

Reinforcing Writing in the Disciplines Courses with Collaborative Instructional Mode: An Exploratory Study

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Abstract

This study examines the effectiveness of classroom-based student writing tutors with discipline-specific backgrounds as adjunct collaborators in supporting non-native English-speaking writing teachers in the disciplines. In this qualitative study, the participants' perceptions of this collaborative instructional model were evaluated through a thematic analysis of semi-structured interviews with the participating students, in-class writing tutors, and writing instructors from two discipline-specific writing courses. The findings highlighted the perceived benefits of this collaborative teaching with discipline-specific tutors and their involvement as the “pedagogical bridge” to overcome language teachers' insufficiency of disciplinary content knowledge. The findings also pointed to pedagogical challenges concerning writing variations within the same discipline and students' need for linguistic knowledge rather than discipline-specific content knowledge. Based on these findings, this study concludes with a discussion of the pedagogical implications for the effective training of discipline-based tutor collaboration and the future implementation of discipline-based writing curricula across disciplines.

Plain Language Summary

This qualitative study explores an alternative approach to teaching writing that involves collaboration between writing tutors and discipline-specific writing instructors. Thematic analysis was conducted on the interviews of students, in-class writing tutors, and writing instructors from two discipline-specific writing courses to gain insight into their perceptions of the collaborative teaching mode. The findings highlighted the perceived benefits of this collaborative teaching method, specifically the role of discipline-specific tutors as the “pedagogical bridge” to overcome language teachers' insufficiency of disciplinary content knowledge. However, the study also reveals pedagogical challenges such as writing variations within the same discipline and students' needs for linguistic knowledge instead of discipline-specific content knowledge. The study concludes by discussing pedagogical implications for effective training of discipline-based tutor collaboration and future implementation of discipline-based writing curricula across different academic disciplines. The findings underscore the importance of collaborative teaching approaches for effective learning outcomes in writing instruction, and can inform the implementation of writing center tutoring programs in non-English speaking countries, particularly in Asia.

Keywords

writing tutor, collaborative teaching, discipline-specific knowledge, writing center, writing in the disciplines

Introduction

An Emergent Need for the Teaching of English Writing in the Disciplines

An increasing demand for English scholarly publications across disciplines in higher education has heightened the need for Writing in the Disciplines (WID) pedagogy (Cargill et al., 2012; Huang, 2010; Li, 2016). WID aims

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Data Availability Statement included at the end of the article



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to familiarize students in specific disciplines with the writing conventions and genres of those disciplines (Hyland, 2017). In the West, WID courses are mainly supported or organized by writing centers that are institutionally separate from other departments in most universities. These writing centers endeavor to provide discipline-specific support to university students, using different pedagogical approaches to foster students' academic success. In many of these writing centers, writing professionals and tutors offer writing workshops, one-on-one consultation services, disciplinary subject learning and writing courses, and other discipline-specific support to university students through different pedagogical approaches (Devet, 2014; Hall & Birch, 2018; Riedner et al., 2015). Despite all efforts made to support WID programs, research on WID pedagogy primarily focuses on practitioners and students in English-speaking countries. Little attention has been paid to the need for and the impact of WID pedagogy on non-native-speaking (NNS) English teachers and students at the higher education (HE) level in non-English speaking countries.

In Asian higher-education institutions, such as many in Taiwan, thesis writing in English has become a graduation requirement, which presents greater challenges for NNS English teachers, graduate students, and scholars. With the increasing emphasis on WID and constant pressure on scholars and graduate-level students to publish scholarly papers in English, it is vitally important to unpack the challenges of teaching WID courses encountered by the local NNS English teachers and to examine the effective strategies they seek to address these challenges as well as student needs relevant to their specialized disciplines.

The Challenges in WID Pedagogy

The implications for the growing centrality of writing in all academic fields highlight the impacts and challenges that accompany the teaching and learning of English scholarly writing to English language learners across disciplines. In addition to subject-specific knowledge, students must now master the discourse structure of English writing and rhetorical awareness. This shift toward the integration of specialized subject knowledge across disciplines calls attention to the challenges faced by English language instructors assigned to teach these courses. While research on the challenges of teaching English writing in the disciplines has not been thoroughly explored, investigations into English for Specific Purposes (ESP) have revealed challenges often encountered by ESP teachers. These challenges include difficulties in dealing with subject knowledge outside their area of expertise, skepticism from specialized disciplinary professors who question ESP teachers' qualifications to

teach writing in their disciplines, and maintaining a balance between teaching language and teaching content knowledge required by learners from different academic disciplines (Chang, 2017; Chen, 2011; Fălăuș, 2017; Fitzpatrick et al., 2022; Hutchinson & Waters, 1987; Tavakili et al., 2013).

Chen's (2011) analysis of ESP pedagogy in Taiwan specifically highlights the difficulties faced by ESP teachers within the rigid power structure of academia, in which most English teachers, whose training has been either in linguistics or literature, feel reluctant to teach ESP. This reluctance is due to the perception of ESP as a "tool-oriented" subject rather than a real discipline, perpetuating the dichotomy between language and disciplinary content teachers, but also threatening ESP teacher identity development (Chen, 2011, p. 27). Teaching academic writing in English to NNS students of different disciplinary backgrounds is thus a challenging task that requires NNS language teachers to possess an understanding of multi-dimensional disciplinary contexts and written language while accommodating students' diverse learning needs. Effective integration of these elements, instead of viewing them in isolation, is crucial to striking a balance between academic literacy skills and disciplinary expertise.

