

Artículo de revisión

# Developing Engineering Students' Writing Skills through a Process-Genre Writing Approach: A Literature Review

Desarrollo de habilidades de escritura en estudiantes de ingeniería a través del enfoque de escritura procesual-genérico: Una revisión de literatura

**Cindy A. Rosales Contreras \***, **Nallely Garza Rodríguez <sup>1</sup>**, **Francisco J. Treviño Rodríguez <sup>2</sup>**

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\* Autora para correspondencia. Maestra en Lingüística Aplicada a la Enseñanza de Lenguas Extranjeras. Universidad Autónoma de Nuevo León.

ORCID: : 0009-0002-3990-3461.

Contacto: cindy.rosalescnt@uanl.edu.mx

<sup>1</sup> Doctora en Educación Bilingüe por la Universidad de Texas A&M Kingsville.

ORCID: 0000-0001-8023-0778.

Contacto: : nallely.garzardr@uanl.edu.mx

<sup>2</sup> Doctor en Administración y Ciencias Políticas por la Universidad Autónoma de Nuevo León.

ORCID: 0000-0003-1061-5175.

Contacto: francisco.trevinorr@uanl.edu.mx

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## ABSTRACT

This literature review aims to describe a series of studies that highlight the challenges engineering students face when learning English as a foreign language, especially in terms of written communication. Moreover, this paper advocates for the implementation of the Process-Genre Writing Approach (PGWA) as an effective methodology to address these challenges and foster improvement in students' writing skills. The studies described in this work suggest that the main issues include students' lack of motivation, poor language proficiency, deficient literacy skills, and teachers' commitment to teaching writing. Literature suggests the PGWA as a pertinent and useful approach to developing engineering students' technical writing skills. The implementation of English for Specific Purposes (ESP) is presented as an effective way to integrate the PGWA to develop not only students' technical writing skills but also their ability to adapt to different writing contexts and genres within the field.

### Keywords:

Process-Genre Writing Approach (PGWA), writing skills, English as a Foreign Language (EFL).

## RESUMEN

Esta revisión de literatura tiene como objetivo describir estudios que resaltan los desafíos de estudiantes de ingeniería al aprender inglés, especialmente en términos de comunicación escrita. Además, este trabajo sugiere la implementación del Enfoque de Escritura Procesual-Genérico (EEPG) como una metodología efectiva que fomenta las habilidades de escritura de los estudiantes. Los estudios descritos sugieren que entre los principales problemas se encuentran la falta de motivación, el bajo dominio del idioma, las deficiencias en las habilidades de alfabetización y la falta de compromiso de los docentes con la enseñanza de la escritura. La literatura sugiere el EEPG como pertinente y útil para desarrollar las habilidades de escritura técnica. La implementación del Inglés para Propósitos Específicos (IPE) se presenta como una forma efectiva de integrar el EEPG para desarrollar las habilidades de escritura técnica y la capacidad de los estudiantes para adaptarse a diferentes contextos y géneros de escritura.

### Palabras clave:

Enfoque de Escritura Procesual-Genérico (EEPG), habilidad de escritura, Inglés como Lengua Extranjera (ILE).

## Introduction

Currently, the use of English as a second language has increased dramatically. Being proficient in a second language, in this case English, is considered one of the most important requirements that helps professionals expand their opportunities in life (Montero et al., 2020; Waigandt et al., 2016). Although the acquisition and proficiency of English are hardly ever easy for students, developing communication skills is crucial for them.

When learning English as a Foreign Language (EFL), developing the four skills, listening, reading, speaking and writing can be challenging. However, in the field of engineering, students feel that writing is not an essential skill as they believe the development of academic or formal writing is not needed in their professional field; therefore, writing is a complex process that students tend to avoid (Rivera, 2011). Nevertheless, evidence suggests that employers do complain about the deficiency of writing skills in their employees and recently graduated prospects (Ibrahim et al., 2017; Anuradha & Thirunagari, 2016).

Yousefifard and Fathi (2021) state that writing skills are becoming increasingly relevant as Information and Communications Technology advances, due to the technological society in which we interact, leading to an increase in written communication. Moreover, Ibrahim et al. (2017) emphasize the relevance of writing. Firstly, due to employment opportunities, and secondly, because of technical reports, case studies, and articles that learners and graduates may create if needed, and finally, due to its implications in real-life competencies that graduates must achieve. Thus, it becomes relevant to examine how to develop engineering students' writing skills, as they are considered one of the most complex skills to master. Therefore, the research questions that will guide this literature review are stated below.

