

Academic Writing with IT Researchers: Co-editing as an Instructional Technique

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Abstract

Globalisation and the World Wide Web have fostered the pervading use of English as a Lingua Franca among international academic contexts. Scientific knowledge exchange, participation in congresses or paper publications require Latin-American researchers, regardless of their field, to effectively command English, without which they can hardly access socialisation, promotion or consistent funding. Nonetheless, postgraduate seminars fail to address this need to write in EFL. In this article I describe the challenges faced by two Computer Sciences researchers for the Argentinian Scientific and Technical Research Council (*CONICET*) to produce texts for international journals. Then, I include a description of the process of coediting based on the Cognitive Process Theory of Writing and list the IT tools employed to co-edit their work in private classes. Finally, I analyse researchers' perception on the benefits of co-editing.

Key words: English for academic purposes (EAP), scientific writing, co-editing, writing skills development

Resumen

El uso generalizado del inglés como lengua franca en contextos académicos internacionales implica que investigadores latinoamericanos requieran un alto dominio del mismo para intercambiar conocimientos científicos, participar en congresos o publicar artículos. Entonces, la socialización, promoción y/o financiamiento dependen en gran medida de una habilidad considerada secundaria en sus programas de formación, pues los seminarios de posgrado no abordan esta necesidad de escribir en inglés como lengua extranjera. En este artículo, describo los desafíos que enfrentaron dos investigadores de Ciencias de la Computación del CONICET al producir textos para revistas internacionales. Luego, incluyo una descripción del proceso de coedición basado en la Teoría Cognitiva del Proceso de Escritura y menciono algunos de los recursos TIC empleados para co-editar sus borradores en clases particulares. Finalmente, analizo la percepción de los investigadores sobre los beneficios de la coedición.

Palabras claves: inglés para fines académicos, escritura científica, coedición, enseñanza de proceso de escritura.

Introduction

Globalisation and the World Wide Web have fostered extended and distributed team work both in business and academia; as a result, English has been established as the main language to access scientific information in discussion, symposia, congresses and publications (Belcher, 2007; Graddol, 1999; Holliday, 2005, 2006; House, 2003; Hyland & Hamp-Lyons, 2002; Hyland, 2003a, 2003b, 2004, 2006, 2007; Lillis & Curry, 2010;

Seidlhofer, 2005; Swales, 1990). Most European and Latin-American researchers, regardless of their field, find that socialisation, promotion and consistent funding for their work depends on the influence of their research, often by considering their papers published in leading academic journals in which English is the preferred Academic Lingua Franca (Pennycook, 2001, 2003, 2010, 2012, 2017). In Argentina, the National Scientific and Technical Research Council (*CONICET*) ranks these international journals with the highest impact factor for researchers' promotion; thus, the need for postgraduates to upgrade their writing skills in English for Scientific Purposes (ESP). Nonetheless, formal English undergraduate courses in national universities are often limited to reading-comprehension, while writing courses, when required, are aimed at improving Spanish language skills. Post-graduate programmes often include a foreign language seminar and may require competence in reading-comprehension and the use of English bibliography, yet writing in English is not part of the core seminars and postgraduates need to take ad-hoc workshops, private classes or hire translators to gain access to international readerships.

In this paper I analyse the challenges faced by two post-graduate Computer Sciences researchers for the National Council of Scientific and Technical Research (*CONICET*) at *Universidad Nacional del Centro de la Provincia de Buenos Aires (UNICEN)* and the approach adopted in personalized classes to teach writing skills tailored to their specific purposes, namely writing and editing academic research articles for international journals. Then I include a description of the process of co-editing based on the Cognitive Process theory of Writing, firstly introduced by John Hayes and Linda Flower (1981), and its reworked model (Hayes, 2012), in which the teacher scaffolds the writers' monitor function expanding available cognitive resources. I also list the IT tools employed. Finally, I offer the student-researchers' perceptions about the benefits of co-editing and argue for the incorporation of EAP writing courses in post-graduate curricula.