Literature Review

Collaborative Teaching and Learning in Writing Communities

Collaboration has been recognized as a valuable approach for acquiring discipline-specific literacy practices, as it fosters shared expertise, team teaching, and cooperation among instructors from different fields, leading to meaningful learning outcomes (Chu, 2021; Li et al., 2019; Salonen & Savander-Ranne, 2015). This notion of collaboration is grounded in the conceptual foundation of learning as a "community of practice" (CoP) (Lave, 1996; Lave et al., 1991) and Bourdieu's theory of practice (Bourdieu, 1984). In the context of interdisciplinary writing communities, members of a CoP (e.g., language specialists, discipline-specific specialists, and students in a classroom setting) negotiate meanings, generate new knowledge, and improve practices through this form of collaboration.

In this sense, peer tutoring has gained recognition as a form of collaborative learning in the writing center community and played a crucial role in assisting student learning across disciplines (Ali et al., 2015; Dowse & van Rensburg, 2015; Scharold, 2017; Shiely & McCarthy, 2019). In general, there are three common types of peer tutoring: Reciprocal Peer Tutoring, Class-Wide Peer Tutoring, and Cross-Age Peer Tutoring, each of which offers unique benefits (Ali et al., 2015).

Reciprocal Peer Tutoring involves peers taking turns being tutors and students to increase student confidence levels, while Class-Wide Peer Tutoring takes place in the classroom, where students work together in small groups to achieve mutual goals and learn actively from one another. Cross-Age Peer Tutoring involves more advanced students as tutors teaching less experienced students as learners, providing valuable teaching experience for tutors and one-on-one attention for tutees.

While the benefits of peer tutoring have been widely explored, views on the roles of peer tutoring and how it can be best implemented to maximize its effectiveness remain inconclusive. Soliday (1995) examined the shifting roles of writing tutors from the context of writing centers to classroom space and highlighted the blurring boundaries between the traditional “tutorly” role of writing center tutors and the “teacherly” role of classroom-based tutors. The study revealed that the insider tutors who were integrated into the classroom setting were perceived more positively and expressed a greater sense of accomplishment compared to outsider tutors. Soliday’s finding highlights the importance of integrating peer tutors into the classroom setting and reconfiguring their roles to enhance collaboration and effectiveness. It is therefore important to consider what knowledge and skills are required for tutors to perform their roles effectively.

Through the analysis of writing center tutors’ reflections on their work, Pigliacelli (2019) highlights six knowledge categories required for tutor-training improvement, including writing center knowledge, disciplinary genre knowledge, writing knowledge, rhetorical awareness, interpersonal knowledge, and intrapersonal knowledge. By incorporating the knowledge and skills required for effective tutoring in the classroom setting, writing centers can ensure more effective collaboration between WID teachers and in-class writing tutors.

Classroom-Based Writing Tutors as an Alternative Collaborative Teaching

Empirical investigations into the effectiveness of peer writing tutor practices have shown a mixed view on reconceptualizing and transforming tutor training and practices (Doman, 2014; Kohn, 2014; Sanford, 2012; Shiely & McCarthy, 2019). For example, Kohn (2014) stresses the importance of scientific rhetoric and the connection between science writing genres and the delivery of scientific writing to different audiences in tutor training programs. In other words, writing tutors should best serve as language specialists with scientific genre knowledge, not subject tutors. Doman (2014), in contrast, argues for a strategy termed Tutors in the Classroom as a way to incorporate supplemental instructors. This supplemental instructional model represents co-teaching

instruction offered by the Tutors in the Classroom and the classroom teacher. The model demonstrated positive results in enhancing student learning outcomes as well as retention levels. Sanford (2012) also suggested a peer-interactive, writing center approach at the University of New Mexico, known as the Writing Drop-in Lab, which provided classroom-based writing tutoring by integrating peer tutors into classrooms, providing scaffolding guidance for students in small groups and facilitating peer review among student writers. The goal of this peer-interactive writing center approach envisions writing as a collaborative act, rather than “a fix-it shop,” and strives to increase student usage by more effectively utilizing tutors’ time. Shiely and McCarthy (2019) suggested that tutors’ roles as subject specialists are instrumental to their success in improving the student learning experience.

Despite the demonstrated effectiveness of peer-writing tutoring assistance, empirical literature on the effectiveness of classroom team-teaching with writing tutors as collaborators in assisting WID teachers and providing writing support for discipline-specific students has been relatively scarce. Most literature on WID support with tutorial assistance and writing consultation has generally involved programs for undergraduate students in general academic writing courses, with very few studies examining WID for postgraduate students (Dinitz & Harrington, 2014; Sari et al., 2017; Saulnier, 2016).

Therefore, this study aims to explore the effectiveness of classroom-based writing tutors with discipline-specific backgrounds as adjunct collaborators (ACs) in supporting WID teachers. Specifically, the study addressed the following research questions:

- 1) How effective is an adjunct collaborator with a discipline-specific background in helping students learn in the WID courses?
- 2) How effective is an adjunct collaborator with a discipline-specific background in helping a WID teacher enhance the teaching?
- 3) How effective is the application of the proposed collaborative instructional mode in a WID class?

Methodology

The primary objective of this study was to examine how ACs could support WID teachers in the classroom with specific focuses on students’ and teachers’ perceptions of their learning/teaching experiences. A qualitative approach was employed for its strength of gaining a better understanding of underlying opinions that are grounded in lived experiences and in the participants’ own words (Denzin, 1989; Rahman, 2017). Specifically, a three-phased qualitative study was conducted at an

interdisciplinary writing center in a public university in Taiwan: preliminary course design and preparation in phase one, WID courses implementation in phase two, and participant reflections on teaching and learning experience in phase three.

