

Assessing English writing needs for civil engineering students: evidence from a Philippine college

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ABSTRACT

This study examined the perceived English writing needs of civil engineering students at a private higher education institution in the Philippines. Using a quantitative, descriptive, cross-sectional survey design, data were collected from 216 second- to fourth-year students through purposive sampling and a validated 15-item writing needs questionnaire. The instrument demonstrated strong internal consistency, and the data were analyzed using descriptive statistics. The findings showed that students reported substantial needs in both foundational writing skills and field-related written outputs. The most strongly perceived needs were related to grammar, sentence clarity, idea development, and the writing of engineering reports, executive summaries, formal letters, and memoranda. These results suggest that general English instruction alone may be insufficient to address the disciplinary communication demands of civil engineering. The study highlights the need to integrate discipline-specific writing support into the curriculum to strengthen students' academic writing, professional communication, and workplace readiness.

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1. INTRODUCTION

Engineering practice depends not only on technical knowledge but also on clear written communication. Engineers are expected to explain designs, justify decisions, document procedures, and communicate recommendations through written texts. Communication is therefore not secondary to engineering work, but a core competence that supports safe, effective, and accountable professional practice [1], [2]. In civil engineering in particular, students and practitioners are expected to produce reports, memoranda, specifications, summaries, and other documents that must meet disciplinary expectations for clarity, accuracy, and usefulness [3]–[5].

This view is consistent with scholarship in English for specific purposes (ESP) and academic writing, which holds that writing is most effectively taught in relation to the communicative demands of a discipline rather than as a purely general language skill [6]–[8]. In engineering education, this means that students need support not only in grammar and sentence-level correctness but also in learning how to produce

the written genres valued in their field. Such support is strongest when writing instruction is embedded in disciplinary contexts and aligned with engineering tasks, genres, and assessment practices [9].

Prior studies have shown that engineering students often experience difficulty in writing, especially in areas such as grammar, sentence construction, cohesion, rhetorical organization, and the appropriate use of technical language [10]. These difficulties are not merely individual weaknesses; they also reflect the fact that language instruction in many higher education institutions remains general and insufficiently contextualized to the disciplinary writing demands encountered in engineering courses and later in the workplace [4], [8]. Research in civil engineering and related fields has likewise shown that students need more focused preparation in writing technical reports, professional correspondence, project documents, and other discipline-linked texts [3], [4]. Evidence from Asian and other non-native English-speaking contexts indicates that these challenges are widespread. Studies in Thailand, Malaysia, Iran, Pakistan, Bangladesh, and other settings have reported that engineering students often recognize the importance of English writing but still feel underprepared for academic and workplace communication tasks [11]–[14]. These studies further suggest that writing instruction becomes more effective when it is informed by needs analysis and linked directly to disciplinary and professional communication [6], [13]–[15].

In the Philippine context, English proficiency and communicative competence remain important foundations for higher education and employability [16]. However, limited local evidence exists on the specific English writing needs of civil engineering students, particularly in relation to both foundational writing skills and discipline-specific written outputs. This gap is significant because civil engineering students are expected to write not only grammatically correct sentences, but also texts that reflect the communicative conventions of their field and the expectations of professional practice [3], [17]. To address this gap, the present study examines the perceived English writing needs of second- to fourth-year civil engineering students at a private higher education institution in the Philippines. It focuses on foundational writing concerns such as grammar, sentence structure, and cohesion, as well as civil engineering-related written outputs such as technical reports, executive summaries, memoranda, and professional correspondence. By identifying these areas of need, the study aims to contribute evidence for more discipline-sensitive writing support in the civil engineering curriculum [4], [8], [18].

Civil engineering students in the Philippines are expected to communicate through written genres that are central to both academic work and professional practice. However, language instruction in many higher education settings remains broad and decontextualized, which may leave students underprepared for the specific writing demands of civil engineering. While prior scholarship has identified writing challenges among engineering students and emphasized the need for discipline-based communication support, limited research has examined the particular English writing needs of civil engineering students in the Philippine context, especially in relation to both foundational writing skills and discipline-specific written outputs. This gap limits the development of curricular interventions that are responsive to the communicative demands of the field [1]. Hence, this study aims to:

- Determine the perceived English writing needs of second- to fourth-year civil engineering students at a private higher education institution in the Philippines in relation to foundational writing skills such as grammar, sentence structure, and cohesion;
- Identify the students' perceived needs in producing civil engineering-related written outputs, including technical reports, executive summaries, memoranda, and professional correspondence;
- Provide evidence-based recommendations for integrating discipline-specific writing support into the civil engineering curriculum.

