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REPORT

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Programme-level English enhancement strategy in civil engineering undergraduate education: an application of innovative strategy

Barbara Wing Yee Siu [a], Chu Nok Yi[a] and Muhammad Afzaal [b]

[a]Department of Civil Engineering, The Hong Kong Polytechnic University, Hunghom, Hong Kong; [b]Institute of Corpus Studies and Applications, Shanghai International Studies University, Shanghai, People's Republic of China

ABSTRACT

This paper documents the use of 'assessment intervention' to better align language teaching and the teaching of disciplinary knowledge through English Across the Curriculum (EAC) strategies within science and engineering classrooms to create a language-in-use environment. The majority of Hong Kong Science and engineering university students, who are ESL learners, receive English training that does not take into account disciplinary context. The study aims to (i) improve assignment task instructions in alignment with disciplinary communication conventions, (ii) assign appropriate weights in the corresponding assessment items to reflect the importance of effective communication, and (iii) evaluate students' effective communication using specific rubrics prepared by the language specialists. Genre guides and self-learning online resources were also prepared by language specialists to facilitate students' self-learning. The results suggest that the implementation of the EAC strategies yielded an overall positive effect on the participants' English skills. Data analysis indicated an increase in the written and verbal disciplinary communication abilities and genre awareness of the participating students. The substantially positive results of this study support further exploration of the contribution of EAC strategies towards improving student writing within the science and engineering disciplines.

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EAC; assessment intervention; genre awareness; technical communication; innovation strategy

Introduction

English Across the Curriculum (EAC) initiative has started to gain popularity in recent decades. It originated from Writing Across the Curriculum (WAC). The adoption of EAC in Asia, such as in Hong Kong, is a more recent practice (Lughmani et al. 2016; Wu 2013). There has been little focused EAC research in a specific discipline in the context of Hong Kong. To this end, this paper focuses on an EAC implementation in a specific discipline, namely, civil engineering, elucidating how EAC approaches can be put into practice across rhetorical situations in a technical discipline and shedding light on the possibilities of EAC strategies in the hope to facilitate teachers in drafting subject intervention plans. The pilot implementation of EAC initiatives in civil engineering discipline was carried out at a large university in Hong Kong (academic year 2020/21). By means of assessment intervention, EAC strategies were incorporated into the civil engineering curriculum. Learning of discipline English communication in professional settings and convention were embedded in existing subjects (Wingate, Andon, and Cogo 2011). To cover different professional settings and rhetorical

CONTACT Muhammad Afzaal muhammad.afzaal1185@gmail.com Department of Civil Engineering, The Hong Kong Polytechnic University, Hunghom ZS916, Kowloon, Hong Kong

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situations in the field of civil engineering, the subject intervention was targeted at undergraduate courses and the final year project. To date, attention paid to the embedment of language into discipline curriculum has largely focused on the writing aspect in academic discourse, (Braine and McNaught 2007). It is worth noting that in our study, attempts were made to cover both writing and verbal EAC strategies. Details of the implementation of EAC strategies will be discussed in the following sections.

English Across the Curriculum (EAC) & Writing Across the Curriculum (WAC)

While some scholars agree that language is a transferable skill which can be applied across rhetorical situations (Carroll 2002; James 2009; Lea and Street 1998; Walvoord and McCarthy 1990), some question the transferability among individuals and the extent across unfamiliar situations (Currie 1999; Leki 1995; Russell 1995; Snow 1993; Spack 1997). In fact, many students encounter difficulties in transferring their language skills from the general context to the discipline context (Russell 2007). Meanwhile, discipline teachers may not have the linguistic metaknowledge to unpack their implicit knowledge about how language works and the related pedagogical expertise (Jaidev and Chan 2018). To overcome the grey interface in discipline-specific communication (Biggs et al. 1999), language learning movements were introduced, from English for Academic Purposes (EAP) to English for Special Purposes (ESP), and more recently 'Writing Across the Curriculum' (WAC), from which a related initiative 'English Across the Curriculum' (EAC) later emerged. This trend may suggest that language enhancement is more effective in discipline contexts (Evans and Green 2007; Murray and Hicks 2014).

Historically, WAC emerged in the early 1970s in the United States and became prevalent as a new pedagogical paradigm among tertiary institutions in the United States and the United Kingdom (Jones and Comprone 1993; McConlogue, Mitchell, and Peake 2012; Wingate 2016; Zawacki and Cox 2014; Zawacki and Rogers 2012). It is a pedagogical practice to embed writing instructions into the discipline's curriculum (Wingate 2012), where discipline specialists collaborate with language teachers and introduce students to the discourse communities of their discipline (Carter, Ferzli, and Wiebe 2007), who '*play a very important role in socializing novices and implicitly teaching them to think, feel, and act in accordance with the values, ideologies and traditions of the group*' (Duff 2007, 311). The capability to communicate competently requires knowledge of the community's epistemology, the genre of the community's interactions, and the convention of these interactions (Wingate 2016). There is evidence that writing and effective communication promote higher-order thinking and thus students' learning of subject content (Braine and McNaught 2007; Fulwiler and Young 1990). EAC was modelled upon WAC in the United States and 'disciplinary literacy' in the United Kingdom (Lea and Street 1998; Wingate 2012; 2016; Wingate and Tribble 2012). Similar to WAC, the focus of the EAC model is rhetorical where English enhancement is contextualized through the integration of language learning into a discipline's curriculum. EAC can be seen as an extension of WAC, but the deployment of pedagogical tools is not confined to writing instructions. It is observed that so far most previous studies related to the integration of language and discipline content focus on writing instructions but not verbal skills (Braine and McNaught 2007).

Adoption of EAC strategies in Hong Kong in a technical discipline

EAC has become prevalent in Asia in the recent two decades (Lughmani et al. 2016; Wu 2013), especially in Hong Kong (Lai et al. 2020). Lughmani et al. (2016) describe a number of EAC initiatives in Hong Kong. In fact, the dominant practice in Hong Kong follows many tertiary institutions around the world: students often receive English training through university English language units or English centres. They need to take credit-bearing courses covering English for Academic Purposes (EAP) and English for Specific Purposes (ESP). EAP is quite distant in relation to the students' major (Braine and McNaught 2007). While ESP courses are supposed to be linked to discipline study, they are often viewed as peripheral to the curriculum (ibid). This provision fails to address students' real learning needs (Wingate 2016) as these courses cannot sufficiently prepare students for discipline-specific

language use and communication (ibid; Lai et al. 2020). This gives rise to a lack of transferability of their English skills to their discipline. Meanwhile, English competency as an academic literacy is particularly crucial in L2 environments at the university level, for instance, in Hong Kong (Wingate 2016). The introduction of the EAC initiative may serve a complimentary role to existing second language courses, such as EAP and ESP courses (Lai et al. 2020). In the backdrop of Hong Kong in an L2 setting, pilot institutional EAC schemes were conducted at the university level, involving various disciplines, such as the studies by Braine (2001), Braine and McNaught (2007), Cheng et al. (2015) and Lai et al. (2020), etc. A focused study in a specific discipline in Hong Kong's context is rare.