1. What are engineering students' difficulties when writing in English?
2. How does the Process-Genre Writing Approach (PGWA) benefit engineering students' technical

writing development through English for Specific Purposes (ESP) courses?

The present literature review aims to describe a series of research studies that discuss the issues students face when learning English as a Foreign Language (EFL) in a university context, specifically engineering students, and the need to develop written communication as a powerful tool to pursue professional opportunities and grow in an academic setting, expanding their networking. Additionally, this paper aims to demonstrate how the Process-Genre Writing Approach (PGWA) is a pertinent strategy for enhancing the technical writing skills of engineering students

## Methodology

To conduct the literature review presented, specific steps were followed. First, the researcher identified a problem in a real-life situation, specifically the poor writing proficiency of engineering students at a private university. Then, different academic resources and literature repositories were reviewed, finding 11 relevant studies for this project. Four of the studies presented in this paper are from Latin American researchers, six are from Asian researchers, and one is from an American author. Most of the papers were found in an academic repository from a private university virtual library (EBSCO), whereas a few of them were from public research resources such as SCIELO, ResearchGate, AcademicGate, and DIALNET. The studies were chosen because of the similarities to the problem statement of the selected population of this literature review, which is engineering students.

After selecting, reading, and working with the papers, the author stated research questions and objectives that helped to shape the presented literature review. Next, following the line of the questions, the literature review was categorized into three general themes. Then, two tables were designed to summarize the researchers' ideas according to the study's categories. Finally, the discussion and conclusion were delimited, aligning them with the research questions and the results of the literature review.

## Literature Review

In this section, different perspectives, approaches, and findings of the difficulties of engineering writing in English are described. A series of studies is presented focusing on identifying difficulties in writing (Flores, 2018; Rivera, 2011; Waigant et al., 2016), establishing tasks and activities that will promote writing using the PGWA and will attempt to demonstrate the benefits of this approach when teaching English technical writing in ESP courses (Fu & Noor, 2023; Jenkins et al., 1993; Kitajroonchai et al., 2022; Luna-Ríos, 2021).

### Difficulties in writing

Flores (2018) highlighted that engineering students often struggle with insecurities around writing, mainly because they feel their work needs significant improvement. They do not always receive enough feedback to guide that process. Teachers set high expectations, but their efforts to motivate students' writing performance are less visible. Writing is a central measure of learning across all fields, regardless of teaching methods or subjects, and even students with varied literacy backgrounds strive to meet those expectations. However, misconceptions about different forms of writing—like essays, projects, or summaries—can hinder students' practice of academic writing. Over time, the focus of writing education has shifted from emphasizing the final product to valuing the process, yet challenges remain in aligning student and teacher perceptions.

To explore these dynamics, Flores (2018) used the European Writing Survey to examine the amount of time students dedicate to writing, the types of feedback they receive, and the genres in which they write most frequently. The study involved 86 engineering students and 15 professors, revealing that more explicit instructions and more consistent feedback from teachers are crucial to improving writing proficiency. The findings also suggest that peer collaboration and self-regulation play a crucial role in the development of academic writing. Ultimately, Flores (2018) advocated for stronger literacy policies in engineering programs, emphasizing the importance of

developing scientific and technological writing skills, as well as collaborative practices that equip students to meet the demands of both professional and academic contexts.

In addition, Rivera (2011) found that students primarily believe writing is a complex process. They often feel discouraged, which lowers both their performance and their willingness to engage. In the same direction, the author described the concepts of writing, writing stages, writing skills, approaches to teaching writing, and feedback, highlighting the stages of writing which promote the writing process. She examined how step-by-step guidance could support fourth-semester students at Universidad Santo Tomás, Tunja. She explored how different aspects—such as drafting stages, skill development, teaching approaches, and feedback—help students understand what is expected, begin their work, and refine it with the support of their professors. This guidance not only shapes their progress but also strengthens their confidence in expressing ideas.

Through action research, diaries, student papers, and interviews, Rivera (2011) analyzed how engineering students approached academic tasks. The study confirmed that timely and constructive feedback is essential for teachers to adjust their methods and help students improve. Beyond teaching practices, students' own educational backgrounds also play a key role in shaping how effectively they develop language and communication skills in English.