Furthermore, this study sought to answer the following research questions:

- What are the perceived English writing needs of second- to fourth-year civil engineering students in relation to foundational writing skills?
- What are their perceived writing needs in relation to civil engineering-related written outputs such as reports, executive summaries, memoranda, and professional correspondence?
- How can these identified needs inform discipline-specific curriculum support for writing in the civil engineering program?

2. METHOD

2.1. Research design

This study employed a quantitative, descriptive, cross-sectional survey design [19]. This design was appropriate because the study aimed to identify and describe the perceived English writing needs of civil engineering students at a single point in time rather than to test causal relationships or evaluate an intervention. The survey focused on two domains: foundational writing skills and civil engineering-related

written outputs. The design was also aligned with the study's objective of generating evidence that could inform curriculum support for discipline-specific writing instruction.

2.2. Study setting and participants

The study was conducted at a private higher education institution in Marawi City, Lanao del Sur, Philippines, during school year 2022–2023. The name of the institution is withheld for ethical reasons and in accordance with the agreement made with school management. The college of engineering had a total population of 1,059 students from first year to fourth year during the study period. However, the target population of this study was limited to second- to fourth-year civil engineering students who had already been exposed to English and discipline-related coursework relevant to the study. First-year students were excluded because they had not yet taken English writing subjects and had limited exposure to civil engineering writing tasks.

A purposive sampling technique was used [20]. This approach was appropriate because the study required respondents who met specific inclusion criteria and could provide relevant information about both foundational English writing skills and civil engineering-related written outputs. A total of 216 students met the inclusion criteria and agreed to participate. The sample size was considered adequate for descriptive statistical analysis and sufficient to represent the target group within the scope of the study. The inclusion criteria were as: i) officially enrolled in the selected college during school year 2022–2023; ii) classified as a second-year, third-year, or fourth-year student; iii) willing to participate and able to provide informed consent; and iv) completed the survey questionnaire. In addition, the exclusion criteria were as: i) first-year students; ii) non-students or faculty members of the institution; iii) students who declined participation or did not sign the consent form; and iv) incomplete questionnaire responses. The distribution of respondents by year level is presented in Table 1.

Table 1. Distribution of respondents by year level

Year level	Frequency (f)	Percentage (%)
Second year	69	31.94
Third year	109	50.46
Fourth year	38	17.59
Total	216	100

2.3. Research instrument and data collection

Data were collected using a self-developed writing needs questionnaire consisting of 15 items. The instrument was developed based on relevant literature on ESP, engineering writing, academic writing in engineering, and civil engineering communication needs [3], [4], [6]–[8]. The questionnaire was organized into two parts:

- Writing skills needs, consisting of 5 items covering foundational writing concerns such as grammar, sentence structure, and cohesion; and
- Field-related writing outputs, consisting of 10 items covering civil engineering-related texts such as technical reports, executive summaries, memoranda, and professional correspondence.

All items were rated using a 5-point Likert scale: 5=strongly agree, 4=agree, 3=neutral, 2=disagree, and 1=strongly disagree. Higher scores indicated greater perceived writing need.

To establish content validity, the instrument was reviewed by three language specialists with expertise in English language teaching and academic writing. They evaluated the questionnaire in terms of clarity, relevance, and alignment with the study objectives. The instrument obtained a mean expert rating of 4.55, interpreted as highly valid. Based on the experts' comments, minor revisions were made to improve item wording and clarity.

The questionnaire was then pilot-tested to assess reliability. The overall reliability coefficient of the instrument (Cronbach's $\alpha=0.92$) indicated excellent internal consistency, exceeding the commonly accepted threshold of 0.70 for social science research [1]. The two subscales also demonstrated acceptable to excellent reliability: writing skills needs ($\alpha=0.79$), indicating acceptable internal consistency, and field-related writing outputs ($\alpha=0.90$), indicating excellent internal consistency.

