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The academic writing challenges of undergraduate students: A case study based on three selected science-based faculties at a state university in Sri Lanka

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Abstract

Academic writing is a critical skill for university students, irrespective of the discipline. While prior studies have extensively documented academic writing challenges in Western contexts, few examined the particular aspect of science-based faculties in South Asian universities, particularly in Sri Lanka, where institutional resources and linguistic diversity create unique barriers for undergraduates transitioning from Sinhala or Tamil-medium secondary education to English-medium university instruction. This study addressed this gap by identifying the academic writing challenges faced by undergraduates in the Faculties of Technology, Engineering, and Fisheries and Marine Sciences at the University of Ruhuna, Sri Lanka. Drawing on a qualitative case study approach, data were collected through semi-structured interviews with 24 undergraduates (third-year and final year students) and 9 lecturers from the three selected faculties. Thematic analysis (Braun and Clarke, 2006) using a six-phase approach was employed to identify, analyze, and report patterns within the qualitative data. The research was based on Schmidt's noticing hypothesis (1990), which emphasizes the importance of conscious awareness in language learning, and Vygotsky's social constructivism (Vygotsky, et al. 1978), which highlights the role of social interaction and scaffolding in skill development. The findings revealed four main themes: language proficiency barriers stemming from limited English exposure during secondary education, difficulties in organizing and structuring academic content coherently, a lack of familiarity with essential academic conventions such as citation styles, and pervasive feelings of anxiety and lack of confidence significantly impacting writing performance. Schmidt's noticing hypothesis illuminates how students' inability to consciously notice critical academic writing features, such as formal writing styles, disciplinary conventions, and structural components, contributes to their challenges. Vygotsky's social constructivism reveals how the absence of collaborative learning environments and peer support exacerbates these difficulties. We have noted that addressing these interconnected challenges requires integrated interventions combining explicit instruction to enhance collaborative learning environments that provide social scaffolding, such as discipline-specific English programs, structured writing workshops, peer mentoring, and hands-on practice with citation management tools. This study provides insights for educators and policymakers aiming to enhance academic writing support in science-based higher education in Sri Lanka.

Keywords: Academic writing, Schmidt's noticing hypothesis, Science-based university education, Vygotsky's social constructivism

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Introduction

Academic writing is an essential part of higher education that provides a channel through which a student may express his/her understanding, engage in the academic discussion, and develop the skills of critical thinking (Bailey, 2015; Hyland, 2013). It goes beyond primitive communication and brings in mental and analytical skills that are necessary when achieving academic and career success (Bailey, 2015; Murray, 2017). Students with weak academic writing skills often have poor academic achievements, a lack of self-esteem, and reduced opportunities for promotion. It is a fact that academic writing is a gateway to academic achievement where students can fully actualise their potential in the university environment.

Academic writing in science-based fields, such as science, technology, engineering, and fisheries, has a specific set of skills and conventions, which differ significantly from those commonly used in the study streams of humanities or social sciences (Day and Gastel, 2016; Swales and Feak, 2012). The main aim of scientific writing is to present complicated data with accuracy, objectivity, and brevity, aligning with the set standards of transparency and strictness. In addition, in a science-based scenario, the use of evidence-based information is necessary to correct the subjectivity and provide objective reporting of facts that are supported by scientific arguments. Avoiding subjectivity requires a lot of care towards stylistic details, especially in the writing tone (Herath et al, 2025)

The University of Ruhuna in the Southern Province of Sri Lanka is a leading institution of higher education in the island and has a significant role in producing graduates who will contribute to the development of the nation. Its science-based faculties, which are the Faculty of Technology, the Faculty of Engineering, and the Faculty of Fisheries and Marine Sciences, play a crucial role in providing the increasingly high demand for professionals in those vital sectors. Those faculties are faced with certain issues that are related to the undergraduate writing capabilities at the university level. The percentage of such students who have had their secondary education in Sinhala or Tamil is high, and they do not have much exposure to English, the medium of instruction in the university (Wijayasiri, 2017). This movement, therefore, makes academic writing a daunting task, and therefore, may act as a factor hindering academic success in a science-oriented environment, where all writing tasks are to be carried out in English language.