Our study looked into the adoption of EAC strategies in the discipline of civil engineering. In Hong Kong, engineering students are generally perceived to be weaker in English compared with those reading language or arts (Allison 1992). In addition, they have to overcome the gap of transferring their English skills to their discipline communication, where they tend to lack familiarity with the convention (Evans and Morrison 2010; Hafner and Miller 2018; You and You 2013). The problem is further compounded as engineering students are those who need the most help with the least motivation (Lai et al. 2020) in as much as many of them presume that all matters is accuracy in calculations in their subject learning, without realising the fact that they have to communicate and interpret the meaning of their answers effectively and demonstrate their ability to analyse and evaluate verbally. Discipline teachers are also inclined to place little or no weight on English in teaching and assessment (Braine 2001), painting a misleading picture to students that English plays a small part only in their success in their study and career (Evans and Green 2007; Evans and Morrison 2011; 2012). However, from prospective engineers to professional engineers, it is crucial for them to be aware of the ways how meanings are socio-culturally constructed by the community, in addition to solve engineering problems (Mankowski 1998). As a matter of fact, Hong Kong engineering students are facing demands from stakeholders and the industry to possess the capability to handle specific kinds of communication tasks in their field and in the workplace. For instance, in the accreditation of engineering programmes, Hong Kong Institution of Engineers (HKIE) requires their engineers to have 'an ability to communicate effectively' (HKIE Professional Accreditation Handbook (Engineering Degree) 2013), which is aligned with the requirements of many other engineering bodies and employers around the world. To this premise, the need for EAC is pressing. More importantly, EAC proved to promote higher-order thinking and enhance students' learning of subject content (Braine and McNaught 2007; Fulwiler and Young 1990). In other words, English competency and discipline subject learning are reciprocal.

Concepts in our EAC setting

This section begins by elaborating on the relevance of an English for Specific Purposes (ESP) approach to writing instruction within the science and engineering disciplines. Then it will move towards discussing the EAC model adopted in the study which is based on the concepts of Community of Practice (CoP) and blended learning.

The emergence of this branch of English language teaching transpired due to 'the primacy [ESP] gave to language-using purposes, the need to align curricular content with learner goals, and the use of appropriate teaching methods' (Hyland and Jiang 2021, 13). According to Bawarshi and Reiff (2010, 41), 'English for Specific Purposes focuses on studying and teaching specialized varieties of English, most often to non-native speakers of English, in advanced academic and professional settings'.

Within ESP, a key area of interest is awareness of genre which relates to comprehending the conventions and communicative purposes of various text types in target discourse communities. Hyon (2017) explains that genre analysis constitutes a pivotal approach within the field of ESP given that it is viewed as facilitating learners in understanding patterns of language use within target contexts and discourse communities. As proposed by Swales and Swales (1990), genre awareness entails an understanding of rhetorical structures as well as linguistic features, and communicative functions of specific text types within a given discourse community, for

example, the engineering field. Genre awareness facilitates effective communication within the engineering discipline by enabling students to produce documents that adhere to the conventions of their field. By teaching students to recognize and produce engineering genres, instructors can help them convey complex technical information clearly and professionally. Drawing upon theorists Miller and Bizzel(1984) who noted that genres comprised 'typified rhetorical actions' (163) developing in accordance with the needs of writers and readers and Bazerman (2014) who highlighted the central role of genre awareness in establishing authorial authority, identity, and agency, assert that genre awareness or knowledge is 'important in developing writing expertise and, ultimately, participating within the activity systems that make up our day-to-day lives'.

Against this backdrop, the present study was designed to address observed gaps in current research-based writing instruction by prioritizing genre awareness. This was envisioned to bridge the disconnect between instruction and the disciplinary context and to ultimately improve the engineering students' capacity to communicate effectively in their fields.

The EAC model adopted in this study is underpinned by the key concepts of Community of Practice (CoP) and blended learning.

CoP refers to '*groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly*' (Wenger-Trayner and Wenger-Trayner 2015, 1). The three crucial elements to categorise CoP are the domain, community, and practice. The university in the research setting has started CoP since 2013. In our EAC model, CoP was realised in the collaboration between engineering lecturers and language specialists. *The domain* would be the shared target in sharpening students' English competency in the engineering discipline; *the community* would be the constant engagement of engineering specialists and language specialists in joint activities and exchange of views in embedding English into the engineering curriculum; *the practice* would be the shared practice by both engineering lecturers and language specialists in developing or using a shared repertoire of resources.

In terms of how students enhance English communication and discipline English through our EAC strategies, we drew on the concept of blended learning, for the implementation involves face-to-face learning with computer-mediated instruction to accomplish a pedagogical goal. Through assessment intervention, students study the EAC resources online on their own to improve their English in existing technical assignments, but not assignments in language subjects. The asynchronous self-study reduces face-to-face learning of discipline English in class. As per the level of blended learning, self-study of online materials can be deemed as activity-based mode of blended learning, according to the categorisation of blended learning examples by Graham (2006).

Pilot implementation of EAC strategies in civil engineering undergraduate programmes

Overview of our EAC framework

The pilot implementation of EAC initiatives in civil engineering undergraduate studies was in place in the Department of Civil and Environmental Engineering of a large Polytechnic University in Hong Kong for one year (2020–2021). EAC strategies were incorporated into the civil engineering curriculum and embedded in existing subjects, rather than an addition to the curriculum (Wingate, Andon, and Cogo 2011).

Mode of EAC cooperation

Different from many previous studies where EAC participation is mostly through invitation on a voluntary basis, our EAC initiative was made a departmental requirement. To reduce the commitment of discipline subject teachers, expert personnel are needed to develop language embedment

strategies (Cheng et al. 2015). Our English Technical Communication Team was thus set up, comprising a civil-engineering discipline specialist, who is also the chairman of teaching and learning committee of the civil engineering department, and two English teachers. From the literature, many EAC studies either describe their mode of cooperation as voluntary invitation, or just partnership without giving details as to how the collaboration was like. Also, for most initiatives, English language specialists are the ones who steer the project, while subject teachers cooperate and give advice rather than contribute to the design of the tasks. Therefore, it is believed that our team composition is different from the dominant way of cooperation.

Compared to the dominant mode of collaboration, this team composition has four advantages:

(1) Our team had a discipline expert (but not a subject lecturer) who worked with the language specialists to identify suitable tasks. The high familiarity with engineering curriculum and disciplinary knowledge facilitates the selection of subjects with content and genres most suitable for the incorporation of EAC strategies. Thus, our EAC tasks for students were more likely to address the needs of learning both the subject content and discipline English, reducing the possibility of providing periphery language materials by mere language teachers, the content of which may not be well-aligned with the communication outcomes of the disciplinary thinking, the disciplinary epistemology, the genre and the convention of the disciplinary communication. Owing to the unfamiliarity of the engineering subject content, rendering suitable English support to students in the engineering discipline is a challenge for language teachers (Lughmani et al. 2016), for language teachers are usually unlikely to have come across the disciplinary texts and therefore having a limited understanding of the discipline, not to mention the disciplinary thinking, convention of the disciplinary communication, etc. The challenge can be even more formidable when it comes to subjects with complicated content and highly technical genres. This unfamiliarity may deter many attempts to appropriate language support for engineering students (Lughmani et al. 2016). Our approach of having a discipline specialist as the core part of the EAC team can have this challenge sorted out. In our assessment intervention, with the civil engineering specialist's advice and follow-up effort, we could better identify and make good use of the subject tasks for EAC learning, even for highly technical genres unique in civil engineering, such as the construction design report.
(2) By having an insider, such as a discipline expert (but not a subject lecturer), it is easier to approach and coordinate subject teachers to work with, especially on a mandatory instead of an invitation basis.
(3) The EAC cooperation would be smoother as the discipline expert has a better understanding of the realities in discipline teaching, including the needs and constraints of students and teachers. That means, the learning materials developed are relevant in the sense that they can serve the purpose of subject teaching *and* English communication enhancement with consideration of realistic conditions/ constraints, which is vital for the sustainability of an EAC initiative and interventions, instead of a one-off project.
(4) Subject lecturers do not need to make intense effort because the discipline expert on the team could contribute to the best part of the project, including the design of the tasks. This helps to secure the support of subject teachers, facilitating long-term and sustainable EAC cooperation.