The survey was administered during face-to-face class sessions with the permission of course instructors. Before administration, the purpose of the study was explained to the students, and informed consent was obtained. The researchers clarified the questionnaire instructions and item meanings when necessary to ensure comprehension. After completion, the questionnaires were collected, checked for completeness, and encoded for statistical analysis using SPSS [21].

2.4. Data analysis

The quantitative data were analyzed using SPSS [21]. Descriptive statistics were employed because the study aimed to describe the perceived English writing needs of the respondents rather than to test relationships or differences between variables [22]. Specifically, frequency and percentage were used to describe the distribution of respondents; mean was used to determine the level of perceived writing need for each item; and ranking was used to identify the most strongly perceived needs within each category. Higher mean scores indicated greater perceived writing need. The findings were presented in tables to facilitate comparison between foundational writing skills and field-related writing outputs.

2.5. Ethical considerations

Participation in the study was voluntary. All respondents provided informed consent before completing the questionnaire. Confidentiality and anonymity were maintained throughout the study. No identifying personal information was reported, and the name of the institution was withheld in the manuscript in accordance with the ethical agreement made with school management. Completed questionnaires and encoded data were stored securely and used solely for research purposes.

3. RESULTS

This section presents the descriptive analysis of the perceived English writing needs of 216 civil engineering students. The findings are organized into two categories: foundational writing skills and field-related written outputs. Mean scores and rank order were used to describe the students' responses. Higher mean scores indicate greater perceived writing need.

3.1. Foundational writing skills

Table 2 presents the students' perceived writing needs in foundational writing skills. All five indicators obtained relatively high mean scores, indicating that the respondents perceived a substantial need for improvement in this area. The highest-rated item was writing with correct grammar ($M=4.73$), followed by writing correct and clear sentences ($M=4.63$). The need to write effective thesis statements and supporting details was also strongly perceived ($M=4.55$). The lowest-rated item was using cohesive devices to connect ideas in writing ($M=4.09$), although this still reflected a clear need for writing support. Overall, the category mean for foundational writing skills was 4.47, indicating a very high perceived need for improvement. These findings suggest that grammar, sentence clarity, and idea development are among the most important writing concerns of the students.

Table 2. Perceived writing needs in foundational writing skills

Indicator	Mean	Interpretation	Rank
I need to learn how to write with correct grammar	4.73	Strongly agree	1
I need to learn how to write correct and clear sentences	4.63	Strongly agree	2
I need to learn how to write effective thesis statements and supporting details of a specific topic	4.55	Strongly agree	3
I need to learn how to use correct punctuation marks in writing	4.35	Strongly agree	4
I need to learn how to appropriately connect ideas in writing using cohesive devices	4.09	Agree	5
Category mean	4.47	Strongly agree	

3.2. Field-related written outputs

Table 3 shows the students' perceived writing needs in field-related written outputs. The highest-rated item was writing different types of engineering reports ($M=4.51$), indicating that students considered report writing the most important discipline-specific writing need. This was followed by writing executive summaries or abstracts ($M=4.38$) and writing formal or transmittal letters ($M=4.38$). Students also reported strong perceived needs in writing memoranda, preparing reference lists correctly, and constructing graphs and charts clearly and precisely. The lowest-rated item was writing minutes of the meeting ($M=4.08$), although the score still indicates a notable need for instruction. Overall, the category mean for field-related written outputs was 4.27, indicating a high perceived need in this category. These findings show that, in addition to foundational writing skills, students also perceive a substantial need for support in producing discipline-specific documents required in civil engineering study and practice.

3.3. Overall comparison of the two categories

A comparison of the two categories shows that the respondents reported slightly higher perceived needs in foundational writing skills ($M=4.47$) than in field-related written outputs ($M=4.27$). This suggests that although students recognize the importance of discipline-specific writing tasks in civil engineering, they

perceive an even greater need for improvement in the basic writing competencies that support those tasks. Overall, the findings indicate that writing support for civil engineering students should address both foundational writing abilities and profession-related written outputs.