Two discipline-specific WID classes, one for engineering students and the other for medical students, were chosen to examine the impact of a classroom-based writing tutor's expertise on teaching and learning in the WID classroom. The primary qualitative data sources featured in-depth, semi-structured interviews with the three parties: WID teachers, students, and ACs. Semi-structured interviews allowed the use of guiding questions, while also providing the flexibility to change the sequence of questions and the interview questions. This format resulted in more in-depth, two-way communication between the interviewer and the interviewee rather than a straightforward question-and-answer format. Hence, the semi-structured interview is an instrument well suited to explore the effect of the newly-proposed collaborative instructional mode, the collaboration between a WID teacher and a discipline-specific AC, on the achievement of discipline-specific and knowledge-reinforcing intent.

Participants

Four groups of participants were formed: 20 postgraduates from the engineering fields (WID A Class), ten postgraduates from the medical fields (WID B Class), two experienced WID teachers, two discipline-specific ACs, and one research assistant. Both WID teachers were non-native English speakers with 9 and 6 years of WID teaching experience. The research assistant assisted in collecting and transcribing the interview data. As for the two ACs, four qualification criteria were required: specific disciplinary backgrounds (one in engineering and the other in the medical field), previous WID learning experience (either having received WID-related training or having had the experience of paper publication), English proficiency (measured by an IELTS score of 7.5 or above), and availability to attend bi-weekly meetings and four training sessions. Both ACs received pre-course training of one discussion-guiding workshop, two journal paper analysis workshops, and one task-teaching demo practice session.

The WID Courses

To increase the number of collected samples and better understand the relationship between disciplinary background and pedagogical choices, two homogeneous-group WID courses were chosen for this study, one for engineering students and the other for medical students,

aiming to train graduate students to write and present academic research papers in their respective fields. Here, WID courses refer to three-credit, elective courses in English Writing for Academic Purposes that are regularly offered to graduate students by the writing center at the university in different sessions: (1) a mixed group of students across disciplines, and (2) teaching a homogeneous group of discipline-specific students, both of which provide support for students' discipline-specific needs. To achieve the course objectives, the training equipped graduate students with the knowledge and techniques they needed to write and present an academic research paper, primarily through an introduction to academic English writing features and the framework of each part of a research paper. By discussing results from these two different disciplines, it is hoped that this study could offer valuable insights into the feasibility of the proposed collaborative teaching mode in the WID courses.

Course Design: Teaching Content, Instruction & Assessment. Six writing themes, namely academic English writing features, abstracts, introduction sections, methods sections, data commentary, and the conclusion section were included in the WID classes. Bi-weekly meetings between WID teachers and ACs were held to confirm teaching procedures, content, and materials. The weekly teaching content, adjunct collaborator-guided (hereafter AC-guided) learning tasks, and teaching schedule are shown in Table 1 AC-Guided Activity & Weekly Teaching Schedule, Appendix I.

In this proposed collaborative instructional mode, the WID teacher provided formal instructions, while the AC provided discipline-specific instructional assistance in group discussions and/or learning tasks to reinforce students' understanding of the discipline-specific knowledge. The weekly course content consisted of 2 hr of WID teacher-led lectures and/or class discussions, followed by 1 hr of AC-guided group discussions and/or learning tasks. The learning tasks were designed to develop students' writing skills and enhance their understanding of the structural features of research papers in their disciplines. The pedagogical instructions mainly adopted a genre-based approach to English academic writing, using Swales and Feak's (2013) book as a supplement, with an emphasis on the analysis of rhetorical structures and linguistic features in written texts across academic disciplines. This approach aims to familiarize learners with a set of systematic and commonly accepted rules shared by writers and readers within the discourse community. For example, one learning task involved finding different types of abstracts of journal papers (e.g., a summary-driven abstract, a result-driven abstract, and a structured abstract). The AC would then explain the key ideas and information of the selected discipline-specific journal abstracts and lead the compare-and-contrast group

discussion, followed by formal instruction in abstract writing by the WID teacher.

In total, 16 AC-guided tasks/discussions were designed to meet two intended goals: to prepare students with preliminary discipline-specific content knowledge needed for their upcoming lectures through pre-lecture discussion tasks (e.g., Week 2 AC-guided identifying styles in Appendix I), and to apply their learned skills and concepts in post-lecture drill tasks (e.g., Week 3 AC-guided journal paper analysis task in Appendix I). During the course of class implementations, students were evaluated based on the subjective assessments of collaborative and individual writing assignments, and the objective assessments of in-class learning tasks and three writing evaluation tasks (see Table 2 Summary of Assessment Methods, Appendix II).

Data Collection

A total of 11 semi-structured interviews were conducted: seven student group interviews, two individual adjunct collaborator interviews, and two individual teacher interviews. The length of each interview ranged from 60 to 90 min, and all the interviews took place in the same classroom at the post-course stage to avoid both ACs' and students' concerns about how their responses would affect their teaching or learning evaluations. Group work was a key component of student learning during the course implementations (four to five students in a group). Hence, group interviews were conducted to help alleviate potential interview anxiety, predicting that the sense of familiarity among the group members might also enhance their recall of learning experiences. The interviews were audio-recorded with all the participants' consent.

To minimize the risk of potential loss of meaning and/or misinterpretation associated with interview data, the participants received interview questions prior to the data collection, and the transcriptions were confirmed by the interviewees after the interviews. All participants involved in the study remained anonymous, and would only be referred to by their codes. The pre-determined set of interview questions is presented in Table 3 (Appendix III).

