  the students use their skills to make sure their ideas

come across clearly and leave a positive impact on whoever reads them (Suratman, Ilyas, & Mariamah, 2021; Qonitatun, 2016).

One vital skill for students to develop is the ability to write scientific papers. These papers are essentially reports or documents that explore a specific issue using scientific methods, following the established rules and ethical standards of the scientific community. They come in various forms, such as essays, reports, undergraduate theses, graduate theses, and dissertations. The term of scientific writing typically refers to the publication of original research in journals, presented in a standardized format (Mack, 2018; Huber, et al., 2020; Graham, 2019). This can include review papers, which summarize and analyze previously published articles. Good scientific writing is not just about presenting information but it is also about considering the perspective of the readers (Frankael, Wallen, & Hyun, 2012). It involves guiding them through a logical sequence of ideas, ensuring there are no gaps or missing links, and providing clear and anticipatory explanations to address any questions they may have.

Mastering the art of crafting scientific articles is a fundamental skill expected of university students (Seran, Utomo, & Handoyo, 2020; Suhartina, 2020; Day & Gastel, 2016). Throughout their academic journey, students encounter various courses that necessitate written assignments, whether it involves conducting field research, laboratory experiments, or scholarly discourse. Furthermore, fulfilling the requirements for a bachelor's degree often entails producing a thesis and scientific articles, underscoring the importance of proficient writing skills (Luby & Southern, 2017; Sari, et al., 2021; Azizah & Budiman, 2017). Hence, students must adeptly navigate tasks such as drafting reports, articles, theses, or final projects. Developing proficiency in writing scientific papers not only facilitates academic success at the undergraduate level but also lays a foundation for future academic pursuits, including graduate or doctoral studies. As such, educators today and in the foreseeable future must prioritize honing their students' ability to write scientifically rigorous papers. This proficiency becomes particularly crucial as students progress in their education, where the completion of a thesis or the publication of an article in a reputable journal becomes a requisite for graduation.

It is evident in current academia that students often face challenges with their writing skills. Dubicki (2021) highlights this issue, noting that many students find it difficult to produce robust research papers despite having experience with research assignments in other courses. The primary hurdles students encounter revolve around generating ideas for their final projects, crafting scientific papers, and gathering relevant reading materials (Budhyani & Angendari, 2021). Additionally, students grapple with limitations in their subject-specific knowledge and linguistic abilities (Yu, 2021; Alharbi, 2019). A crucial skill identified by educators is the effective incorporation of source material into written work, which many students find daunting (Cumming et al., 2016). Specifically, when it comes to scientific writing, students struggle with topic selection and sourcing appropriate reading materials, resulting in inaccuracies in their compositions. These difficulties underscore the need for targeted support and instruction to enhance students' proficiency in scientific writing.

In addition to the challenges encountered in writing scientific papers, numerous researchers have delved into the principles of crafting articles. However, there remains a scarcity of focus on instructional materials tailored specifically for teaching research article writing. For instance, Yundayani and Ardiasih (2021) needs analysis among students regarding English writing for academic purposes (EWAP) materials, aiming to validate the effectiveness of task-based material design in enhancing students' EWAP skills. Yuvayapan and Bilginer (2020) utilized an online questionnaire to explore the academic writing requirements of Turkish postgraduate students in English language teaching and English language and literature departments. Schillings et al. (2021) examined student perceptions regarding interventions aimed at improving academic writing skills, emphasizing the value of feedback and feed-forward information. Furthermore, Rakedzon and Baram (2016) conducted a quasi-

experimental study to assess the impact of an academic writing course in English on graduate students' academic and popular science writing abilities. Lastly, Hasanuddin, Emzir, and Akhadiah (2019) undertook research to enhance students' scientific writing through collaborative learning facilitated by blended learning technologies. These studies collectively shed light on the importance of tailored instructional approaches to bolster students' proficiency in academic writing, particularly in the realm of scientific discourse (Haryono & Adam, 2021; Odena & Burgess, 2015).

The development of teaching materials tailored to assist students in writing scientific papers has been notably overlooked. However, these aspects hold considerable importance as they are essential for students to fulfill the requirements for obtaining a bachelor's degree. As part of this process, students are mandated to write research articles that are subsequently published in the online journal of their respective study programs. Consequently, this study seeks to address the need for teaching materials aimed at enhancing students' proficiency in writing scientific articles. The investigation will encompass various aspects, aligning with the identified target needs and focusing on lack. It is anticipated that this study will have a significant impact on the learning experience within Indonesian language courses. By allowing students to identify their specific lack as a challenge, educators can tailor instructional strategies to meet those requirements effectively. Furthermore, this initiative can serve as a practical approach to teaching, offering learning materials that emphasize the desired outcomes of exemplary scientific work by students, thereby enhancing the overall quality of education delivery.