Scaffolding of disciplinary English skills at a programme level

The EAC implementation was considered at a programme level, i.e. multiple subjects across the whole undergraduate programme. Progressively higher targets were set for both written and verbal communications across students' 4-year of studies. Appropriate subjects have been chosen for intervention to achieve the intended goals, and the subjects were carefully chosen such that the frequency and intensity of intervention could be reasonably spread across the whole

programme, as detailed in Table 1. It is observed that most of the past WAC/EAC effort was confined to subject levels, where there was no way to address multiple aspects of skills at a time.

Much as writing is an important academic skill and still the most typical high-stake assessment mode (Lughmani et al. 2016), due attention should also be given to the development of verbal communication. It was found that oral presentation was not a common assessment item or learning activity in technical subjects, speaking assessments were 'time-consuming' as revealed by a subject lecturer in our department. Since our EAC framework is developed at the programme level, our team was able to identify opportunities to develop verbal communication skills. Thus, our initiatives allowed scaffolding of students' written and verbal skills through subject interventions.

The pilot implementation reported in this paper covered four undergraduate programmes in the year 2020–2021, which included ten subjects and final-year projects, as marked in Table 1.

Assessment intervention

The assessment task interventions which comprised the major instrument in achieving the written and verbal communication targets included discipline-specific task instructions and clear grading criteria reflecting attention to language standards. Assessment task intervention was focused upon in the present study for a number of reasons. Research suggests that learner gains in ESL writing proficiency are likely to materialize if the ESP instructional/learning materials align with the programme's pedagogical goals, promote meaningful communication reflecting the specialist domains of the learners and furnish a systematic mechanism for self-regulated learning (Kostrytska and Shvets 2012).

Built into the assessment task intervention deployed in this study was a focus on precise discipline-specific writing tasks and rubrics to foster student motivation and independent learning. According to Brown (2007), authentic tasks that reflect real-world rhetorical situations in ESP classrooms can enhance students' motivation by making learning meaningful and practical. Task design also contributes to students' capacity for goal-setting which allows them to select research topics or identify specific language skills that they want to improve, thus aligning with the process of the self-regulation cycle (Zimmerman 2000). Further, the designing and integration of discipline-specific writing rubrics enable the provision of targeted feedback to students which allows them to make specific revisions to enhance their writing proficiency (Jonsson and Svingby 2007). With the help of such rubrics which provide clear and accessible criteria for evaluating writing tasks, ESL writers can better comprehend what is expected of them in terms of content, organization, style, and language use (Stevens and Levi 2013).

Thus, using assessment task intervention as the major vehicle for instructional and learning change optimally balances students' motivation and realities. There already exist various types of written (and verbal, to a lesser extent) assessment tasks in the majority of the technical subjects, but the quality of English is not usually part of the assessment criteria as far as grading is concerned. Therefore, a great many, if not most students did not have the incentive to pay attention to their language quality, for it is undeniable that students are motivated to do well on assignments if they are graded (Shaver 2007). 'Upgrading' the existing tasks is the most effective in terms of teacher's and student's effort, the tasks are much more relevant to the learning of disciplinary knowledge compared to additional language-oriented writing/speaking task that lacks academic/ disciplinary context.

Figure 1 below outlines the subject intervention methodology. It emphasises the constructive alignment of learning, teaching, and assessment to achieve the goal of language enhancement. Language specialists worked together with subject lecturers to modify existing assignment task instructions to communicate clear expectations and requirements in terms of disciplinary communications, subject lecturers assigned appropriate weights in the corresponding assessment items to reflect the importance of effective communication, and subject lecturers would evaluate students' effective communication using specific rubrics prepared by the language specialists. Genre guides and self-learning online resources were prepared by language specialists to facilitate students' self-learning.

Table 1. Development of written and verbal communication targets at the programme level.

	Year 1	Year 2	Year 3	Year 4
Written communication targets	Structure an essay and fulfil essay expectations, including internal structure of paragraphing.	Structure a laboratory report with appropriate content corresponding to the purpose each section, including explanation of findings, discussion of hypothesis when necessary.	Structure more types of technical reports and ensure cohesion throughout all parts of the reports	Structure a variety of technical writings appropriately in terms of content, genre, diction, and length.
	Express ideas without errors that impede comprehension	Express ideas clearly and convey meaning effectively	Express ideas clearly and convey meaning effectively	Express ideas clearly and convey meaning effectively
		Provide adequate elaboration of arguments	Provide adequate elaboration of arguments and support them with evidence, with proper documentation of sources	Express critical views substantiated with elaboration and ample evidence
				Achieve a concise and precise technical writing style
Verbal communication targets	Verbal exchange of ideas		Delivery of presentations	
	Simple but effective verbal exchanges in a professional setting	Effective verbal exchanges in a professional setting with awareness of the target audience and context in authentic communication	Delivery of academic presentations, with purposes and contents clearly outlined and conclusions effectively presented with supporting evidence	Delivery of academic presentations, with purposes and contents clearly outlined, insights into the topic, and real-time response of the audience
	Able to organise focus and plan content to accomplish relevant tasks	Able to quickly take notes of key ideas being discussed / presented Able to provide accurate summaries of key ideas / theories / suggestions	Able to paraphrase effectively, provide supplementary explanation and example and respond to questions from the audience that are topical in nature / seeking clarification	Able to effectively select and present data in the form of images / tables / graphs to aid effectiveness in communication
				Able to distinguish between expert and non-expert audience, and to select appropriate lexis, format, tone and tools to make communication effective for various audience.
Programme	**Subject - Intervention task (written/ verbal)**			
BEng (Hons) in Civil Engineering	CSE1.1 - Technical Essay (written)	CSE2.1- Laboratory Report (written)	CSE3.1 - Seminar Report and Presentation (written and verbal) CSE3.2 - Structural Design Report (written)	Final Year Project – Project Report, Presentation and Poster (written and verbal)
BEng (Hons) in Structural and Fire Safety Engineering	CSE1.1 - Technical Essay (written)	CSE2.1 - Laboratory Report (Written)	CSE3.1 - Seminar Report and Presentation (written and verbal) CSE3.2 - Structural Design Report (written)	Final Year Project – Project Report, Presentation and Poster (written and verbal)
		CSE2.2 - Laboratory Report (Written)	CSE3.3 - Technical Essay (Written)	

(*Continued*)

Table 1. Continued.