The theoretical background of this research work was based on two major theories, which are the noticing hypothesis by Richard Schmidt (Schmidt, 1990), and the social constructivism by Lev Vygotsky (Vygotsky, et al. 1978). Noticing Hypothesis by Schmidt is based on the concept that says, to acquire successfully an academic language, for instance English, learners should focus on particular characteristics of the target language, or in other words, consciously notice, as they cannot grasp grammatical patterns, vocabulary, and writing norms by just being exposed to them. Several of the common academic writing issues are a result of poor noticing. Students may not be aware of differences between informal and formal writing, individual academic writing rules, and proper source citation techniques, and may not be aware of their mistakes or their areas of ignorance. Social constructivism by Vygotsky (Vygotsky, et al. 1978) takes a perspective on the significance of social interaction and individuals working together in the learning process, where knowledge is created socially and not handed down to the student by the teacher in the form of a

top-down approach. In combination, these frameworks emphasize the complexity of the problems of academic writing faced by undergraduates.

Although the literature has largely captured academic writing problems in the Western context (Hyland, 2013; Wingate, 2012), only a limited number of studies have focused on science-based faculties in the South Asian universities. This gap is painfully pronounced in Sri Lanka, which has institutional resources and language diversity that create special obstacles to undergraduates. The current research, through examining the relevant features in the three science-based faculties in the University of Ruhuna, determined the obstacles that exist in relation to the discipline and hence fills a knowledge gap of significant importance. The paper focuses on explaining these issues by using a case study in the above-mentioned faculties in order to provide students, educators, and institutions with insights on how to overcome those hurdles.

Methodology

Research philosophy

An interpretivism philosophy was adopted to understand different dimensions of academic writing challenges among undergraduates. Interpretivism facilitates exploration of understanding the opinions of the various interviewees and existing differences.

Research design

A qualitative case study approach was employed to investigate the causes of academic writing challenges among undergraduates in three science-based faculties at the University of Ruhuna. The case study method was selected for its strength in providing an in-depth, contextualized understanding of complex phenomena (Yin, 2018). Given the multifaceted and context-dependent nature of academic writing challenges, particularly in non-native English, a case study enabled the exploration of students' lived experiences, perceptions, and the institutional context in detail.

Target population

Undergraduates from the third year and final-year from three selected science-based faculties at the University of Ruhuna, namely the Faculty of Technology, the Faculty of Engineering, and the Faculty of Fisheries and Marine Sciences, and academic staff from these faculties were selected as the target population of the study.

Sampling method

Purposive sampling was used as the sampling technique to identify participants likely to provide rich data. This method ensures that the respondents who show a higher possibility of giving appropriate responses were selected. It was also a way of identifying and selecting cases that will use limited research resources effectively. Third-year or final-year students registered in the three selected science-based faculties, and members of the academic staff involved in lecturing who taught, supervised, or assessed academic writing were selected randomly for the study.

Sample size

According to the sample sizes suggested by Creswell and Poth (2018), sample sizes for qualitative research methods vary depending on the specific approach but generally range from 10 to 50 participants. For this study, 24 undergraduates and 9 lecturers learning and teaching the relevant subjects were selected, allowing for a balance between obtaining diverse perspectives and maintaining manageability within the research scope. This range was expected to provide sufficient depth and variety in responses related to academic writing challenges.

Data collection

Data were collected through semi-structured interviews using an interview guide developed based on the objectives of the study and literature review. Open-ended questions were used in the interview guide, and each interview lasted for about 30 to 45 minutes. Subjected to the preference of the participants, the interviews were conducted in both Sinhala and English languages to ensure clarity in responses and comfort in the procedure. Ethical clearance certificate is obtained from the ethical review committee in University of Kelaniya (UOK/ERC/HU/2025/027). All interviews were audio recorded with the consent obtained before the interview and transcribed later for the analysis.

Semi-Structured Interviews

- Students: Individual interviews explored students' experiences with academic writing, perceived challenges, prior preparation, and use of support resources.
- Academic staff: Interviews focused on their observations of students' writing difficulties, perceived causes of those difficulties, and strategies used to support students.