Similarly, Alshammari (2020) investigated the weaknesses in English writing skills among Saudi learners of English as a second language by reviewing empirical and theoretical research within the Saudi context. The author identified critical factors impacting writing proficiency, including teaching methodologies, cultural and social influences, and the qualifications of instructors. It was highlighted that writing is a complex skill often taught by instructors who are not trained in this area, resulting in ineffective teaching methods that hinder learners' progress. The study emphasized the need for comprehensive strategies to improve writing instruction, such as integrating new teaching theories into classrooms and ensuring that instructors have specialized training in Teaching English to Speakers of

Other Languages (TESOL) and Teaching English as a Foreign Language (TEFL). Additionally, the research suggested implementing proficiency tests and setting eligibility criteria for undergraduate programs to enhance overall outcomes. The paper aimed to provide researchers with a quick reference on the evolution of English writing skills in Saudi Arabia and the specific challenges faced by both learners and educators in this context.

Furthermore, Alaraj (2022) discussed technical writing complications in Saudi university students. The objective of this research was to identify the primary causes of difficulties in technical writing and to establish solutions for these issues. To address the study's problem, Alaraj (2022) employed both quantitative and qualitative methodologies in this research. Two five-member focus groups of engineering students were formed. A brainstorming technique was employed to develop the items for a questionnaire. The questionnaire was reviewed by experts and consisted of multiple-choice (Likert scale), checkbox, and rating items. The implementation was carried out with 53 Saudi university students. The survey was sent via WhatsApp groups. The data was analyzed using Google Forms and Excel. The results showed that spelling, technical terminology, and coherence were the most challenging aspects that students encountered when writing. The least challenging areas were grammar, sentence structure, and vocabulary, followed by cohesion, mechanics, and punctuation. Finally, solutions were found to overcome technical writing difficulties, such as practicing writing and intensive and extensive reading instruction.

In a separate study, Waigandt et al. (2016) discussed the relevance of academic literacy to the curriculum and its relationship to the challenges faced by Argentinean higher education, including high dropout rates and low graduation rates. This problem not only exists in Argentina but also in many countries of Latin America.

The results of the study not only affirmed the undergraduates' dissertations in academic processes, but also highlighted the relevance of writing skills for them to be proficient in obtaining a degree. The author encountered the term literacy as a complex

and multidimensional construct influenced by social institutions and power relations, which affect graduates directly according to their backgrounds. The study was conducted at the Universidad Nacional de Entre Ríos, primarily among Latin American students from lower socioeconomic backgrounds, in two engineering majors. Waigandt et al. (2016) emphasized the importance of equality, quantity, and quality of literacy across all academic levels in programs designed to improve individual students' learning outcomes.

To sum up, Latin American teachers may face similarities in the writing process despite the slight differences that each context experiences. The results were similar to the described literature in which difficulties such as confidence, perceptions towards writing, lack of engagement, teachers' performance, and literacy taught previously in educational levels are factors that difficult the writing skills acquisition.

### **Process-Genre Writing Approach**

After outlining the challenges students face when composing in English, this section presents recommendations to improve students' performance when writing. Regarding approaches to overcome the difficulties related to English writing proficiency, specific authors (Badger & White, 2000; Fu & Noor, 2023; Harmer, 2012; Kitajroonchai et al.; Kondal, 2020; Truong, 2022) encouraged the use of the PGWA to ease the writing production.

This term was first introduced by Badger and White (2000). They described it as "writing involves knowledge about language, knowledge of the context in which writing happens, and especially the purposes for the writing, and skills in using language" (p. 157). It can be defined as the combination of the process approach methodology and the genre approach; this means that the PGWA focuses on the process of writing and the identification of genre texts rather than the production of written texts.

In addition, this approach directs its methodology to analyze the genre and format of the texts and follows the stages of planning, drafting, editing and the final product



(Harmer, 2012). These stages can be redone through his cycling method proposed by Harmer (2012). According to Kitajroonchai et al. (2022), the PGWA combines the process approach and the genre approach to compose knowledge about language, register, context, purposes, and linguistic competences in message transmission. It benefits students by explaining how to compose texts for communicative purposes.