Data Analysis

Grounded theory in the thematic analysis was used for qualitative data analysis to generate research question-based categories, grounded in the data (Strauss & Corbin, 1990; Walsh, 2014). All interview data were transcribed, translated from Chinese to English, and coded thematically and inductively following the thematic analysis approach, which allows researchers to

understand “a set of experiences, thoughts, or behaviors across a data set” (Kiger & Varpio, 2020, p. 2). Data analysis was a continuous, trial-and-error process. The key points were identified from the collected data and labeled with different codes, such as enhancement of motivation, enhancement of subject learning, improvement of peer discussion and communication, and better pedagogical skills. These codes made it easier to ascertain how participants felt about the questions under investigation. From the data collected, the major points were first identified and marked with different codes, such as low anxiety level in English writing, inaccurate grammar use, easier communication, high confidence, and mixed learning performance. These codes facilitated the understanding of participants' perceptions regarding the research questions.

The coding consistency check was carried out to ensure the credibility of the study. The transcriptions were read and reread, categorized based on the emerging themes, and analyzed line by line with each researcher's remarks. The initial codes related to participants' perceptions of their learning/teaching experiences as well as the proposed collaborative instructional mode. After the completion of each researcher's respective coding, the researchers gathered to deliberate on possible codes. Differing codes and categories were explained and justified to be revised for better categorization until there were no more emerging categories. The categorized data were compared with prominent similarities, differences, and recurring themes highlighted.

Trustworthiness

Due to the nature of qualitative research, the terms “validity” and “reliability” are often debated within academia. To better suit its nature in essence, some researchers have suggested terms such as trustworthiness or quality of the data to assess the rigor and credibility of qualitative research (Creswell, 2007). Kirk and Miller (1986) argue that validity in qualitative research can be achieved in a thorough and transparent manner. To ensure the trustworthiness of this study, the following procedural, instructional, and instrumental measures were included, respectively: the interview questions were sent to the interviewees prior to the data collection, and the transcriptions were confirmed by all participants; a coding consistency check of the data analyses was performed; the participating WID teachers and the ACs held regular meetings on course design, planning and implementation; all the interview questions were pilot-tested to ensure their appropriateness for the research goals.

Results

Students' Perception of Adjunct Collaborative Writing Tutors in the WID Classes

Overall, the student participants from both WID classes responded positively to the implementation of the adjunct-collaborative instructional mode and its impacts on their learning and academic performance. The student subjects expressed that having an AC with relevant discipline-specific knowledge had facilitated their comprehension of the course content and writing assignments, thereby increasing their overall learning. Three key themes emerged regarding students' perceived benefits of collaborative teaching with the AC: enhancement of motivation and subject learning, enhancement of peer discussion, and enhancement of communication (Appendix IV, Table 4). Despite the positive perceptions and perceived benefits of the adjunct collaborator's role as a collaborative instructional mode, some challenges and concerns raised by student responses were also identified.

Enhancement of Motivation and Subject Learning. The majority of students perceived AC-guided instructions to be beneficial in enhancing motivation and subject learning among students. In response to the questions on the benefits of the AC-guided instructions and how they reinforced their learning, 17 of the 30 interviewees (57%) reported that the guided instructions and the in-class discussions with the AC had increased their comprehension of specialized terms and logic in English academic writing. In addition, 24 interviewees (80%) confirmed improvement in their ability to analyze rhetorical conventions and academic writing genres, as well as a better understanding of how to organize their thesis projects. One illustration is provided below:

"After observing the adjunct collaborator's demonstration of the moves & steps analysis of the abstract and introduction sections, I understood better what to expect and gained more confidence in analysing the tasks or organizing my paper on my own. I could also review what has been learned to verify and deepen my understanding of the writing tasks." (S6 from WID A)

Furthermore, the AC's tutoring sessions provided students with opportunities to practice and address questions and confusion through the preview and review tasks, which strengthened their comprehension of the course content. The most beneficial aspect of these AC-guided sessions was the observable increase in motivation among students ($n = 19$; 63%), well-demonstrated in the active interactions between the teacher, the AC, and the students, as well as interaction among team members. For example, one student stated:

"Some of the teachers usually give a short recap of the lesson at the end of class and this helps me greatly refresh my memory. But, in this writing class, our adjunct collaborator often provides some review activities. This not only achieves the reviewing goal but also enables me to connect all dots together [to bridge all the sub-ideas and form a holistic understanding of the lesson]." (S14 from WID A)

Similarly, the engagement of teammates in the AC-guided tasks was found to be relevant to their subject learning, which further motivated students:

"My teammates are all very engaged in the discussion tasks because we know what we are getting out from the task will be very relevant to what we will be learning next." (S6 from WID B)

Overall, the findings suggest that the AC-guided instructions and in-class discussions were highly effective in enhancing both motivation and subject learning among students in WID classes.

Enhancement of Peer Discussion and Multiple Perspectives. The implementation of AC-guided instruction was also found to be effective in enhancing peer discussion and multiple perspectives in WID classes. Students reported that the AC's guidance helped increase the participation and productivity of small group discussions ($n = 7$; 23%). Specifically, students gained a better understanding of how to conduct the analysis tasks (e.g., analyzing academic writing features or moves & steps features in the Introduction section of a journal paper) and further raised more in-depth questions regarding disciplinary differences within their own group discussions. The AC's role as a mentor as well as a facilitator was also found to be important in stimulating group interaction and raising multiple perspectives during peer discussion. For example, S11 from WID A class described how their group focused on the variations in writing styles and logical reasoning even within the Engineering-related discipline after the AC provided a sample analysis of the Introduction section. The analysis tasks facilitated by the AC allowed students to gain insights into disciplinary writing styles and academic writing features for specific disciplines. As reported by another student from WID A:

"Through paper analysis tasks by students from different disciplines, I was able to understand disciplinary writing styles and distinguish the academic writing features for specific disciplines." (S8 from WID A)

Some students expressed how having a discussion with the AC and their peers helped them fill in the gaps that were being previously neglected in the paper analysis task. This approach allowed students to generate multiple perspectives and learn from each other:

"Everyone has a different writing focus and narrative style. But, we can remind ourselves of the overlooked points and different usages through different perspectives." (S7 from WID B)

Most students felt actively involved in peer group discussion and valued the opportunity to generate multiple perspectives and learning from each other ($n = 10$; 33%). This was exemplified in the following student's response:

"I later revised my writing based on a sample paper analysis demonstrated by our teacher and adjunct collaborator. I shared this revision process with my teammates during the peer discussion and we all shared how we each applied what we learned into our own writing. We found it very interesting." (S13 from WID A)

The feedback provided by students indicates that peer group discussion and collaboration under the guidance of ACs can be an effective approach to enhancing the WID learning experience and fostering a greater appreciation for multiple perspectives.