	Year 1	Year 2	Year 3	Year 4
BEng (Hons) in Environmental Engineering and Sustainable Development	CSE1.1 - Technical Essay (written)			Final Year Project – Project Report, Presentation and Poster (written and verbal)
BSc (Hons) in Environmental and Occupational Safety and Health *(2-year articulated programme)*			CSE3.4 – Laboratory report (written) CSE3.5 - Group Presentation (verbal) CSE3.6 - Court Case Review (written)	CSE4.1 - Audit Report (written) Final Year Project – Project Report, Presentation and Poster (written and verbal)

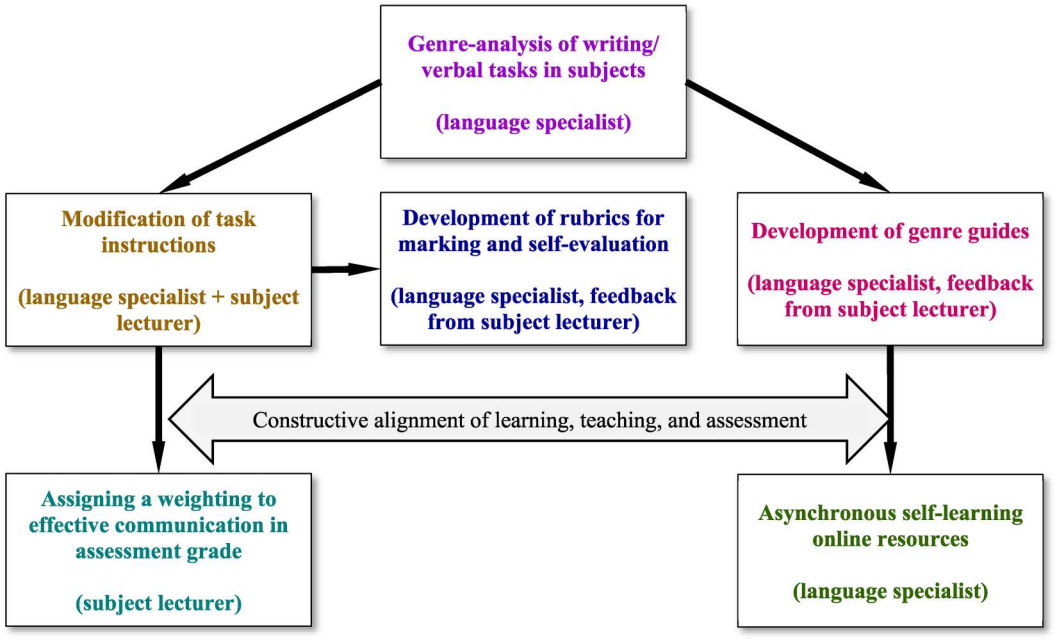


Figure 1. Outline of subject intervention methodology.

Genre-analysis of selected assessment tasks

Our initiative covered various professional settings and rhetorical situations, including highly technical genres, some of which are uncommon to laymen but to civil engineers. Genre analysis was used to better understand the purpose and context of the assessment tasks for drawing up intervention strategies and supporting materials. One of the most significant approaches in genre analysis of university students' graded writing task by Nesi and Gardner (2012) was adopted. Students' writing assignment samples were analysed and categorised according to Nesi and Gardner's taxonomy of writing in Table 2. Genre analysis facilitated the development of our intervention strategies and the drafting of the genre guides for selected writing assessment tasks.

Development of genre guides and supporting materials for self-paced online learning

The linguistic resources to structure knowledge for a specific disciplinary community need to be made available for the user in that discipline (Hyland 2007). Based on the genre analysis result, genre guides were prepared for each selected writing assignment task. The genre guides that emphasise language conventions in specific rhetorical situations are supplemented with relevant skills in technical communication such as how to effectively discuss and compare findings, technical writing style, or commonly misused grammar items (although our EAC initiative focuses on discipline

Table 2. Genre types of written assignment tasks

Subject	Selected writing assignment task	Genre family (Nesi and Gardner 2012)
CSE1.1 CSE3.3	Technical Essay	Essay
CSE2.1 CSE2.2 CSE3.4	Laboratory report	Methodology recount
CSE3.1	Seminar report	Narrative recount
CSE3.2	Structural design report	Design specification
Final Year Project	Final Year Project Report	Research report

communication rather than grammar and mechanics). In addition, oral presentation guidelines, which are more general than technical genre guides in nature, were drawn up to support students' enhancement of professional communication. The genre guides were sent to the subject teacher for feedback and confirmation to ensure consistency to the disciplinary expectations and assignment requirements.

In preparation for all these materials, extracts of authentic students' samples were used as teaching examples because it is beneficial for students to learn strategies in authentic discipline situations (Rhoder 2002). This approach is a pedagogy advocated by Tribble and Wingate (2013) to raise students' genre awareness by commenting on successful and less successful samples.

The aforementioned materials were presented in the form of instructional videos, presentation slides (handout), and exercises. Multimedia learning resources, such as instructional videos, can enhance students' motivation (Woo et al. 2007). Studies indicated that the use of instructional education videos can enhance the level of understanding in learners (DeVaney 2009; Hardin and Ellington 2005), suggesting instructional videos as an alternative in addition to text-based materials. Our videos were filmed in bite-sized units (15–20 min), so students would find them more digestible.

These resources were all available online to facilitate self-learning, breaking through the boundaries of space and time. Online platforms for foreign language learning are playing a more crucial role within the more formal pedagogical environment (Kukulska-Hulme and Shield 2004). This asynchronous part of learning realises blended learning as it reduces the use of class time to deliver the knowledge of discipline English. Due to the alignment between subject's assessment tasks and the respective language resources, students were motivated to explore these online materials for completing their assignments. The self-study approach should help cultivate the engineering students' independent learning skills which are crucial for their professional career development in the future. It is noted that, however, online resources should not be regarded as a replacement for synchronous teaching but an addition to maximise learning effectiveness.

Modification of task instruction

With regards to the engineering discipline, students largely focus on whether they get the keywords or calculations correct but give little attention to English skills and rhetorical functions in specific genres conforming to the industry conventions. This attributes in part to the design of task instructions (Kreth et al. 2010). In fact, there is evidence that carefully designed assessment tasks can support and address students' language skills and also students' understanding of subject content and hence make students behave more like members of the discipline community (Carter, Ferzli, and Wiebe 2007).

However, it was discovered in the course of our analysis of assignment instructions and coursework samples that some task instructions were not well-written in a way to support and facilitate students' learning of structuring a proper report or communicating ideas effectively. For instance, in a 'laboratory report' task, students were indeed asked to do gap filling in a laboratory worksheet instead of writing a proper laboratory report with an explanation of the relevant theory, description of procedures, presentation, and analysis of experimental results and conclusion. This practice gave students a wrong understanding of what a 'laboratory report' should be. Although it is more efficient for teachers to mark the reports, the fill-in-the-blank laboratory worksheet undermines students' opportunity to learn how to write a full report in the genre of their profession. Another case is that the sections or the questions on the assignment task instructions are not placed in a logical sequence to support report writing. For example, in an assignment task instruction, the conclusion of experimental findings preceded the discussion of experimental results, making students put inappropriate content in both sections. It was also found that there was a report assignment with no task instructions – only a list of questions that students were supposed to address in the 'discussion' section in case a proper report was provided. The design of assignment tasks is crucial as poorly designed tasks allow students to get away from structuring a proper report in their industry convention (Smithson and Sorrentino 1987). Although discipline teachers look at the technical content in

the main, the structure of the paper that includes an introduction, a conclusion, and textual explanation, is not without value. Also, instead of communicating with numbers and calculations, students should be provided guidance and opportunity to express their own thoughts and to communicate effectively.