## RESEARCH METHOD
### Research Design

The design used in this research is a case study. The sample comprised 72 students who had successfully completed all their courses within the English Education Study Program. These students were selected to participate in the study based on their availability and willingness to provide insights into their experiences with academic writing. Throughout the study, data collection methods such as questionnaires, interviews, or document analysis may have been utilized to gather rich, qualitative information from the participants. These data collection techniques enabled the researcher to explore various aspects of the students' writing experiences, especially their challenges encountered.

### Population and Sample

The sample for this study consisted of 72 students who had completed all their coursework within the English Education Study Program. These students were chosen to participate in the research based on their availability and willingness to share their insights into academic writing experiences. This selection process aimed to include individuals with a comprehensive understanding of the program's curriculum and requirements. Through purposive sampling, participants were deliberately chosen to represent a range of perspectives and experiences related to academic writing within the context of their English Education studies. By focusing on this specific cohort, the study aimed to gather detailed and nuanced insights into the challenges of students regarding academic writing in the English Education Program at Universitas PGRI West Sumatera.

### Instruments

The instrument used in this research is a questionnaire. This questionnaire was designed to collect data from 72 students enrolled in the English Education Study Program at Universitas PGRI West Sumatera, who had completed all the courses. The purpose of the questionnaire was to assess the students' needs regarding writing scientific articles, considering the final requirement of the course to produce an article for publication in accredited journals. It was

structured focusing on  lacks only. The items within each section aimed to elicit responses from the students regarding their perceived lack related to writing scientific articles.

The questionnaire employed a closed format, requiring respondents to select one of the available answers and provide additional information or choose several options that best represented their perspectives. This instrument served as a valuable tool for gathering insights into the specific lack or challenges faced by students in the process of writing scientific articles for publication.

**Data Analysis**

The data analysis involved calculating the average response for each statement item and organizing them into five categories: very low, low, medium, high, and very high. This process allowed for a clear understanding of the overall sentiment towards each statement. Statements falling into the "very low" or "low" categories indicated minimal agreement, while those in the "high" or "very high" categories showed strong consensus. This categorization facilitated the identification of key trends and priorities among the participants' perspectives on academic writing.

**RESEARCH FINDINGS AND DISCUSSION**

**Research Findings**

The analysis of the data presented in table reveals significant insights into students' proficiency levels across various elements crucial to writing scientific articles. For instance, in the "Abstract" section, students demonstrated a notably high level of proficiency in tasks such as creating a research gap and summarizing main results, with mean difficulty scores ranging from 4.17 to 4.54, reflecting percentages above 78%. Similarly, within the "Introduction" and "Method" sections, students displayed commendable proficiency in setting the topic of study and describing data collection procedures, as evidenced by mean difficulty scores ranging from 4.17 to 4.50 and percentages exceeding 83%. Moreover, in critical sections like "Result," "Discussion," and "Conclusion," students exhibited particularly strong proficiency in tasks such as presenting results and restating research objectives, with mean difficulty scores ranging from 4.21 to 4.63, and percentages surpassing 84%. Overall, the data suggest that while students generally demonstrate high proficiency levels in various elements of scientific article writing, there are areas where further improvement could enhance their overall competency.

Table 1
The result of student lacks of writing scientific articles

| Elements | Total | Means (difficulty) | % | Category |
|---|---|---|---|---|
| **Abstract** | | | | |
| a) Creating research gap | 327 | 4.54 | 90.83 | Very high |
| b) Describing the research procedure | 300 | 4.17 | 83.33 | High |
| c) Summarizing the main results of the research | 306 | 4.25 | 85.00 | High |
| d) Evaluating the research | 306 | 4.25 | 85.00 | High |
| e) Using abstract forming expression | 282 | 3.92 | 78.33 | High |
| **Introduction** | | | | |
| a) Defining the field of study | 285 | 3.96 | 79.17 | High |
| b) Setting the topic of study | 315 | 4.38 | 87.50 | High |
| c) Describing the study | 282 | 3.92 | 78.33 | High |
| d) Using linguistic aspects | 306 | 4.25 | 85.00 | High |