Enhancement of Dialectical and Dialogical Communication Between the Students, the Adjunct Collaborators and the Teachers. Another perceived impact of the ACs that merits attention is the enhancement of communication between students and the WID teachers. The students valued the similarities in reasoning logic, prior knowledge, and student identity between themselves and the ACs. During the interviews, students repeatedly mentioned the value of having the ACs communicate their concerns to the teachers (frequency: 21 times), particularly with respect to their anxiety or confusion regarding assignments and course requirements. They were all impressed with the amount of time and the extent of involvement that the adjunct collaborators had contributed ($n = 25$; 83%), which they believed had enhanced both the quality of communication with the instructors and their comprehension of subject learning. This may also have contributed to their perception of the ACs as being different from the "conventional teaching assistant encountered in other courses" (S17 from WID A). Conventional teaching assistants in most university classes in Taiwan often have administrative responsibilities, such as taking attendance, collecting and filing assignments, and managing grades, and do not attend classes on a regular basis. This was the student's first experience having an adjunct collaborative tutor who was present throughout the course to provide individual attention and support. As S8 from WID B put it below:

"To me, bridging the communication with the teacher and providing emotional support was her most valuable contribution. Sometimes, I had to go through the adjunct collaborator to express my concerns or ask further questions. We thought the

teacher might be very busy, so the adjunct collaborator played a crucial role as a mediator or a messenger for us."

Seventeen student interviewees mentioned that having their questions answered and messages communicated through a non-threatening intermediary seemed to be a crucial determinant facilitating the quality of communication for many participants. In addition, when they were asked about the advantages of having an AC with a background similar to their own, students believed that the AC's shared disciplinary knowledge and past learning experience played a significant role in improving communication. S3 from WID B described the AC as a "peer teacher" who could offer valuable guidance and quickly identify issues:

"She was like a peer teacher, unlike the other TAs in my past courses. Not only does she have similar disciplinary background to us, but more importantly, she has taken the course before. She has more subject knowledge and better English proficiency, so she was able to provide guidance and identify my problems more quickly."

This feedback indicates that ACs who have taken the WID course before may have an advantage in providing effective guidance and support to students. S6 from WID A similarly expressed how the AC's understanding of special terms and ways of thinking within their field helped bridge the communication gap between students and teachers.

"She can quickly understand special terms and ways of thinking in my field. She's like a peer teacher. She helped bridge the communication gap between the teacher and us."

Overall, the benefits students perceived of having an AC with a related discipline-specific background have accentuated the importance of the dialectical and dialogical communication between the students, the AC, and the teacher. However, the AC's ability to serve as a "bridge" may indicate a need to address communication barriers or gaps between the teacher and the students. Effective communication between teachers and students is crucial for success in WID classes, and ACs can effectively translate and communicate information between the teacher and the students, resulting in more productive and meaningful interactions.

Perceived Challenge: Variation Within the Same Discipline. Regarding the challenges or difficulties faced in this type of collaborative instruction, most students shared a similar concern about variation within the same discipline despite students' positive attitude toward AC's guidance. Although both writing classes were offered to homogenous groups of students in respective engineering

studies and medical fields, a wide range of disciplinary expertise still exists in the same discipline. A couple of students noted that while the benefits of having an AC were undeniable, the ability to clarify students' questions or clear their doubts about the writing assignments and linguistic and rhetorical knowledge was not as precise and perceptive as the WID teacher's.

"Sometimes it is a challenging task because the Methods, Results and Discussion sections can differ widely in terms of their writing style and structures even though we are all in the Engineering-based disciplines. But, I think discipline-specific writing tasks increased our understanding of different writing styles and this learning opportunity can be a preliminary step for future interdisciplinary collaboration." (S4 from WID A)

While some students recognized the value of having an AC with a similar disciplinary background, it may not always be sufficient to address the unique challenges of variations within the same discipline. Therefore, it is essential to consider how to address the variation in disciplinary expertise within a field and how to provide targeted support to students who need it.

Student's Need for Writing Knowledge. Both the students and the ACs prioritized their need for writing knowledge over their specific subject knowledge in this course. As suggested in one of the ACs' feedback to this teaching model, "this is even more advantageous than consulting with my own discipline-specific professor, because I need more help with writing skills and organizing my paper more logically." In another example, S11 from WID A class described this collaborative teaching mode as an "enriched learning landscape," which was a consistent viewpoint shared by S9 from WID B. As he described:

"The adjunct collaborator and I came from a similar disciplinary background but differed in the concentrated area of study. So, we both tend to focus more on the detailed descriptions but were often inattentive to the use of conjunctions in our writing. I can easily get the idea of adjunct collaborator's explanation. On the other hand, the teacher can show me different ways of expression in various disciplines. On the whole, their teaching mode has given me a panorama of learning experience." (S9 from WID B)

The students viewed this collaborative teaching model of combining subject-specific knowledge with writing knowledge as an enriched learning experience that provided them with a broader understanding of writing knowledge across disciplines.