Table 3. Perceived writing needs in field-related written outputs

Indicator	Mean	Interpretation	Rank
I need to learn how to write different types of reports related to engineering	4.51	Strongly agree	1
I need to learn how to write an executive summary or abstract for a report	4.38	Strongly agree	2
I need to learn how to write a formal letter such as a transmittal letter	4.38	Strongly agree	2
I need to learn how to write a memorandum with its correct format	4.34	Strongly agree	4
I need to learn how to write a reference list in the correct way	4.31	Strongly agree	5
I need to learn how to construct graphs and charts that present data clearly and precisely	4.26	Strongly agree	6
I need to learn how to write a résumé for work	4.25	Strongly agree	7
I need to learn how to write work-related emails	4.13	Agree	8
I need to learn how to write a cover letter for work.	4.10	Agree	9
I need to learn how to write minutes of the meeting.	4.08	Agree	10
Category mean	4.27	Strongly agree	

4. DISCUSSION

The findings show that civil engineering students reported substantial writing needs across both foundational writing skills and field-related written outputs. This pattern suggests that writing challenges are not limited to surface-level language problems, nor are they confined to specialized technical genres. Rather, the results indicate a broader difficulty in developing the kinds of written communication expected in civil engineering education and practice. This supports work in academic literacies and ESP, which argues that writing should be understood as a disciplinary practice shaped by context, genre, and professional expectations rather than as a purely general language skill [22].

Among the foundational writing skills, the strongest perceived needs were related to grammar, sentence clarity, and development of ideas. This finding is consistent with previous work showing that engineering students, especially in multilingual and Global South contexts, often struggle with sentence-level accuracy, organization, and control of academic discourse [23], [24]. The present findings also reinforce the argument that exposure to general English instruction alone may not be sufficient to prepare students for the writing demands of disciplinary study [25]. In this sense, the issue is not only language proficiency, but also the extent to which students are inducted into the writing practices of their field.

The findings on field-related written outputs point in the same direction. Students reported the greatest need in writing engineering reports, executive summaries or abstracts, formal letters, and memoranda, all of which are central genres in civil engineering communication. This result is important because civil engineering writing is closely tied to professional action: reports, summaries, and correspondence do not merely present information, but also document decisions, justify designs, and coordinate technical work [5], [26]. The results therefore align with research showing that students often experience a gap between classroom writing and workplace-oriented civil engineering communication [14], [27]. They also support evidence that discipline-specific instruction can improve students' performance in engineering writing when genre expectations and rhetorical structure are taught explicitly [28].

Taken together, the findings suggest that writing instruction in civil engineering should not be treated as a supplementary component delivered only through general English subjects. Instead, the results support a more integrated approach in which language specialists and engineering faculty work together to embed writing instruction within disciplinary coursework [28]–[30]. Such an approach would allow students to develop both foundational control of written English and familiarity with the genres most relevant to civil engineering practice. In this way, the study contributes a context-specific Philippine case to broader discussions of engineering communication, academic literacies, and curriculum reform in the Global South [29].

The findings of this study present significant pedagogical implications for civil engineering education. They indicate a need for increased discipline-specific writing support within the curriculum, particularly through ESP approaches that address the communicative demands specific to civil engineering. Incorporating writing tasks such as technical reports, executive summaries, memoranda, and professional correspondence into engineering courses may assist students in developing greater proficiency in the genres most pertinent to their academic and future professional environments. Collaboration between language specialists and engineering faculty in creating writing-related instruction and assessment may enhance such initiatives.

5. CONCLUSION

This study identified substantial English writing needs among civil engineering students in both foundational writing skills and discipline-specific written outputs. The most strongly perceived needs were related to grammar, sentence clarity, idea development, and the writing of engineering reports, executive summaries, formal letters, and memoranda. These findings suggest that writing remains a significant area of difficulty for civil engineering students and that such difficulties extend beyond general language accuracy to the broader communicative demands of the discipline.

The findings highlight the importance of integrating discipline-specific writing instruction into civil engineering curricula. Greater alignment among English instruction, disciplinary coursework, and professional communication demands may help strengthen students' academic writing, workplace readiness, and professional development. Future research may extend this work by including multiple institutions and using qualitative approaches to gain deeper insight into the writing practices and communication needs of civil engineering students and professionals.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

Authors declared no conflict of interest.

INFORMED CONSENT

Researchers have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

Ethical protocols were strictly followed throughout the research. All participants were informed about the study's objectives, procedures, voluntary nature, and confidentiality measures. Informed consent was secured prior to data collection, and participants were assured of their right to withdraw at any time without penalty. The study adhered to the standards outlined in the National Ethical Guidelines of the Philippines.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author, [SAF], upon reasonable request.

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