Data analysis technique

Thematic analysis in accordance with Braun & Clarke, 2006 was used to discover, examine and discuss patterns of the qualitative information obtained after semi-structured interviews. To improve the credibility and depth, a triangulation approach was followed. To supplement the thematic analysis of student interviews, the transcripts of nine lecturer interviews were transcribed and analyzed in the same manner. The data on lecturers were coded and grouped into themes that were similar to those found on the student data, making it easy to compare.

The main purpose of the study was to outline the academic writing problems that are faced by undergraduates, including the problems related to language proficiency, organizational and structural problems, lack of familiarity with academic conventions, as well as lack of confidence and increased anxiety. These issues are central to defining the academic performance of undergraduates in science-based faculties.

A triangulation matrix was developed to systematically cross-validate findings. For each theme, student and lecturer perspectives were presented side by side, and areas of convergence and divergence were highlighted. This approach not only strengthened the trustworthiness of the

results but also provided a richer, multi-faceted understanding of the academic writing challenges in these faculties.

Results

The thematic analysis of interview data revealed four key themes that capture the academic writing challenges faced by undergraduates in the three selected science-based faculties at the University of Ruhuna. These themes emerged consistently across student and lecturer interviews and reflected both linguistic and affective dimensions of academic writing. The four themes identified were language proficiency barriers, difficulties in organisation and structure, lack of familiarity with academic conventions, and anxiety coupled with lack of confidence.

Theme 1: Language proficiency barriers

This theme examined the challenges faced by undergraduate students in science-based faculties at the University of Ruhuna due to language proficiency barriers. Academic writing in higher education in English demands a high level of language proficiency, which is required for expressing complex ideas, synthesizing information, and formulating coherent arguments. However, many students struggle with these demands due to limited exposure to English during their secondary education and insufficient mastery of technical vocabulary and scientific terminology.

Manifestation of students' perspective on language proficiency barriers

Students frequently expressed difficulty in selecting appropriate vocabulary and accurately conveying scientific concepts. One participant noted:

"My vocabulary is not sufficient when I try to write. I often struggle to find the correct words for my assignments. I also get stuck for lack of better words when I try to explain scientific concepts." (participant 2)

Another student highlighted the challenge of recalling technical terminology during assessments:

"I have even written Sinhala words for my examinations when I don't know the exact term for certain scientific words in English. Remembering and using technical terminology is a huge challenge when listening to lectures and writing exams." (participant 4)

The process of translating thoughts from the first language into English also contributed to inaccuracies in expression:

"I automatically think in Sinhala and try to write that in English, but when I read it, I understand that the sentence is wrong and it does not express what I intended to say." (participant 1)

Several students described the broader impact of English-medium instruction on their academic trajectories:

“Having to learn content in another language other than Sinhala is a really tough task. I especially struggled a lot during my first year at the university. In my batch, a few students dropped the degree because of the medium of instruction.” (participant 8)

Manifestation of lecturers’ perspective on language proficiency barriers

Lecturers consistently observed that students’ limited command of English affected the clarity and effectiveness of their academic writing. One lecturer remarked:

“Grammar and vocabulary are the most common issues. Students often make basic grammatical errors and use limited vocabulary, which negatively affects clarity.” (participant L1)

Another lecturer emphasized that linguistic limitations often overshadowed students’ conceptual understanding:

“Even when students have good ideas, their language limitations make it difficult to express those ideas clearly.” (participant L2)

Both students and lecturers identified language proficiency as a foundational barrier that influenced multiple aspects of academic writing.

Theme 2: Difficulties in organization and structure

This theme examined the challenges faced by undergraduate students in science-based faculties at the University of Ruhuna due to difficulties in organizing and structuring their academic writing tasks. These difficulties often stemmed from a lack of foundational skills, limited exposure to academic conventions, and insufficient practice in synthesizing information effectively.