| Elements | Total | Means (difficulty) | % | Category |
|---|---|---|---|---|
| **Method** | | | | |
| a) Presenting the procedure for measuring research variables | 300 | 4.17 | 83.33 | High |
| b) Describing the data collection procedure | 324 | 4.50 | 90.00 | Very high |
| c) Describing data analysis procedures | 312 | 4.33 | 86.67 | Very high |
| **Result** | | | | |
| a) Presenting meta-textual information | 315 | 4.38 | 87.50 | Very high |
| b) Presenting the results | 324 | 4.50 | 90.00 | Very high |
| c) Using hedging | 303 | 4.21 | 84.17 | High |
| **Discussion** | | | | |
| a) Providing background information | 324 | 4.50 | 90.00 | Very high |
| b) Presenting result statement | 303 | 4.21 | 84.17 | High |
| c) Commenting on results or findings | 324 | 4.50 | 90.00 | Very high |
| **Conclusion** | | | | |
| a) Restating the research objectives and approach | 333 | 4.63 | 92.50 | Very high |
| b) Summarizing findings | 303 | 4.21 | 84.17 | High |
| c) Evaluating research contributions | 312 | 4.33 | 86.67 | Very high |
| d) Recommendations for further research | 306 | 4.25 | 85.00 | High |
| **Total** | 6792 | 4.28 | 85.53 | High |

The analysis results in Table 1 show that students' lack of writing scientific articles format research articles is in the high category, with an average of 4.28 (85.53%). From the data, nine statements are in the very high category, and 13 are in the high category. The statements in the very high category were 'creating research gap' (M=4.54), 'Describing the data collection procedure' (M=4.50), 'Describing data analysis procedures' (M=4.33), 'presenting meta-textual information' (M=4.38), 'presenting results' (M=4.50), 'providing background information (M=3.58), 'Commenting on results or findings' (M=4.50),'Restating the research objectives and approach' (M=4.63) and 'evaluating research contributions' (M=4.33).

**Discussion**

The analysis of the data pertaining to the elements of writing scientific articles reveals notable insights into students' proficiency levels across various aspects. Firstly, in the "Abstract" section, students demonstrate exceptional competence in tasks such as 'creating research gap,' with a mean difficulty score of 4.54, indicating a very high level of proficiency. This is further supported by the high percentage of 90.83%, suggesting that the majority of students excel in articulating the research gap effectively within the abstract. Additionally, in tasks such as 'summarizing the main results of the research' and 'evaluating the research,' students exhibit commendable proficiency, as reflected by mean difficulty scores of 4.25 and corresponding percentages of 85.00%. These findings indicate a strong grasp of synthesizing and critically evaluating research findings, essential skills for effective scientific communication. However, it is noteworthy that in tasks such as 'describing the research procedure' and 'using abstract forming expression,' students demonstrate slightly lower proficiency levels, with mean difficulty scores of 4.17 and 3.92, and percentages of 83.33% and 78.33%, respectively, categorizing them in the high proficiency range. This suggests areas where students may benefit from additional support or instruction to enhance their ability to

articulate research procedures clearly and employ abstract forming expressions effectively. Overall, while students exhibit commendable proficiency in several aspects of writing scientific articles, there are opportunities for improvement in specific areas, emphasizing the importance of targeted interventions to strengthen students' overall competency in scientific writing.

The examination of students' performance in the "Introduction" section sheds light on their proficiency levels in setting the groundwork for scientific discourse. Notably, students demonstrate a commendable grasp of certain tasks, as evidenced by the mean difficulty scores and corresponding percentages. For instance, in tasks such as 'setting the topic of study' and 'using linguistic aspects,' students exhibit particularly strong proficiency, with mean difficulty scores of 4.38 and 4.25, respectively, and percentages of 87.50% and 85.00%. These findings underscore students' ability to effectively establish the subject matter and employ appropriate language conventions to communicate their ideas, essential components of a well-crafted introduction. However, it is noteworthy that in tasks such as 'defining the field of study' and 'describing the study,' students demonstrate slightly lower proficiency levels, with mean difficulty scores of 3.96 and 3.92, and percentages of 79.17% and 78.33%, respectively, placing them within the high proficiency range. This suggests areas where students may benefit from additional support or instruction to enhance their ability to provide concise and comprehensive descriptions of the research context and objectives. Overall, while students exhibit commendable proficiency in certain aspects of the introduction, there are opportunities for improvement in specific tasks, highlighting the importance of targeted interventions to strengthen students' overall competency in this critical section of scientific writing.

The analysis of students' performance in the "Method" section provides valuable insights into their proficiency levels in articulating the research methodology. Notably, students demonstrate a commendable grasp of key tasks, as evidenced by the mean difficulty scores and corresponding percentages. For instance, in tasks such as 'describing the data collection procedure' and 'describing data analysis procedures,' students exhibit particularly strong proficiency, with mean difficulty scores of 4.50 and 4.33, respectively, and percentages of 90.00% and 86.67%. These findings underscore students' ability to effectively outline the steps involved in collecting and analyzing data, crucial components of methodological rigor in scientific research. Moreover, in the task of 'presenting the procedure for measuring research variables,' students demonstrate satisfactory proficiency, with a mean difficulty score of 4.17 and a percentage of 83.33%, placing it within the high proficiency range. This suggests that while students are adept at elucidating the process of measuring research variables, there may be opportunities for further refinement in this aspect. Overall, students exhibit commendable proficiency in elucidating the methodological aspects of their research endeavors, with notable strengths in describing data collection and analysis procedures. However, continuous support and instruction may be beneficial to further enhance students' clarity and precision in presenting research methodologies.