In view of this, in our EAC initiative, the task instructions were developed or modified upon the subject teachers' consent. The improvements included (1) instructions unfolding in a way the organisation was evident for a proper full paper, (2) stimulating expression and elaboration of critical understanding rather than just filling in numerical answers (3) reducing students' misconception that calculation is adequate for technical communication as technical communication is much more than just mathematical symbols, and (4) getting to know the discipline communication convention in different genres.

Assigning weighting to English in the assessment grade

While it is commonly agreed that English skills are essential in discipline study, the allocation of marks to English among discipline teachers is often optional. Discipline teachers tend to pay little specific attention to the quality of language in students' assignments (Cheng et al. 2015). Some discipline teachers would not assign specific weighting to English in assessments, as they believe that the quality of English in communicating ideas can be reflected in students' overall performance in their assessments. Therefore, in our initiative, subject teachers were recommended to assign a weighting to English communication. To motivate students working on the tasks, no less than 20% of the weighting was recommended. All subject lecturers of the participating courses found this agreeable and some even suggested a higher weighting, after considering the significance of language communication in specific assessment tasks, some examples of subjects are listed in Table 3.

Preparation/ revision of existing rubrics

Prior to our project intervention, few discipline teachers would evaluate English communication in students' assignments. Even so, evaluation criteria or guidelines about language use lack details in most cases (Cheng et al. 2015; Lughmani et al. 2016). Specific comments on the rhetorical or linguistic performance of students' assessments were rarely given, possibly because they thought teaching English was not their job and/or they did not consider themselves to have sufficient expertise to give feedback on aspects beyond the discipline content (Cheng et al. 2015).

To address the gap that most discipline teachers (who are not language specialists) lack the tools to evaluate or provide feedback on the rhetorical and linguistic aspects of the students' assessment (Cheng et al. 2015), rubrics were developed by the language specialists. These rubrics spelt out explicitly the criteria and standard associated with a specific genre and were carefully aligned with the corresponding assignment instructions to ensure consistency. The rubrics provided clear guidance to students on what they were expected to achieve and served as a handy tool for teachers to provide feedback to students on their areas for improvement in terms of communication.

The rubrics developed in this project were adapted and simplified forms of typical language evaluation rubrics: only the criteria in the use of English such as structure, organisation, and grammar are being kept, while features of specific technical genre, context, and requirements of

Table 3. Examples of subjects assigning substantial weight to effective communication.

Subject	Selected assessment task	Weight allocated to effective communication (%)
CSE1.1	Technical Essay	50%
CSE3.1	Seminar report	50%
	Seminar report presentation	50%
CSE3.6	Group presentation	20%
Final Year Project	Project Report	15%
	Oral presentation	44%

the assessment task were added. These rubrics were reviewed by the subject lecturers to ensure consistency with the disciplinary expectations and assignment requirements.

Evaluation of our EAC initiative: student assignment sample analysis

To evaluate the effectiveness of our EAC initiative, student assignment samples were analysed with reference to the rubrics developed for each genre/ type of assessment task, benchmarked with student samples from courses without assessment intervention (of the same subject in the previous year, or a very similar subject in the current year). Samples used were randomly selected from the high, medium, and low quartiles, submitted by the subject teachers. Subjected to the availability of control samples at the moment this paper is being written, only laboratory Report (narrative recount), final year project report (research report), and group (oral) presentation fell into the ambit of our comparative studies. The quality of communication in these samples was evaluated according to the criteria and standard setup in the rubrics developed in this project, students' performance in each criterion was classified into 4 levels: Excellent, Good, Satisfactory, and Below Satisfactory. For brevity's sake, only the distribution of results in the overall rating is presented in Tables 4–6, and the performance in each detailed criteria is averaged and presented in Figures 1–3, whereas those being rated 'Excellent' are converted to 4 points and 'Below Satisfactory' corresponds to 1 point in the computation, (see Figure 4).

Assessment task: laboratory report; genre: methodology recount

Substantial improvement could be seen in the samples with the intervention both in overall terms (Table 4) and in each specific aspect (Figure). The intervention included the refinement of laboratory report task instructions and the development of self-study genre guide and rubrics (for grading and self-evaluation), both the subject and control did not make explicit specifications in the percentage weight allocated to the quality of communication in the laboratory reports. Prior to our intervention, many of the samples were in gap-filling or question-and-answer format, and sections requesting more textual information such as introduction, theoretical background, and conclusion were simply omitted, probably due to the students' misconception that only the result and discussion were important. Upon our intervention, the samples were structured in proper sections. For communication ability and expression of thought, more explanation and interpretation of the meaning of the numerical results can be observed. The discussion no longer relied on calculations

Table 4. Comparison of overall quality of written communication in the laboratory report.

Laboratory Report	Subject: CSE2.1 (sample size = 18)	Control: CSE2.4 (sample size = 13)
Overall rating	Count (percentage)	Count (percentage)
Excellent	0 (0%)	0 (0%)
Good	5 (28%)	0 (0%)
Satisfactory	9 (50%)	1 (8%)
Below Satisfactory	7 (22%)	12 (92%)

Table 5. Comparison of overall quality of written communication in the final year project report.

Final Year Project Report	Subject: Final Year Project Reports (20/21) (sample size = 15)	Control: Final Year Project Reports (19/20) (sample size = 15)
Overall rating	Count (percentage)	Count (percentage)
Excellent	2 (13%)	3 (20%)
Good	4 (27%)	3 (20%)
Satisfactory	7 (47%)	4 (27%)
Below Satisfactory	2 (13%)	5 (33%)

Table 6. Comparison of overall quality of verbal communication in the group oral presentation.

Group Oral Presentation	Subject: CSE3.5	Control CSE3.7
Overall rating	Count (percentage)	Count (percentage)
Excellent	0 (0%)	0 (0%)
Good	3 (37%)	0 (0%)
Satisfactory	8 (63%)	4 (50%)
Below Satisfactory	0 (0%)	4 (50%)



Figure 2. Comparison of students' performance in the laboratory report.

or one or two short sentences. It was discernable that under the intervention, in some samples, students started to put theories into context, exhibiting their ability to express thoughts in accordance with various rhetorical situations of methodological recount.

Assessment task: final year project; genre: research report

It is seen that students' writing in the final year project report was better than in the laboratory report even without our intervention. It is worth noting that even before the commencement of this project, 15% weight had been allotted to effective communication in students' final-year project reports (and this weighting has not been further modified). This observation reinforces our rationale in using 'assessment intervention' as the major method in achieving the project outcomes: students are more motivated to put in more effort in writing (effective communication) if the quality of writing bears upon their grades. The project team provided genre guides, supplementary language materials, and rubrics (for grading and self-evaluation) to students, accounting, perhaps, for the small improvement observed in overall rating (Table 5) and the specific aspects (Figure).

The format of the reports improved under the intervention. There were fewer missing sections, particularly among the poorly performed samples, such as abstract, literature review, conclusion, etc. The most serious was the absence of abstracts. Without intervention, more than one-third of the samples missed the abstract while almost no abstracts were found missing for samples under intervention.