Manifestation of students’ perspective on difficulties in organization and structure

Several students described uncertainty about how to organize their ideas effectively:

“Organizing my ideas coherently with a clear flow is difficult for me. At times I feel I am just putting whatever comes to my mind on paper, without any attempts to logically organize ideas into a flow.” (participant 11)

Another student acknowledged a lack of awareness regarding structural expectations:

“My organization is really poor, as I do not include enough sections for my assignments. I actually don’t have any idea about organizing.” (participant 4)

Surface-level engagement with tasks was also reported:

“I fail to engage deeply with the tasks given and try to answer the question on the surface level.” (participant 7)

Time constraints further exacerbated organizational difficulties:

“Writing a good report takes a lot of time, and in the university, we have to write many reports for various subjects, so we really don’t have time to do a good job with one report.” (participant 6)

Manifestation of lecturers’ perspective on difficulties in organization and structure

Lecturers echoed students’ concerns regarding logical flow and coherence:

“Logical organization is a major issue. Students often submit assignments with ideas scattered and lacking a coherent structure.” (participant L2)

Another lecturer highlighted recurring issues with basic academic structure:

“I frequently have to remind students about the importance of a clear introduction, body, and conclusion. Many struggle to connect their arguments logically.” (participant L4)

Both groups emphasized that weaknesses in organization and structure significantly undermined the quality of academic writing.

Theme 3: Lack of familiarity with academic conventions

This theme explored the challenges faced by undergraduate students in science-based faculties at the University of Ruhuna due to their lack of familiarity with academic conventions. Academic conventions encompass a range of practices essential for scholarly communication, including citation styles, formatting, and adherence to discipline-specific norms. Mastering these conventions is critical for producing credible, well-structured academic work that meets the expectations of higher education. The lack of familiarity with academic conventions poses significant challenges for undergraduate students transitioning from secondary education to university-level writing.

Manifestation of students’ perspective on lack of familiarity with academic conventions

Students frequently described citation as a demanding and time-consuming task:

“Citation is always a struggle for me. It is time-consuming, and it sometimes takes me more time than doing the assignment.” (participant 1)

Some students reported losing marks due to improper citation:

"I have serious issues with citation; sometimes I score low marks merely because my citation was not properly done." (participant 4)

Others acknowledged the importance of citation while expressing difficulty in execution:

"Citing authors is important because without due credit, our work is not accepted, but it is a challenging task." (participant 12)

Students also noted the challenge of adapting to academic writing conventions during their early university years:

"This new writing style is really challenging. Most often my writing is not up to the standard because I am not familiar with academic writing. This was worst when I was in the first year." (participant 15)

Manifestation of lecturers' perspective on lack of familiarity with academic conventions

Lecturers consistently identified persistent problems with referencing and adherence to academic standards:

"Students have persistent problems with referencing and following the required academic conventions. Incorrect citation is a frequent issue." (participant L3)

Another lecturer reiterated the link between language limitations and convention-related difficulties:

"Even when students have good ideas, their language limitations make it difficult to express those ideas clearly." (participant L5)

Both students and lecturers identified unfamiliarity with academic conventions as a major impediment to successful academic writing.

Theme 4: Anxiety and lack of confidence

Emotional and psychological factors were explored under this theme, specifically a lack of confidence and heightened anxiety, on the academic writing performance of the undergraduates. Academic success not only depends on language and organizational skills but is fundamentally tied to a student's sense of self-efficacy and emotional well-being.

Manifestation of students' perspective on anxiety and lack of confidence

Several students expressed uncertainty and self-doubt regarding their writing abilities:

“Confidence wasn’t there. Most of the time I don’t understand how I should use academic writing in my assignments.” (participant 2)

Others described stress-related avoidance behaviors:

“The stress makes me not want to write anything at all. I always postpone writing because it is so stressful to begin writing.” (participant 4)

Concerns about inadequate technical understanding were also evident:

“I think the key thing to remember is that I have no technical understanding to write a research paper.” (participant 7)

A lack of peer support contributed to anxiety:

“I didn’t get enough help from peers and got anxiety over this.” (participant 10)

Manifestation of lecturers’ perspective on anxiety and lack of confidence

Lecturers observed hesitation and avoidance among students when engaging with writing tasks:

“Many students hesitate to start writing assignments and seem anxious about meeting academic standards.” (participant L1)

Another lecturer noted that lack of confidence affected students’ willingness to seek support:

“Students’ lack of confidence is evident when they avoid seeking help or feedback, and this impacts their progress.” (participant L3)

Both students and lecturers recognized anxiety and lack of confidence as significant barriers that compounded other academic writing challenges.