AC's Perceptions of Collaborative Instructional Mode in the WID Classes

The student-perceived impact was also confirmed in the ACs' perceptions of their roles and impacts they had on student learning. Both ACs perceived this collaboration as a rewarding experience of professional development, while enjoying the interaction with the students. The analysis of the AC interview data revealed three themes regarding the most valued gains from the experience: enhanced confidence, furthered discipline-specific professional knowledge and skills, and improved pedagogical skills. For example, the AC from WID A expressed that her confidence was boosted, which might have promoted her to reflect on her own previous learning experience and subsequently influenced her own writing behaviors, as shown in the following excerpt:

"When preparing guided lessons for the class, I was able to present my ideas more systematically and logically to the peer students. This teaching experience is undoubtedly helpful when I get started with my thesis writing and organizing my thoughts." (AC from WID A)

The other evident improvements were the ACs' knowledge and skills in both teaching and discipline-specific professionalism. Both ACs indicated their progress as postgraduates and novice co-teachers:

"I'm not sure how students felt, but after a semester of co-teaching, when I skim through paper titles and keywords now, very likely I could quickly grasp the general idea and form my opinions on how an introduction may be organized or how to effectively read an article of choice." (AC from WID B)
"A couple of them were not very motivated initially, so I tried to encourage them, to motivate them by sharing my past learning experience." (Adjunct Collaborator from WID A)

While the AC from WID B focused on her improvement in analyzing writing features after the co-teaching, the AC from WID A reflected on her improvement in the pedagogical skills of motivating and engaging students. These transformations were fostered through a repeated cycle of a "teaching-reflecting-learning" process. This competency-acquiring dynamic was described as a "reciprocal process" by the AC from the WID A class:

"I feel I've learned a lot from the students. It's a reciprocal learning process. Through discussions with them, I understand better how to effectively apply the academic writing skills I learned in class. Furthermore, I learned how to effectively express myself and communicate ideas to facilitate their understanding of the content." (AC from WID A)

The ACs drew upon their own experiences and tried to associate their means of problem-resolving with students' learning difficulties in an attempt to replicate their experiences.

Regarding their responses to questions on the teaching/learning effectiveness of having an AC offer discipline-specific knowledge-reinforcement in a WID class, both ACs confirmed positive attitudes toward the implementation of such a collaborative teaching mode. The signs of success were argued to be observable in their roles as communication mediators and discipline-specific knowledge facilitators. Both ACs attributed the advantageous teaching outcomes to their shared backgrounds with their students and their "close to equivalent" statuses:

"Because of my learning background, when I read students' papers, I can quickly understand those specialized terms, such as cancer-related drugs or some specific mechanisms, and this preliminary knowledge helps me explain the experiment procedures and results in a more precise and detailed manner." (Adjunct Collaborator from WID B)

It did occur a few times that I felt it's easier for me to communicate with the students compared to our teacher. I didn't know whether it's an engineer's innate thing or my equal role as a "peer." (Adjunct Collaborator from WID A)

Both ACs perceived their collaborative teaching mode to be feasible and promising in assisting teacher as well as student learning in WID classes. Nevertheless, like all theories and approaches, this collaborative mode also comes with its limitations. The adjunct collaborators addressed the limitations and difficulties they encountered during their preparation and instruction, including (1) the great amount of time and effort required to find appropriate reading materials and interventions easily accessible and motivating to all students, (2) students' questions that went beyond the adjunct collaborator scope of knowledge, and (3) the development of more sophisticated presentation skills and pedagogical strategies to deal with more delicate matters taking place in the classroom. Most of these challenges were closely associated with the variations within the same academic discipline, which were consistent with the students' shared concern for the WID teaching discussed previously. The excerpts below illustrate the struggles the ACs encountered.

"It usually took me thirty minutes to one hour to prepare for the learning task and discussion but it could take almost a week for me to find a material which could be used in class... It's even more difficult to find similar reading materials but with different organizations. Meeting all students' needs is nearly impossible." (AC from WID B)

"Several students asked me for help when writing their short presentation scripts. I'm confident in providing my feedback

on their overall presentation but it's much trickier to deal with the aspects of creativity and cross-disciplinary communication. I struggled when two students asked me to comment on the appropriateness of their analogies in the presentations. All I could come up with was 'I know what you are doing here, but I don't really know why you are doing this.' The analogies adopted did not help their delivery of the messages, but I failed to give any constructive suggestions." (Adjunct Collaborator from WID A)

In response to these teaching challenges, two countermeasures were taken as time proceeded and problems emerged. In the ACs' interview data, two pedagogical modifications were made to relieve the ACs' workload and reinforce teaching efficiency. The burden of seeking appropriate reading materials was lessened with the student cooperation.

"One day, I think it's probably week nine or ten, when a student shared, 'I read this paper before and it's one of my cited literatures in my introduction chapter. If you had asked me, you would have saved your time and money.' And then an idea hit me, the students could also be the provider of our reading materials. So, we tried it out and it turned out to be a great substitute." (Adjunct Collaborator from WID A)

The other modification was to form round-table discussions to tackle the most difficult questions. In those discussions, the team members were encouraged to explore possibilities and exchange ideas. The focused goal was not to find the answers, but to re-define the questions and brainstorm possible interpretations of the studied questions, followed by the teacher's instruction. Hence, the round-table discussions were learning opportunities for both the students and the adjunct collaborators.