The analysis of students' performance in the "Result" section provides valuable insights into their proficiency levels in presenting research findings. Notably, students demonstrate exceptional competence in key tasks, as indicated by the mean difficulty scores and corresponding percentages. For instance, in tasks such as 'presenting meta-textual information' and 'presenting the results,' students exhibit particularly strong proficiency, with mean difficulty scores of 4.38 and 4.50, respectively, and percentages of 87.50% and 90.00%. These findings underscore students' ability to effectively convey essential contextual and results-oriented information, crucial components of comprehensive research reporting. Moreover, in the task of 'using hedging,' students demonstrate satisfactory proficiency, with a mean difficulty score of 4.21 and a percentage of 84.17%, placing it within the high proficiency range. This suggests that while students are adept at employing hedging techniques to qualify their statements, there may be opportunities for further refinement in this aspect. Overall, students exhibit

commendable proficiency in elucidating research results, with notable strengths in presenting meta-textual information and results. However, ongoing support and instruction may be beneficial to further enhance students' use of hedging strategies to convey the nuances and uncertainties inherent in scientific findings.

The analysis of students' performance in the "Discussion" section provides valuable insights into their proficiency levels in contextualizing and interpreting research findings. Notably, students demonstrate exceptional competence in key tasks, as indicated by the mean difficulty scores and corresponding percentages. For instance, in tasks such as 'providing background information' and 'commenting on results or findings,' students exhibit particularly strong proficiency, with mean difficulty scores of 4.50 for both tasks and percentages of 90.00%. These findings underscore students' ability to effectively provide comprehensive background context and insightful commentary on research outcomes, essential components of a robust discussion section. Moreover, in the task of 'presenting result statement,' students demonstrate satisfactory proficiency, with a mean difficulty score of 4.21 and a percentage of 84.17%, placing it within the high proficiency range. This suggests that while students are adept at articulating the main findings of their research, there may be opportunities for further refinement in this aspect to ensure clarity and conciseness. Overall, students exhibit commendable proficiency in synthesizing and analyzing research results within the discussion section, with notable strengths in providing background information and commenting on findings. However, ongoing support and instruction may be beneficial to further enhance students' ability to succinctly present result statements while maintaining the rigor and coherence of their discussion.

The analysis of students' performance in the "Conclusion" section reveals significant proficiency in summarizing and reflecting on research outcomes. Notably, students demonstrate exceptional competence in key tasks, as indicated by the mean difficulty scores and corresponding percentages. For instance, in tasks such as 'restating the research objectives and approach' and 'evaluating research contributions,' students exhibit particularly strong proficiency, with mean difficulty scores of 4.63 and 4.33, respectively, and percentages of 92.50% and 86.67%. These findings underscore students' ability to effectively encapsulate the purpose and methodology of their research while critically evaluating its significance and contributions to the field, crucial aspects of a robust conclusion section. Moreover, in the tasks of 'summarizing findings' and 'providing recommendations for further research,' students demonstrate satisfactory proficiency, with mean difficulty scores of 4.21 and 4.25, respectively, and percentages of 84.17% and 85.00%, placing them within the high proficiency range. This suggests that while students are adept at summarizing research outcomes and suggesting future directions, there may be opportunities for further refinement in these aspects to enhance clarity and specificity. Overall, students exhibit commendable proficiency in synthesizing and reflecting on research findings within the conclusion section, with notable strengths in restating research objectives and evaluating contributions. However, ongoing support and instruction may be beneficial to further enhance students' ability to summarize findings effectively and provide targeted recommendations for future research endeavors.

## CONCLUSION

The examination of students' challenge to write in a scientific articles provides valuable insights into their strengths and areas needing improvement. Across various sections of a scientific paper; like the abstract, introduction, method, results, discussion, and conclusion, students show impressive skills, especially in crucial tasks such as identifying research gaps, explaining research methods, detailing data collection and analysis procedures, presenting findings, giving background information, discussing findings, restating research goals, and assessing research contributions. These tasks, labeled as "very high," indicate students' strong

proficiency in expressing important aspects of scientific research and analysis. However, while students excel in many areas, there are still opportunities for improvement, especially in tasks like using abstract language, defining the study's scope, and summarizing findings, which are in the "high" proficiency category. These results emphasize the need for specific teaching approaches to further improve students' skills in these aspects. Overall, the analysis shows that students have a solid foundation in scientific writing, with room for growth and improvement through targeted educational methods and support.

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