Discussion

The results indicate that there are four interdependent academic writing issues that undergraduates in the three science-based faculties in the University of Ruhuna face, namely, language proficiency barriers, difficulties in organization and structure, lack of familiarity with academic conventions, and anxiety and lack of confidence. . Instead of being disconnected obstacles, these issues are a complex, mutually reinforcing nexus that can be explained by jointly considering the perspectives of the complementary noticing hypothesis and social constructivism perspectives of Schmidt and Vygotsky, respectively. The discussion did not confine itself to a description of student problems, but it investigated the origin, continuation, and interplay of the problem in the context of science-based education in Sri Lanka.

Language proficiency barriers

The theme of language proficiency barriers extended beyond the surface observation that students struggle to express scientific ideas in English. The mechanism that underpins it is a recursive process that is based on cognitive as well as social determinants. The students who shift to English-mediated university teaching did so having no previous linguistic preparation to support them, which also forms a zone of proximal development (ZPD), as theorized by Vygotsky, that is too broad to be closed without significant support. The gap between the independent performance of the students and their educational needs is thus too vast to overcome without conscious teaching assistance.

The noticing hypothesis by Schmidt provides the critical understanding of the reasons why this chasm continues to exist and expand. The students cannot consciously observe the key characteristics of the academic English, including an active-passive voice transformation in the scientific texts, the accuracy of the technical language, or the language of hedging, typical of the academic discourse, as they are not exposed to these elements of linguistics in any meaningful context. The insufficient attentional resources were overwhelmed by the cognitive load of simultaneously perceiving the intricate scientific material and locating themselves within the unknown linguistic patterns. Since, as participant 2 stated, she did not have enough vocabulary when she attempted to write, students were not able to enhance linguistic traits of which they are not consciously aware. The underlying problem is more than a mere lack of vocabulary; instead, the students fail to develop metacognitive awareness of what aspects of linguistic behavior they should pay attention to in academics.

There is a cascading effect of this linguistic barrier. In the cases in which the students are not able to put their understanding in a transparent manner in the English language, they are provided with negative feedback on the same, a factor that erodes confidence and increases anxiety, showing direct association with the fourth theme. The inability to access and understand academic sources in the English language limits access to the first theme, which, in turn, leads to the second and third themes. This interdependence proves that the language proficiency is not just another problem in the row but a cornerstone problem that increases the severity of issues and creates more issues.

Lack of collaborative learning experiences, which Vygotsky would call the lack of social interaction in the construction of knowledge, would mean that students are not able to enjoy the modelling on the part of their peers or collective problem solving as applied to language use. Students in a socially isolated learning situation are not exposed to as much of what more advanced students do in learning the language, nor do they get informal feedback that would be able to help them recognize the mistakes and areas of confusion in the language.

Difficulties in organization and structure

The difficulties undergraduates encountered in organizing and structuring their ideas represent more than poor planning or time management. These difficulties were indications of the lack of internalized discourse structures of academics, a gap that is explained by Schmidt in his system

as a lack of noticing structural patterns, which is explained by Vygotsky as the lack of social scaffolding at the time of critical learning stages.

When participant 11 stated, "I feel I am just putting whatever comes to my mind into paper, without any attempts to logically organize ideas into a flow," it revealed a fundamental misunderstanding of academic writing as a cognitive process. Students appear to conceptualize writing as transcription, converting thoughts to text, rather than as a recursive process of knowledge construction, argumentation, and rhetorical positioning. This misconception emerged because students were not guided through explicit modeling of how experienced writers plan, organize, and revise their work.

From Schmidt's perspective, the study of the hierarchy of academic texts eludes the student: the development of paragraphs to the thesis statements; the indication of organizational structure to the topic sentences; the establishment of coherence to the transitions; the synthesis of conclusions instead of summarizing them. These structural elements were not visible to the students since they are not taught to care about these aspects consciously. The time limits mentioned by participant 6, which stated that they simply did not have time to do a good job with a single report, worsen this situation, as the process of noticing is intentional, and requires focused attention, which cannot be given under the pressure of rushing to write a report.

Vygotsky, in his social constructivism, explains the growth of organizational skills in socialized interaction and directed practice. Observation of expert practice of the writing process, participation in collaborative outlining and peer review, and formative feedback that brings organizational expectations into focus are all needed by students. These missing social learning opportunities imply that the students do not have more knowledgeable others to scaffold the creation of organizational competence. The observation of lecturer participant L4 pointed out that in most cases, students were not able to connect their arguments logically. It indicated that though they might have had enough content knowledge, they did not master the type of rhetorical process that governs the academic discourse in their subjects.