Luna-Ríos (2021) was concerned about providing students with the essential skills, tools, and abilities necessary for professional development in their careers. The author found that English for Specific Purposes (ESP) courses are carefully tailored aids that meet the needs analysis, drawing on tools such as interviews and surveys, so that engineering students can strengthen the skills required to understand and work with specialized texts in their field. Luna-Ríos (2021) demonstrated the need for ESP courses in engineering teaching programs to equip students for professional development in their careers. The study approached fulfilling students' needs and demands by conducting interviews and surveys to provide students with the necessary training to manage particular information related to their professions.

The study took place in 2017 at the Language Center of a Technological University in Mexico, involving 27 engineering students and an exploratory case study. Results exhibited students' perceptions of the need for implementation of specialized courses due to the concern of English use in the engineering field and how reading can improve their job proficiency. In addition, the implementation of a reading course increases vocabulary and language to have access to relevant text and materials related to their area of expertise.

The result obtained by Luna-Ríos (2021) showed that students' main concern about learning a foreign language was the proficiency of oral skill, but they were aware it had to be complemented by other skills such as reading, listening, and writing. Another concern was the implementation of technical language to expand vocabulary and be more confident in the engineering field. The participants expressed their concerns about the working field and were worried about the English level

acquired and the desired level in the target language that companies demanded.

Another relevant study, conducted by Jenkins et al. (1993), found similar difficulties in writing performance among engineering students from six different American universities. This research was conducted in North America with transnational students who were studying in that country and continued to live there. They emphasized the importance of communication skills for professional engineers, citing the increasing demand for science and technology graduates, which is met by the timing, content, and proper focus that ESP courses offer. The study was based on questionnaire data from six different engineering schools to establish the role of writing in graduate engineering programs, and how it can work for the design of writing ESP courses.

Overall, the results suggested that students did not possess competent writing skills and that they considered writing as a non-essential skill, unless a formal written piece, such as a thesis, dissertation, or essay, was assigned. This showed that the programs students had taken expected students to learn how to write by themselves. In their research, the authors found that the primary assignments in graduate engineering departments included examinations, problem-solving exercises, technical research reports, and descriptions of laboratory experiments. Jenkins et al. (1993) identified an important gap between the writing expectations of engineering undergraduates, their results, and the current needs, resulting in a disparity in the outcomes. The authors concluded that ESL colleges must offer complete programs in which writing courses are essential to help students develop proper writing skills.

Therefore, the implementation of ESP courses, tasks, and activities related to technical vocabulary are valuable resources that can be implemented in classes to promote writing. Guided instruction and prompts that align with the lesson goals are key factors in the acquisition of learning. It is crucial to start debating the necessities, concerns, and expectations of the students to begin developing real knowledge.

In summary, an ESP course combined with the application of PGWA can enhance students' abilities in

the workplace as well as in other areas of their lives, such as research. However, to achieve this, students need an intermediate level of English language proficiency to implement what is taught effectively. The importance of having a teacher with experience in the engineering field and a good level of English to teach the ESP course is one of the requirements that participants expect.

### **Benefits of the Process-Genre Approach**

Several authors (Fu & Noor, 2023; Kitajroonchai et al., 2020; Kondal, 2020; Truong, 2022) have described specific approaches that are valuable resources for developing writing skills. They agreed on the benefits of PGWA in meeting the students' requirements to encourage this ability. Fu and Noor (2023) mentioned the benefits of joint construction in the PGWA to improve students' writing skills in argumentative essays in English as a Foreign Language (EFL). According to them, the joint construction stage is a collaborative activity where the teacher functions as both scribe and mediator of genre knowledge, guiding students as they apply process-writing strategies to co-develop a text based on the skills acquired during the modeling stage.

Using a quasi-experimental design, two classes of 62 Chinese students in a private university in mainland China participated in the study. They were divided into two groups: one group with joint construction stages and the other without. The study demonstrated that using the PGWA in conjunction with the joint construction stage is more effective for students in improving their writing skills.

In addition, Fu and Noor (2023) first suggested the use of Teaching Learning Cycles (TLC), a model created by genre scholars to teach students genre writing skills. The stages in this model include modelling, joint construction, and independent construction. In this model, on the one hand, the teacher's position is as a test scribe and genre knowledge provider to enhance students' writing. On the other hand, students need to practice what was taught in class using the modelling stage.

TLC works using joint construction by teaming up in writing activities, such as students working together

to write a collaborative essay or composing similar texts. This stage is identified by the authors as the most crucial stage in this model, due to the motivation and information that can result from its use.