Teachers' Perceptions of Implementing Collaborative Instructional Mode in the WID Classes

The teacher interview data revealed positive comments in general. In general agreement with the student and AC interview responses, both teachers also recognized the effectiveness of the collaborative instructional mode in the aspects of material preparation, knowledge facilitation, communication, and anxiety alleviation. In addition to the benefits this pedagogical approach may bring about, a challenge was also introduced. The preliminary tutoring training and regular meetings were indispensable, but required more advance preparation. To address this challenge, a collaborative partnership between the department and a writing center was proposed. The following excerpt offers a glance at this possibility.

"The adjunct collaborator training consists of the training of teaching techniques, discussion-leading strategies, content knowledge practice, and teaching demos. These required

constant attention and experienced trainers... The first semester could be more time- and energy-consuming, but the combined adjunct collaborator-teacher workload could be greatly reduced afterwards if the same adjunct collaborators involved. Collaborative partnership between a department and a writing centre may increase the efficiency while decreasing the pressure.” (Teacher from WID A)

Therefore, providing adequate support and training for the role of AC is key to the success of this collaborative instructional approach to WID pedagogy. Furthermore, the teacher from WID A suggested that continuing partnerships between departments and writing centers may provide long-term benefits for both parties.

Discussion

The aim of this study was to investigate the effectiveness of classroom-based writing tutors with discipline-specific knowledge as adjunct collaborators in supporting WID teachers and students. The data highlight the importance of an adjunct collaborator's role as a mediator and a communicator, as well as a mentor with discipline-specific knowledge, in facilitating the student learning process and writing development. In addition, the findings suggest that the adjunct collaboration with WID instructors would be an effective alternative to the team-teaching strategy proposed in WID pedagogy research. Our results are consistent with the advantages found in having classroom-based writing tutors as collaborative instructors (Doman, 2014; Sanford, 2012; Shiely & McCarthy, 2019).

The WID teachers of this present study reported that the collaborative instructional mode reduced their anxiety of teaching discipline-specific content, alleviated the workload of finding appropriate discipline-specific reading materials on their own, and enhanced communication, especially during group discussion and giving learning task instructions. Both teacher participants considered this collaboration with in-class teaching assistants or writing tutors with discipline-specific backgrounds to be more practical and more “controllable” for the teachers in a WID classroom. The suggestion of involving a writing center was made by both WID teachers, as a writing center may offer support in providing relevant tutoring training and academic writing courses.

Two interesting phenomena were unveiled in the findings. There was no distinct difference in the perceptions of the proposed instructional mode or the effectiveness of the adjunct collaborators' incorporation found between the two classes despite their disparity in academic backgrounds. Also, most students prioritized the learning of writing knowledge and skills in the experimental WID classes. This finding calls for a closer

observation in the future, as what was initially assumed in this present study was that students would benefit more from having an adjunct collaborator with discipline-specific knowledge who could better understand their needs and more effectively increase their learning outcomes by integrating discipline-specific knowledge with linguistic writing knowledge in a WID class. However, here the findings suggest that students perceived writing not merely as the “tool” to meet the students' goal of producing their scientific findings or expressing opinions—a concept that is often taken for granted in English writing classes. Rather, writing was also perceived as the “learning content” and “area of exploration” by the student subjects, which may be the very motive for students taking this writing class in the first place. This argument echoes Carter's (2007) stance in that WID is also a way of knowing how to promote active ways of knowing. Another possible reason for this is that research on WID programs is primarily focused on WID practitioners and students in English-speaking countries; thereby, the importance of language learning is often considered (Li et al., 2019; Luo & Garner, 2017) but the need for and impact of WID pedagogy on L2 writers is rarely examined.

Conclusion and Implications

To the best of our knowledge, the present study was the first empirical research to investigate the impact of classroom-based writing tutors with discipline-specific backgrounds as collaborators on WID learning and teaching. The results revealed that all student participants rated the adjunct collaborators very highly, indicating that, after interacting with them, they understood the course content better. If the better comprehension level was not made explicitly visible, the improvements in the easiness of and response pace for comprehending the reading materials and teachers' instruction were evidently confirmed in the interview data. The participants also perceived the ACs' disciplinary knowledge to be an asset for tutors in WID courses, a viewpoint also shared by Kohn (2014) that writing tutors should best serve as language specialists with scientific genre knowledge.

The involvement of two discipline-specific ACs is crucial in this present study, as they serve as the “pedagogical bridge” to overcome WID teachers' insufficiency of discipline-specific content knowledge. Our exploratory findings have suggested some important references to the implementation and future directions of research. First, the need for more systematic training in writing knowledge and interactive feedback tactics for discipline-specific writing tutors should be provided. During the interview, both ACs showed a lack of confidence in their

linguistic awareness and in giving feedback on students' writing or ideas. Some students also made suggestions for improvement in writing tutor support.

Another important implication is the shifting roles of discipline-specific writing tutors from traditional one-to-one tutorial sessions to team teaching with WID teachers. This shifting focus could contribute to more effective WID pedagogy; however, finding an ideal discipline-specific adjunct collaborator, who is comfortable with his or her English proficiency and has a strong motivation to teach, is a daunting task. One possible way to resolve this could be to seek an adjunct collaborator through discipline-specific teachers or departments. With their support, it would be easier to identify individuals who plan to seek careers in academia—the very same individuals who would be more motivated to take on this teaching challenge. Fortunately, the ACs in this study

had taken the writing courses offered by the WID teachers a year before the start of this research.

One more foreseen challenge in course implementation was the stability of the adjunct collaborator force. That is, even if qualified ACs are to be identified and well-trained, there is a high probability of frequent turnover, as the duration of employment is usually determined by the duration of the study, which should be considered a potential obstacle when practicing this collaborative team teaching mode. The effects of turnover could be mitigated using the teacher resources available through a writing center. This study provides important insights into the practicality of the proposed collaborative instruction in higher education, and the findings may serve as an important reference for future adjunct-collaborative team cultivation and WID course implementation.