More importantly, the difficulties in organization and structure could not be uncoupled from the language proficiency obstacles. The mental energy that is used to construct sentences in a non-native language takes away the mental resources that an individual uses when it comes to higher-order organizational planning. Students who were at the boundaries of their linguistic competence based their attention on the sentence-related issues at the expense of having less cognitive ability to organize their discourse. This communication of themes proves that any intervention aimed at one facet of the issue would provide a minimal effect.

Lack of familiarity with academic conventions

The lack of familiarity with academic conventions such as citation styles, formatting requirements, and disciplinary norms represented what literacy scholars identify as "gatekeeper knowledge": implicit understandings that separate insiders from outsiders in academic communities. The finding that students struggled with these conventions revealed not individual deficiency but rather systemic failure to make tacit knowledge explicit.

The explanation that can be offered to the reason why exposure to academic texts does not necessarily result in mastery of conventions is the noticing hypothesis by Schmidt. After participant 1 states that citation is never easy with me. It is time consuming, but the hidden problem is that the process of citation needs to acknowledge that patterns are involved at various levels, such as when citations are needed, what the discipline expects of citation density, what the technical formatting requires, and what rhetorical work citations accomplish in support of scholarly arguments. Unless specific teaching is provided that aims at these multidimensional aspects, students are prone to see only the veneer aspects of formatting without looking beyond the surface.

The difficulties related to citation practices especially clarify the relationship between these difficulties. The inability to properly paraphrase the found source poses a great challenge to students with low levels of English and as such they are more likely to either plagiarize unintentionally or revert to direct quotes. Both replies are unorthodox as per the rules of academia, but the cause of the problem is not moral but linguistic. Similarly, students who are not accustomed to organizational structures can introduce citations in any position within their text rather than in any position in line with particular claims a symptom of structural insufficiency which in turn generates problems with citation.

According to the framework outlined by Vygotsky, academic conventions are the socially constructed norms, which have to be passed on by engaging in the communities of practice. When participant L3 noticed that, after several attempts, the students continue to struggle with the need to reference and adhere to the necessary academic standards, this is not their fault, but the lack of systematic socialization into the community of academic discourse. The opportunities of legitimate peripheral participation are necessary to effective pedagogy: seeing how scholars use citations, working under mentorship, and gradually taking on more responsibility of one's own.

The disciplinary specificity of academic conventions creates additional complexity in science-based faculties. Scientific writing privileges particular features such as passive voice, hedging, precise technical terminology, Introduction, Methods, Results, and Discussion (IMRaD) format that differ from conventions in other fields. Students must not only learn general academic writing principles but also notice and master discipline specific variations. As lecturer participant L3 observed, "Many students are unfamiliar with the IMRaD format," indicating that even students who develop general academic literacy may struggle with specialized disciplinary conventions.

Anxiety and lack of confidence

The psychological dimensions of anxiety and lack of confidence represent both the consequence of other challenges and an independent contributing factor that intensifies difficulties. The theory of Schmidt says that the noticing process is impaired directly by anxiety. Through cognitive studies, it has been proven that high anxiety levels constrict attention and decrease the working-memory capacity and makes it neurologically more challenging to identify linguistic features, structural patterns, or traditional demands among anxious students. When participant 4 declared that the stress causes him not to want to write anything at all, it showed that the avoidance behavior is what triggers this vicious cycle: less skill practice means less skill development, which

increases the future levels of anxiety and reduces skill practice in turn. Schmidt framework indicates that anxiety hinders the active participation of learners to the content and the ability to notice their mistakes.

Social constructivism by Vygotsky provides an idea that is complementary to the origin and maintenance of anxiety in socially isolated settings. The fact that participant 10 did not get sufficient peer support, was showed by him saying that he has not received proper help and has developed anxiety, directly refers to the lack of social support as a cause of psychological distress. According to Vygotsky, the person who learns without an appropriate scaffolding, trying to engage in activities that are beyond his/her current ability, will feel repeated failure, thus undermining self-efficacy and creating anxiety. The fact that lecturer participant L1 observed that the students were reluctant to start writing assignments and seemed to be anxious about the quality of their work, led to the conclusion that this anxiety became anticipatory; students were anxious even before they start doing the relevant work, as failure is bound to happen was the way they had been conditioned to think.