Fu and Noor (2023) emphasize that in PGWA, students are more exposed to language features, communicative purposes and the read-writer relationship, while the cognitive processes of pre-writing, drafting, revising, and editing are presented, as well as eliciting students to integrate both language ability and writing skills. However, it is recommended that more research in the field be conducted, due to the limited information already existing on the conjunction of the TLC and PGWA. The authors pointed out that teachers must consider the TLC together with PGWA because students learn thinking skills, topic-related knowledge, and English language in argumentative writing, which was the purpose of the study.

In addition to this, Kitajroonchai et al. (2020) researched the effect of PGWA and Process Writing Approach (PWA) on 40 Asian EFL students from a private university in central Thailand by using quasi-experimental research, showing an increase in performance in students' writing. The participants were divided into two groups, one group focused on the PWA, and the second one in PGWA.

Kitajroonchai et al. (2020) found that both approaches improved the students' writing performance, but PGWA showed a significantly higher improvement in writing. The authors concluded that using PGWA in EFL courses can enhance students' academic writing skills by providing language acquisition and linguistic resources, and actively engaging them in the writing process.

Thus, approaches to promote technical writing are addressed in the following section to develop a method that can meet the needs of English teaching, along with the development of writing skills. The first issue is presented by Kondal (2020). In this study, the author established that learners have deficiencies in various elements of business writing, including format, structure, and organization. He found out that this issue may be attributed to inadequate exposure and insufficient expertise in business writing. Consequently, the study

aimed to explore the impact of the PGWA on teaching business writing skills to management professionals. The participants consisted of 40 management students and 32 English teachers. A questionnaire was administered to both students and teachers, and an intervention program using PGWA was implemented. Intervention questionnaires were also administered to the students. The results showed that the use of PGWA was effective in promoting business writing skills to management students, eliciting writing proficiency, and enhancing business writing skills.

Another study using PGWA was conducted by Truong (2022) at a private university in Ho Chi Minh City, Vietnam. The study explored the impact of PGWA on EFL sophomores' writing performance, self-efficacy, and autonomy. This was a quasi-experimental study over an eight-week period during the 2020-2021 academic year. The research involved implementing this approach in an Academic Writing course using selected units from the textbook *Skillful Reading & Writing Level 4* by Bixby and Scanlon. The study's findings indicated that the PGWA notably improved students' overall writing performance, particularly in coherence, cohesion, grammatical range,

and accuracy. Additionally, it enhanced students' self-efficacy in writing ideation, conventions, and self-regulation, as well as their autonomy in writing steps and techniques. The author suggested that further research should include diverse data collection methods and larger sample sizes to validate these findings.

Therefore, PGWA enables EFL students to enhance their writing performance by improving their writing quality in terms of content, organization, vocabulary, and language knowledge. PGWA enhances language acquisition by actively engaging students in the writing process, interacting with peers to encourage attention to different genres and types of texts, and accompanying them throughout the creative writing process, which leads to improved quality in the written products they construct.

To organize the findings from the reviewed studies, the following tables summarize the main themes, authors, and results. Table 1 presents research focused on the challenges students face in academic writing, while Table 2 compiles studies on the Process-Genre Writing Approach and its impact on writing development.

**Table 1**  
*Literature review themes: Difficulties in writing*

Literature review themes	Authors	Results
Difficulties in writing	Flores (2018)	The study explored students' and teachers' perceptions of writing, highlighting the need for explicit guidance and consistent feedback. Findings indicate that continuous feedback and peer collaboration have a significant impact on academic writing development.
	Rivera (2011)	The research emphasized that following structured stages of composition, supported by teacher feedback, helps students strengthen their process and gain confidence in academic tasks.
	Alshammari (2020)	The research aimed to investigate the direct and essential elements of writing difficulties in Saudi L2 (Second Language) learners. It also recommended adopting "writing-to-learn" approaches to foster progress.
	Alaraj (2022)	The author's objective was to determine the difficulties and potential causes Saudi university students meet when employing technical writing to address pedagogical solutions.
	Waigandt et al. (2016)	This study examined the significance of academic literacy in higher education curricula, and how its shortcomings contribute to the high dropout and low graduation rates in Argentinean universities. The authors focused on the importance of equal access to quality academic literacy in order to improve student outcomes.