A slight improvement has been discovered in the writing and communication of ideas, for instance, students started to write clearer thesis statements and objectives but still had problems contextualising the research study and narrowing their ideas smoothly. For example, students just stated the key knowledge, equations, and models without connecting them to their own study. It is worth noting that, unlike other typical class assignments, final-year projects were completed under the guidance and supervision of various supervisors. The style of supervision, the importance



Figure 3. Comparison of students' performance in the final year project report.

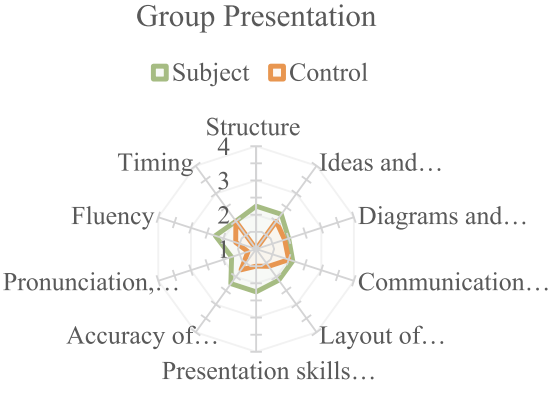


Figure 4. Comparison of students' performance in the group oral presentation.

the supervisors attach to effective communication, plays a significant role in the quality of the final product.

Assessment task: group presentation

Whilst the performance of the group presentation was still weak in general (1 = barely satisfactory, 4 = excellent), substantial improvement was seen in overall terms (Table 6) and each specific aspect (Figure 3). In the control subject, the subject lecturer had a rubric that consisted of items related to content and communication, but no explicit breakdown of weights was specified. For the subject under intervention, oral presentation guidelines and rubrics for self-evaluation had been prepared, and the subject lecturer allocated 30% weight to items related to effective communication. Upon our intervention, students did better in meeting the requirements in each aspect of the rubric, leading to better overall performance.

In terms of structure, samples of the control subject lacked the structure of a complete presentation with only the topic mentioned at the start, but no indication of a proper introduction, and the conclusion was by and large absent. Students were much more aware of the proper structure of a presentation when guidelines had been made available. For communication effectiveness, for samples of the control subject, students' critical views were largely absent from the presentation whilst samples under intervention displayed good organisation outlining the students' reflections on the chosen topic, with their own critical perspectives incorporated. The delivery of both batches of sample presentations was monotonous, as if students were reading scripts, rather than

interacting with an audience. Perhaps this might be the consequence of the that they were only given about 5 min to speak in the presentation. However, the presentations under intervention were, on the whole, better delivered with more accurate pronunciation, more accurate language usage, and greater fluency.

Challenges in implementation

The implementation, as expected, was not without challenges, corroborating the study by Clughen and Connell (2012). Our EAC project was a departmental initiative, in which the participation of subject teachers was compulsory. Therefore, it was inevitable that some subject teachers were nominated despite their reluctance to get involved. However, voluntary participation or invitation would not facilitate a systematic EAC implementation of a discipline. More importantly, discipline genres might not be covered.

To implement the EAC initiative, additional effort is inevitable. Failing to recognise the immediate benefits that EAC may bring to the learning of the discipline content, some teachers' involvement in the initiative was not as pronounced as we expected, thus affecting the extent of intervention on the students. It was found that some discipline teachers did not emphasise the new assessment arrangement to students or attach importance to the initiative.

To cope with the difficulties, the very essence is trust-building (Lai et al. 2020) to eliminate the fear of discipline teachers. Since EAC is a relatively recent initiative at the university under study, it takes time for discipline teachers, who mainly focus on subject content in their teaching and assessment, to see the value of EAC strategies and accept the initiative to a greater extent (Clughen and Connell 2012). It is crucial to bring across the message to discipline teachers that their support and involvement is important in students' acquisition of discipline English, which in turn improves the learning of subject content. We have to empower discipline teachers to experiment with EAC strategies as useful teaching and learning tools instead of treating them as sources of extra workload. Staff development is thus necessary (Lughmani et al. 2016). Therefore, full institutional and departmental support and leadership are of paramount importance for the success of EAC implementation. Also, discipline teachers should be incentivised by institutional rewards or recognition for their EAC contribution (Furco and Moely 2012).

Conclusion

The empirical study of EAC implementation in the civil engineering discipline at a large university in Hong Kong was conducted for one year. EAC strategies were incorporated into the civil engineering curriculum by targeting various undergraduate courses through assessment intervention. The major innovations in this project are: (1) the programme-level implementation of EAC strategies and (2) the core project team consisting of a disciplinary expert and language specialists which offered an optimal balance between technical and language learning outcomes and greatly enhanced coordination and trust-building. Community of Practice was also realised in the process. The implementation was effective on multifarious levels, as proved by the evidence from student assessment sample analysis, in which the students' communication abilities with and without assessment intervention were compared in terms of different genres in civil engineering. The results show that under EAC intervention, students' writing and verbal communication skills in discipline contexts were improved across various rhetorical genres in the discipline, along with increased genre awareness and enhanced ability to express deeper thoughts and interpret calculations and analysis. The EAC model setting has proved effective and should have answered the research question and thrown light on how EAC approaches can be put into practice in the science and engineering disciplines and across rhetorical situations. This study is significant in facilitating teachers in the drafting of subject intervention plans, contributing to the academic exploration of possibilities and opportunities of EAC strategies in technical disciplines.

Notes on contributor

Dr Barbara Wing-Yee SIU is currently a senior teaching fellow in the department of civil and environmental engineering at the Hong Kong Polytechnic University. She obtained her PhD at the Hong Kong University of Science and Technology in 2009 studying travel time uncertainty. She has over 10 years of experience in teaching and student project supervision in the areas of transportation engineering, planning, operations, and management. Dr Siu is actively engaged in education research that aims to enhance teaching and learning in engineering disciplines. She received the Faculty Award for Outstanding Performance in Teaching in 2017.

Dr. Muhammad Afzaal joined the Institute of Corpus Studies and Applications at Shanghai International Studies University, China, as an associate professor after earning his PhD from Shanghai Jiao Tong University, China. He also has extensive research fellowship experience from the Hong Kong Polytechnic University, Hong Kong, and nine years of teaching experience at Foundation University Islamabad, Pakistan. His research spans several areas including corpus linguistics, discourse analysis, critical discourse analysis, translation studies, and the integration of language sciences with NLP and big data. He has authored a book titled, "A Corpus-Based Analysis of Discourses on the Belt and Road Initiative: Corpora and the Belt and Road Initiative," published by Springer Nature, and edited the volume "Language Corpora and Technology in Applied Linguistics," demonstrating his expertise in corpus-based research. He can be contacted at afzaal@shisu.edu.cn.

Chu Nok Yi Chu Nok Yi is currently affiliated with the department of civil engineering at The Hong Kong Polytechnic University. Specializing in academic writing, Chu Nok Yi has been involved in numerous projects and research initiatives that contribute to the field.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Barbara Wing Yee Siu http://orcid.org/0000-0001-5608-6331
Muhammad Afzaal http://orcid.org/0000-0003-4649-781X

References

Allison, D. 1992. "From "Remedial English" to "English Enhancement" (So, What Else Is New?)." *Hongkong Papers in Linguistics and Language Teaching* 15: 15–29.