The interconnection between anxiety and other themes operates through multiple pathways. Language proficiency barriers generate anxiety because students fear their ideas would be misunderstood or judged negatively due to linguistic errors. Organizational difficulties produced anxiety because students felt overwhelmed by the complexity of structuring extended texts. Unfamiliarity with conventions created anxiety because students lacked confidence that they met implicit expectations. Each of these anxieties compounded the others, creating what participant 2 described: "Confidence wasn't there. Most of the time, I didn't understand how I should use academic writing in my assignments."

More importantly, the performance of writing was not the only area of anxiety influence, as help-seeking behavior was also affected. According to lecturer participant L3, the inability of students to seek help or feedback was an indicator of a lack of confidence. This shyness not only denied students the social interaction that Vygotsky describes as the key to learning but also isolated them further and denied them the scaffolding needed to develop. Therefore, the lack of social support causes anxiety and hinders the access to available support, which leads to a vicious cycle, which worsens instead of solving challenges.

Interconnections between challenges

The triangulation matrix revealed a strong level of overlap in the views of students and lecturers, hence justifying the determining these four themes as pertinent impediments. One could see a deeper picture when these issues are not considered as separate issues but as a part of a system. The obstacles to language competence hinder the identification of the organizational trends and compliance with academic norms, which, in turn, create anxiety. The lack of linguistic resources need to be expressed. It should be understood that intricate logical relations makes organizational troubles worse, and such situations are escalated under stress. The lack of familiarity with conventions intersects with the language constraints and organizational issues, the negative feedback loop of this issue further increases the anxiety and prevents confidence.

The noticing hypothesis, formulated by Schmidt, and social constructivism, formulated by Vygotsky, offer explanations of this interrelated system. According to Schmidt, it is only the cognitive mechanisms that are put into play when the learners are aware of the relevant features whereas according to Vygotsky, social mechanisms are mandated by learners to acquire new skills beyond their present abilities in the absence of proper social provision strategies. All these frameworks imply that both dimensions should be addressed when developing effective interventions.

The pedagogical implications become very clear: a single intervention that is based on an individual problem will have a low degree of effectiveness since the interdependence of these problems requires simultaneous training of the areas. The language development programs should take specific care of the organizational structures and academic conventions. Citation and formatting workshops must be able to support the linguistic constraints of students and provide them with scaffolding based on their existing skills. The interventions should include confidence-building efforts, not be separated from psychological assistance.

Moreover, the theoretical models refer to particular pedagogical strategies. To encourage noticing (Schmidt), the teacher can use consciousness-raising exercises that specifically bring to light aspects of academic writing, use annotated exemplar texts, carry out comparative analyses of good and bad examples, and give feedback, which leads students to focus on specific elements of language. Institutions may provide social scaffolding (Vygotsky) by establishing collaborative learning activities that incorporate structured peer-review practices, writing groups, near-peer mentoring, and graduated responsibility frameworks whereby students experience more heavily scaffolded tasks and gradually become more responsible.

The contextual influence of this study, which was on science-based faculties in Sri Lanka, where students switch between vernacular and English-based teaching showed that these issues have pinpointed intensity. However, the mechanisms underlying them are applicable more widely. The mutually constitutive nature of language, organization, conventions, and the effect of academic writing implies that the results could be applied to practice not only in similar South Asian settings but also in any other case where learners have to deal with language, educational, or discipline-related transitions.

Pedagogical implications and integrated interventions

Addressing language proficiency barriers

The noticing hypothesis by Schmidt demonstrates that the students find it difficult due to their inability to make conscious recognition of the main characteristics of the academic English technical vocabulary, formal register, and patterns of language specific to the discipline. This understanding forms the basis of intensive English programmes which utilize consciousness-raising strategies like using annotated model texts, comparative language exercises of formal and informal language, and focused noticing activities. At the same time, social constructivism as proposed by Vygotsky emphasizes the fact that language acquisition can be gained through socialization in the context of ZPD, which can be translated into cooperative settings that involve structured peer reading groups, near-peer mentoring programmes and collaborative writing activities. Institutions can overcome language proficiency challenges by integrating cognitive and

social components of learning by combining explicit attention-directing instruction (Schmidt, 1990) with social supportive learning situations (Vygotsky, 1978).