**Table 2***Literature review themes: Process-Genre Writing Approach*

Literature review themes	Authors	Results
Process-Genre Writing Approach	Luna-Ríos (2021)	This paper aimed to identify and explore the needs and demands that engineering students face to propose an ESP course design. Results showed that teachers must not only be proficient in the target language but also aware of the engineering field.
	Jenkins et al. (1993)	This study determined the position of writing in graduate engineering programs to show the need in the engineering field. Results proposed the design of ESP writing courses.
Benefits of Process-Genre Writing Approach	Fu and Noor (2023)	This research investigated the effect of the joint construction stage of PGWA on promoting students' argumentative essay writing skills among Chinese university students. Results showed that the use of both can benefit and promote students' writing skills.
	Alaraj (2022)	The author's objective is to determine the difficulties and potential causes Saudi university students meet when employing technical writing to address pedagogical solutions.
	Kitajroonchai et al. (2020)	The paper researched the effects of PGWA and the PWA in Asian EFL pre-university students' academic writing. The paper suggested PGWA benefits students' writing performance.
	Kondal (2020)	The purpose of the study was to investigate the effectiveness of the PGWA in teaching business writing skills to management students. The results obtained indicate that PGWA enhances the writing skills of management students, resulting in higher proficiency and improved performance.
	Truong (2022)	The study's objective was to test the use of PGWA to promote EFL students' performance, self-efficacy, and autonomy in writing. The author confirmed that PGWA improved writing performance, self-efficacy, and autonomy, making it an effective approach for EFL classrooms.

## Discussion

For this paper, the first research question delimited was about identifying the difficulties of writing in English for engineering students. The authors encountered a lack of confidence and motivation, students' poor literacy, and low teachers' performance in teaching writing. The primary issue presented was the students' assumption of the writing process and how their perception influenced writing motivation.

The second issue presented was literacy as prior knowledge taught and learned by the student, and the implications that it has, such as hampering students' acquisition of writing skills by impeding the composition of texts. Additionally, teachers' performance during lessons is mentioned, suggesting that teachers may

unknowingly employ methods, approaches, or strategies to teach writing, and thereby help students learn how to write specific texts.

Moreover, students' concern about the relevance of English in the work environment is a factor that enhances students' willingness to learn, as they are aware of the benefits of communication skills and second language acquisition, in this case, English, for their resumé and employment. Being fluent in English for the workplace was another matter of interest for students.

In addition, specific strategies, such as progressive feedback, constant practice, collaborative peer work, and writing autoregulation, were also employed. It was mentioned that these strategies can improve the acquisition of writing skills. These tasks and activities are listed in the use of the PGWA to elicit students'

composition of written products. Luna-Ríos (2021) and Jenkins et al. (1993) agreed on the use of courses like ESP which can be designed according to the needs of the students and goals of the program in which they are enrolled.

ESP and technical language can enhance engineering students' profiles by improving vocabulary, communicative skills, language competence, and students' confidence in tasks. It can also promote motivation to learn to write, develop writing skills, and enhance self-expression. Thus, ESP courses in the engineering field are believed to benefit future engineers by fulfilling their specific requirements in acquiring and comprehending the technical variations in their field, using English as the target and most common language.

The second research question was selected to mention the benefits of the Process-Genre Writing Approach for engineering students. The results indicated that when students are taught using this approach, their performance improves due to the constant feedback and guidance provided during the lesson or the writing process. It was also mentioned that the Process-Genre Writing Approach and its stages promote students' writing performance, development of writing skills, acquisition of English in EFL students, as well as confidence and motivation.

## Conclusion

In conclusion, this paper examines the difficulties related to writing skills in engineering students. Based on the selected studies, the benefits of using PGWA to improve technical writing development in engineering students are highlighted. The main recommendations are to identify the issues faced by the population (students or graduate students), promote students' motivation to write, and adopt a method that best suits the context in which the problem occurs.

The use of PGWA along with an ESP course can facilitate the development of writing skills in almost every student by providing practical strategies during the lessons. By integrating PGWA, engineering students can develop not only their technical writing skills but also

their ability to adapt to different writing contexts and genres within the field.

It is essential to develop writing skills in undergraduate engineering students to promote the competencies that a professional must possess. A deeper understanding of the skills required in the current world can bring new perspectives to engineering graduates. The analysis of the studies above confirms that writing skills are in high demand by future employers because being able to communicate effectively is essential in their future profession. This paper invites teachers to recognize that a combination of approaches and methods can offer a diverse range of innovative pedagogical perspectives on modern educational demands

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