Bawarshi, A. S., and M. J. Reiff. 2010. "Genre in Linguistic Traditions: English for Specific Purposes." In *Genre: An Introduction to History, Theory, Research, and Pedagogy*, 41–56. West Lafayette, IN: Parlor Press.

Bazerman, C. 2014. "Understanding the lifelong journey of writing development." *Infancia y Aprendizaje* 36 (4): 421–441. http://dx.doi.org/10.1174/021037013808200320.

Biggs, J., P. Lai, C. Tang, and E. Lavelle. 1999. "Teaching Writing to ESL Graduate Students: A Model and an Illustration." *British Journal of Educational Psychology* 69 (3): 293–306. https://doi.org/10.1348/000709999157725

Braine, G. 2001. "When Professors Don't Cooperate: A Critical Perspective on EAP Research." *English for Specific Purposes* 20 (3): 293–303. https://doi.org/10.1016/S0889-4906(00)00011-9

Braine, G., and C. McNaught. 2007. "Adaptation of the 'Writing Across Curriculum' Model to the Hong Kong Context." In *English Language Teaching in China: New Approaches, Perspectives and Standards*, edited by J. Liu, 311–328. London: Continuum International Publishing Ltd.

Brown, H. D. 2007. *Principles of Language Learning and Teaching*. New York: Pearson Education.

Carroll, L. A. 2002. *Rehearsing new Roles: How College Students Develop as Writers*. Carbondale and Edwardsville: Southern Illinois University Press.

Carter, M., M. Ferzli, and E. N. Wiebe. 2007. "Writing to Learn by Learning to Write in the Disciplines." *Journal of Business and Technical Communication* 21 (3): 278–302. https://doi.org/10.1177/1050651907300466

Cheng, W., M. Chan, H. Chiu, A. Kwok, K. Lam, K. M. Lam, G. Lim, and R. P. Wright. 2015. *Enhancing Students' Professional Competence and Generic Qualities Through Writing in English Across the Curriculum*. Hong Kong: The Hong Kong Polytechnic University.

Clughen, L., and M. Connell. 2012. "Writing and Resistance: Reflections on the Practice of Embedding Writing in the Curriculum." *Arts and Humanities in Higher Education* 11 (4): 333–345. https://doi.org/10.1177/1474022211429543

Currie, P. 1999. "Transferable Skills: Promoting Student Research." *English for Specific Purposes* 18 (4): 329–345. https://doi.org/10.1016/S0889-4906(98)00008-8

DeVaney, T. A. 2009. "Impact of Video Tutorials in an Online Educational Statistics Course." *MERLOT Journal of Online Learning and Teaching* 5 (4): 600–608.
Duff, P. 2007. "Second Language Socialization as Sociocultural Theory: Insights and Issues." *Language Teaching* 40 (4): 309–319. https://doi.org/10.1017/S0261444807004508
Evans, S., and C. Green. 2007. "Why EAP is Necessary: A Survey of Hong Kong Tertiary Students." *Journal of English for Academic Purposes* 6 (1): 3–17. https://doi.org/10.1016/j.jeap.2006.11.005.
Evans, S., and B. Morrison. 2010. "The First Term at University: Implications for EAP." *ELT Journal* 65 (4): 387–397. https://doi.org/10.1093/elt/ccq072
Evans, S., and B. Morrison. 2011. "Meeting the Challenges of English-Medium Higher Education: The First-Year Experience in Hong Kong." *English for Specific Purposes* 30 (3): 198–208. https://doi.org/10.1016/j.esp.2011.01.001.
Evans, S., and B. Morrison. 2012. "Learning and Using English at University: Lessons from a Longitudinal Study in Hong Kong." *The Journal of Asia TEFL* 9 (2): 21–47.
Fulwiler, T., and A. Young. 1990. *Programs That Work*. Portsmouth, New Hampshire: Boynton/Cook.
Furco, A., and B. E. Moely. 2012. "Using Learning Communities to Build Faculty Support for Pedagogical Innovation: A Multi-Campus Study." *Journal of Higher Education* 83 (1): 128–153. https://doi.org/10.1353/jhe.2012.0006
Graham, C. R. 2006. "Blended Learning Systems: Definition, Current Trends, and Future Directions." In *Handbook of Blended Learning: Global Perspectives, Local Designs*, edited by C. J. Bonk, and C. R. Graham, 26–28. San Francisco, CA: Pfeiffer.
Hafner, C., and L. Miller. 2018. *English in the Disciplines: A Multidimensional Model for ESP Course Design*. New York: Routledge.
Hardin, J. R., and A. J. Ellington. 2005. "Using Multimedia to Facilitate Software Instruction in an Introductory Modeling Course." *INFORMS Transactions on Education* 5 (2). https://doi.org/10.1287/ited.5.2.9
The Hong Kong Institution of Engineers. 2013. "Professional Accreditation Handbook (Engineering Degrees)." https://www.hkie.org.hk/zh-hant/quali/criteria/upload/page/55/self/59ba2b4d548ec.pdf.
Hyland, K. 2007. "Genre Pedagogy: Language, Literacy and L2 Writing Instruction." *Journal of Second Language Writing* 16 (3): 148–164. https://doi.org/10.1016/j.jslw.2007.07.005.
Hyland, K., and F. K. Jiang. 2021. "Delivering Relevance: The Emergence of ESP as a Discipline." *English for Specific Purposes* 64: 13–25. https://doi.org/10.1016/j.esp.2021.06.002
Hyon, S. 2017. *Introducing Genre and English for Specific Purposes*. New York: Routledge.
Jaidev, R., and P. Chan. 2018. "Embedding Communication in the Disciplines: A Tale of Two Faculties." *Innovation in Language Learning and Teaching* 12 (3): 199–211. DOI: 10.1080/17501229.2016.1156685
James, M. A. 2009. ""Far'' Transfer of Learning Outcomes from an ESL Writing Course: Can the Gap Be Bridged?" *Journal of Second Language Writing* 18 (2): 69–84. https://doi.org/10.1016/j.jslw.2009.01.001
Jones, R., and J. Comprone. 1993. "Where Do We Go Next in Writing Across the Curriculum?" *College Composition and Communication* 44 (1): 59–68. https://doi.org/10.2307/358895
Jonsson, A., and G. Svingby. 2007. "The Use of Scoring Rubrics: Reliability, Validity and Educational Consequences." *Educational Research Review* 2 (2): 130–144. https://doi.org/10.1016/j.edurev.2007.05.002
Kostrytska, S., and O. Shvets. 2012. "Assessment Strategies in Esp Course as a Way for Motivating Student Learning." https://core.ac.uk/works/27396181.
Kreth, M., M. A. Crawford, M. Taylor, and E. Brockman. 2010. "Situated Assessment: Limitations and Promise." *Assessing Writing* 15 (1): 40–59. https://doi.org/10.1016/j.asw.2010.03.001
Kukulska-Hulme, A., and L. Shield. 2004. "Usability and Pedagogical Design: Are Language Learning Websites Special?" Paper Presented at ED-MEDIA 2004 World Conference on Educational Multimedia, Hypermedia and Telecommunications, Lugano, June 22-26.
Lai, J., E. Ng, L. Man, and C. Rozendaal. 2020. "English Across the Curriculum Collaborative Projects: A Flexible Community of Practice Model at The Chinese University of Hong Kong." In *Diverse Approaches to Teaching, Learning, and Writing Across the Curriculum: IWAC at 25*, edited by L. Bartlett, S. Tarabochia, A. Olinger, and M. Marshall, 225–249. Hong Kong: The WAC Clearinghouse.
Lea, M. R., and B. V. Street. 1998. "Student Writing in Higher Education: An Academic Literacies Approach." *Studies in Higher Education* 23 (2): 157–172. doi:10.1080/03075079812331380364.
Leki, I. 1995. "Coping Strategies of ESL Students in Writing Tasks Across the Curriculum." *TESOL Quarterly* 29 (2): 235–260. https://doi.org/10.2307/3587624
Lughmani, S. D., S. Gardner, J. Chen, H. Wong, and L. Chan. 2016. "English Across the Curriculum: Fostering Collaboration." ELTWO: Special Issue on 5th CELC Symposium Proceedings, volume 2016: 19-33.
Mankowski, P. 1998. "A Bridging Engineering-English Communication Course." *Southern African Journal of Applied Language Studies* 6 (1): 74–87. DOI:10.1080/10189203.1998.9724677.
McConlogue, T., S. Mitchell, and K. Peake. 2012. "Thinking Writing at Queen Mary, University of London." In *Writing Programs Worldwide: Profiles of Academic Writing in Many Places*, edited by C. Thaiss, G. Bräuer, P. Carlino, L. Ganobcsik-Williams, and A. Sinha, 203–211. The WAC Clearinghouse; Parlor Press. https://wac.colostate.edu/books/perspectives/wpww/.