Developing organizational skills

The organisational problems students face are due to a lack of awareness with regard to hierarchical structures and rhetorical patterns of academic discourse (Schmidt). The strategies to be used in practice include annotated organisational templates, colour-coding exercises to visualise logical relationships, reverse-outlining exercises, and formative feedback highlighting organisational aspects. The principle of scaffolding suggested by Vygotsky is being operationalized in terms of graded writing tasks, whereby the initial ones are highly scaffolded and gradually become increasingly independent. Tacit knowledge is made explicit through peer-review protocols which focus on organizational coherence and writing workshops that use think-aloud protocols. In turn, organizational competence develops because of the combination of explicit consciousness-raising (Schmidt) and socially mediated guided practice (Vygotsky).

Mastering academic conventions

The noticing hypothesis explains the lack of success in exposure culminating in mastery: students need to be conscious of attending to citation practices at several levels. In the methods used to enhance effective instruction, exercises related to citation density detecting, paraphrasing strategies practising and understanding how expert writers use citations in rhetoric are included. According to the legitimate peripheral participation, by Vygotsky, students learn conventions as authentic scholars within the context of genuine scholarly activity with guidance. Its practical uses are teaching citation management software, faculty-sponsored research writing workshops, submissions with formative feedback, and journal clubs, which induce students into communities of disciplinary discourse. This method brings together the concentrated attention on traditional features (Schmidt, 1990) and participatory socialisation (Vygotsky, 1978) together.

Building confidence and reducing anxiety

Anxiety is a direct disruption of the noticing process because it reduces the attentional focus (Schmidt), which causes the development of anxiety-reduction mechanisms during the entire instruction instead of considering confidence as a distinct sphere. Strategies include normalising academic difficulties, offering low stakes writing tasks, multiple revision, and reflective writing tasks. The fact that Vygotsky focuses on social support is the concern of anxiety exacerbation in isolation. Peer support systems such as writing buddies, peer feedback groups, and collaborative sessions include structured peer support that provides social scaffolding which lessens anxiety and develops skills. Peer tutors provide socially favourable conditions through the near peer mentoring and writing centres. This twofold can deal with both the mental processes by which anxiety disrupts learning (Schmidt, 1990) and the social aspects of confidence-building (Vygotsky, 1978).

Conclusions

This study identified four interconnected academic writing challenges faced by undergraduates in three science-based faculties at the University of Ruhuna: language proficiency barriers, difficulties in organization and structure, lack of familiarity with academic conventions, and anxiety and lack of confidence. The research revealed that these challenges are not isolated obstacles, but rather interdependent components of a complex system rooted in students' transition from Sinhala or Tamil-medium secondary education to English-medium university instruction. The complementary theoretical frameworks of Schmidt's noticing hypothesis and Vygotsky's social constructivism illuminate why these challenges emerge and persist. Schmidt's framework explains the cognitive mechanisms students cannot improve what they fail to consciously notice, while Vygotsky's framework explains the social mechanisms—students cannot develop skills exceeding their current capability without appropriate scaffolding. Understanding these interconnections is critical because interventions targeting single dimensions of difficulty will have limited effectiveness; instead, holistic, theoretically informed writing support systems must simultaneously address cognitive, linguistic, social, and affective dimensions.

The findings have significant implications for science-based faculties in Sri Lanka and comparable multilingual higher education contexts. Rather than viewing academic writing challenges as individual deficiencies or simple language problems, institutions must recognize them as complex, interconnected obstacles requiring comprehensive, integrated interventions. This study provides a foundation for developing context-responsive writing support systems that integrate explicit instruction into disciplinary courses, create collaborative learning communities, provide ongoing formative feedback that enhances noticing, and address both confidence and anxiety alongside skill development. By grounding pedagogical interventions in the complementary insights of Schmidt's noticing hypothesis and Vygotsky's social constructivism, science-based faculties can transform academic writing from a persistent barrier into a powerful tool for learning and professional development.

Conflict of interest statement

The authors declare no conflict of interest

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