Appendices

Appendix I: AC-Guided Activity & Weekly Teaching Schedule.

Table 1. AC-Guided Activity & Weekly Teaching Schedule

Week	Theme/Content	AC-Guided Task/Discussion
1	Course Introduction	Need Analysis & Grouping
2	Theme 1—Academic English Writing Features	AC-guided Activity: Identifying styles and formality task
3	Theme 1—Academic English Writing Features	AC-guided Activity: Journal paper analysis; Example sharing task
4	Theme 1—Writing Feature: Funnel Writing <i>Writing Evaluation Task 1</i>	AC-guided Activity: General to Specific & AC-guided Activity: Specific to General writing jigsaw exercise
5	Problem-Solving Task	AC-guided Activity: Collaborative writing practice I
6	Problem-Solving Task	AC-guided Activity: Assignment 1 Rubric explanation & peer review task
7	Theme 2—Introduction Sections	AC-guided Activity: Writing for non-specialist audience exercise
8	Theme 2—Introduction Sections	AC-guided Activity: Assignment 1 revision; sample sharing task
9	Presentation Skills <i>Writing Evaluation Task 2</i>	AC-guided Activity: Journal paper move and step analysis exercise
10	Individual Consultations Online Presentations	AC-guided Activity: Online presentation peer evaluation
11	Theme 4—Data Commentary	AC-guided Activity: Data Commentary Analysis
12	Theme 4—Data Commentary	AC-guided Activity: Assignment 2 peer review task
13	Theme 5—Conclusion Sections	AC-guided Activity: Joint discussion section model paper analysis
14	Theme 6—Abstracts <i>Writing Evaluation Task 23</i>	AC-guided Activity: Assignment 2 revision; Sample sharing task
15	Poster Presentation Individual Abstract Writing	AC-guided Activity: Abstract types practice
16	Allowing Your Visual Aids to Do the Talking	AC-guided Activity: Posters sharing Assignment 3 peer review task
17	Research Ethics and Avoiding Plagiarism	AC-guided Activity: Styling & Referencing Practice
18	In-Class Presentations	

Appendix II: Summary of Assessment Methods.**Table 2.** Summary of Assessment Methods.

Types of Assessment & Weightings	CC	Description
In-Class Learning Tasks 25%	1, 2, 3	- Students share ideas via individual responding to reading, peer reviews or group discussions. - Students edit and proofread their own and their peers' writing. - Students develop an academic paper via pre-writing, writing, and re-writing.
(1) Collaborative Writing & (2) Individual Writing 30%	1, 2, 3	- Students demonstrate their familiarity with the academic English writing features observed in publications. - Students practice writing skills regarding idea/argument development. - Students demonstrate communicative and team skills by working collaboratively to solve an assigned problem.
(3) Individual Writing Evaluation Tasks 30%	1, 2, 3	- Students demonstrate their familiarity with the academic English writing features observed in publications. (Writing Evaluation Task 1) - Students analyze the moves and steps in a journal paper. (Writing Evaluation Task 2) - Students produce writing that responds to requirements set out in the task. (Writing Evaluation Task 3)
Presentations 15%	2, 3	Students demonstrate their ability to design effective slides to give a discipline-specific presentation and enhance interdisciplinary communication.

Appendix III: Interview Questions and Their Corresponding Research Questions.**Table 3.** Interview Questions and Their Corresponding Research Questions.

Research Questions	Interview Questions
<i>For student interviewees</i> RQ1: How effective is an adjunct collaborator with a discipline-specific background in helping students learn in the WID courses?	1. Please share your opinions regarding the level of difficulty or your level of comprehension of the pre-writing reading materials provided in class. 2. Do you think the AC-guided instructions help you learn better in the WID class? 3. If so, in what ways do the AC-guided tasks reinforce your learning? 4. If not, what strategies do you use to comprehend the content?
<i>For the ACs</i> RQ2: How effective is an adjunct collaborator with a discipline-specific background in helping a WID teacher enhance the teaching?	1. Do you think the AC-guided instructions reinforce your WID teaching? 2. If so, in what ways does the adjunct collaborator reinforce your learning? 3. If not, what strategies or alternatives do you adopt to overcome the challenges in the WID classes?
<i>For the teacher interviewees</i> RQ3: How effective is the application of the proposed collaborative instructional mode in a WID class?	1. What are the advantages of having an adjunct collaborator offering discipline-specific knowledge-reinforcing instruction in the WID class? 2. What are the weaknesses of having an adjunct collaborator offering discipline-specific knowledge -reinforcing instruction in the WID class? 3. What difficulties have you encountered in this collaborative teaching mode of instruction? 4. How do you tackle those encountered difficulties and challenges?

Appendix IV: Most Frequent Interview Responses ($n = 30$).**Table 4.** Most Frequent Interview Responses ($n = 30$).

Positive feedback	<i>n</i>	Concern	<i>n</i>
Enhances subject learning	25	Enriches perspectives	11
Enhances learning performance	24	Increases negotiation for meaning	10
Enhances comprehension via tasks	21	Variations within the same discipline	7
Enhances motivation	21	Need for writing knowledge	5
Enhances confidence in formal lectures	21	Limited English proficiency	4
Enhances T/AC-S communication	19	Need clarifications or further assistance from the teacher on some occasions	9
Encourages peer interactions	15		
Enhances student communication	12		

List of Abbreviations

AC – adjunct collaborator
 CoP – community of practice
 DSK – discipline-specific knowledge
 English for Specific Purposes (ESP)
 ERPP – English for research publication purpose
 ESP English for specific purposes
 L2 – second language
 WID – writing in the disciplines

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Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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