Miller, L. B., and R. P. Bizzell. 1984. "Long-Term Effects of Four Preschool Programs: Ninth- and Tenth-Grade Results." *Child Development* 55 (4): 1570–1587http://dx.doi.org/10.2307/1130027.

Murray, N., and M. Hicks. 2014. "An Institutional Approach to English Language Proficiency." *Journal of Further and Higher Education* 40 (2): 170–187. https://doi.org/10.1080/0309877X.2014.938261.

Nesi, H., and S. Gardner. 2012. "Families of Genres of Assessed Writing." In *Genres Across the Disciplines: Student Writing in Higher Education*, edited by H. Nesi, and S. Gardner, 21–56. Cambridge: Cambridge University Press. http://www.cambridge.org/aus/catalogue/catalogue.asp?isbn=9780521149594.

Rhoder, C. 2002. "Mindful Reading: Strategy Training That Facilitates Transfer." *Journal of Adolescent & Adult Literacy* 45 (6): 498–512.

Russell, D. R. 1995. "*Activity Theory and its Implications for Writing Instruction*." In *Reconceiving Writing, Rethinking Writing Instruction*, edited by J. Petraglia, 51–77. Mahwah, NJ: Erlbaum.

Russell, D. R. 2007. "Rethinking the Articulation Between Business and Technical Communication and Writing in the Disciplines: Useful Avenues for Teaching and Research." *Journal of Business and Technical Communication* 21 (3): 248–277. https://doi.org/10.1177/1050651907300452

Shaver, L. 2007. "Eliminating the Shell Game: Using Writing-Assignment Names to Integrate Disciplinary Learning." *Journal of Business and Technical Communication* 21 (1): 74–90. https://doi.org/10.1177/1050651906293532

Smithson, I., and P. Sorrentino. 1987. "Writing Across the Curriculum: An Assessment." *Journal of Teaching and Writing* 6 (2): 325–342. Retrieved from http://journals.iupui.edu/index.php/teachingwriting/article/download/954/921.

Snow, M. A. 1993. "*Discipline-based Foreign Language Teaching: Implications from ESL/EFL*." In *Language and Content: Discipline- and Content-Based Approaches to Language Study*, edited by M. Krueger, and F. Ryan, 37–56. Lexington, MA: D.C. Heath and Co.

Spack, R. 1997. "The Acquisition of Academic Literacy in a Second Language: A Longitudinal Case Study." *Written Communication* 14 (1): 3–62. https://doi.org/10.1177/0741088397014001001

Stevens, D. D., and A. J. Levi. 2013. *Introduction to Rubrics: An Assessment Tool to Save Grading Time, Convey Effective Feedback, and Promote Student Learning*. 2nd ed.. New York: Stylus Publishing, LLC.

Swales, J. M., and J. Swales. 1990. *Genre Analysis: English in Academic and Research Settings*. Cambridge: Cambridge university press.

Tribble, C. T., and U. C. Wingate. 2013. "From Text to Corpus: A Genre-Based Approach to Academic Literacy Instruction." *System* 41 (2): 307–341. doi:10.1016/j.system.2013.03.001.

Walvoord, B. E., and L. P. McCarthy. 1990. *Thinking and Writing in College: A Naturalistic Study of Students in Four Disciplines*. Urbana: National Council of Teachers of English.

Wenger-Trayner, E., and B. Wenger-Trayner. 2015. *Communities of Practice: A Brief Introduction.* https://wenger-trayner.com/wp-content/uploads/2015/04/07-Brief-introduction-to-communities-of-practice.pdf.

Wingate, U. 2012. "Using Academic Literacies and Genre-Based Models for Academic Writing Instruction: A 'Literacy' Journey." *Journal of English for Academic Purposes* 11 (1): 26–37. https://doi.org/10.1016/j.jeap.2011.11.006

Wingate, U. 2016. "Academic Literacy Across the Curriculum: Towards a Collaborative Instructional Approach." *Language Teaching* 51 (3): 1–16. doi:10.1017/S0261444816000264.

Wingate, U., N. Andon, and A. Cogo. 2011. "Embedding Academic Writing Instruction Into Subject Teaching: A Case Study." *Active Learning in Higher Education* 12 (1): 69–81. https://doi.org/10.1177/1469787410387814

Wingate, U., and C. Tribble. 2012. "The Best of Both Worlds?" *Studies in Higher Education* 37 (4): 481–495. doi:10.1080/03075079.2010.525630.

Woo, Y., J. Herrington, S. Agastinho, and T. Reeves. 2007. "Implementing Authentic Tasks in Web-Based Learning Environments." *Educause Quarterly* 3 (3): 36–43.

Wu, D. 2013. *Introducing Writing Across the Curriculum Into China: Feasibility and Adaptation*. Springer. doi:10.1007/978-3-642-33096-4.

You, X., and X. You. 2013. "American Content Teachers' Literacy Brokerage in Multilingual University Classrooms." *Journal of Second Language Writing* 22 (3): 260–276. https://doi.org/10.1016/j.jslw.2013.02.004

Zawacki, T. M., and M. Cox. 2014. *WAC and Second Language Writers: Research Towards Linguistically and Culturally Inclusive Programs and Practices*. The WAC Clearinghouse; Parlor Press. https://wac.colostate.edu/books/perspectives/l2/.

Zawacki, T. M., and P. M. Rogers. 2012. *Writing Across the Curriculum: A Critical Sourcebook*. New York: Bedford/St. Martin's.

Zimmerman, B. J. 2000. "Attaining Self-Regulation: A Social Cognitive Perspective." In *Handbook of Self-Regulation*, edited by M. Boekaerts, P. R. Pintrich, and M. Zeidner, 13–39. New York: Academic Press.