Context

Participants

The analysis presented in this work is based on the tutoring of two student-researchers at *Instituto Superior de Ingeniería de Software Tandil (ISISTAN¹)* since 2010 to 2015. These student-researchers had completed the reading-comprehension courses required by the university, and they had taken private classes prior to 2010. One of them evidenced general communicative competence for B1, and her experience with writing was scarce; the second had a general B2 level and had completed two writing workshops on academic writing. The difficulties listed here and the procedures described apply mostly to their papers for publications, though some were also relevant for their doctoral dissertations. The disciplinary topics researched were highly specific of the area of computer sciences, covering recommender systems, software architecture design and agile methodologies for software development.

Challenges

Some of the challenges faced by student-researchers resulted from the widespread misconceptions about literacy in general and writing pervading academia, and their incomplete knowledge about the complexities of the writing process. To begin with, it is often assumed that their experience as readers may give them the tools to transfer their receptive competences into productive skills for the creation of their own texts, regardless of their talent for writing in their native language or general language proficiency in

¹ The *ISISTAN* depends on both the *UNICEN* and the *CONICET*.

English. Often these student-researchers have acquired a high level of expertise as ESP readers and can identify different scientific genres, their sections, specific syntactic structures and lexis. Nonetheless this leaves the novice researchers to work intuitively, and so produce texts that follow structural patterns and rhetorical moves with limited understanding of the possibilities of the language beyond the description of their work. As a rule, the texts produced are revised by more experienced writers or tutors who tailor texts to their personal style. When the papers are deemed ready, they are sent to journals; and reviewers' feedback functions as guidelines to address problems both in the content and the use of language, many of which might have been avoided if student-researchers had received basic linguistic guidance during the writing process.

In order to categorise the main issues with student-researchers' text, it is relevant to analyse the problem from a theoretical stance. From the perspective of Systemic Functional Linguistics (SFL), language is a semiotic system for the expression of meaning. Halliday & Matthiessen (2014) argue that language is structured to simultaneously convey three kinds of meanings, also called metafunctions: ideational (or experiential: semantic content of information conveyed in the text), interpersonal (the establishment and maintenance of social relations between the text producer and the readers as codified in tone, assumed knowledge and/or jargon) and textual (linking of linguistic elements and parts of a text into a coherent and cohesive whole) as language users make choices within the conventionalised coding (semiotic) system by considering the appropriacy or inappropriacy of different linguistic choices in relation to the rhetorical situation. Such rhetorical situation requires the writer's consideration of the information to be transmitted (ideational), the audience (interpersonal) and the media (textual). This cognitive process is closely connected to the social role of language, as every instance of discourse or text is assumed to comply with certain registerial and generic conventions that contribute to the semantic potential of the text. SFL defines register as the set of variables in the immediate context of situation that impact on language use, thus the analysis of mode (amount of feedback and role of language), tenor (role relations of power and solidarity) and field (topic or focus of the activity). "(T)his analysis of the situation tells us something significant about how language will be used (...) it turns out there are some very obvious implications of contrast between spoken and written modes" (Eggins, 2004 p. 92). Both situational context and the cultural context affect discourse, and any instance of discourse, spoken or written, is meant as a vehicle for self-expression, interpersonal transactions or construction of interpersonal relationships within a community. In order to be successful users, second/foreign language learners need to gain awareness of genres—the way of doing things with the language—and their variations from one culture to another as well as the cultural differences and expectations concerning values, behaviour and language use, both in writing and speaking. Moreover, when writing determines affiliation to a particular scientific field, it is imperative to learn and display more specific generic expectations in relation to particular discourse communities (Swales, 1990).

Problems with ideational metafunction were related mainly to the type of content required for each of the publications. Some of the papers required revision based on the intended audience or reviewers who required specific works to be included in the bibliography; in other cases, the reviewers found that some of the experimental procedures or conclusions required higher level of details either in the theoretical background or discussion of results. All these were dealt with first with the research tutors and then in the English class, but as a whole these aspects were rarely predictable as reviewers who are typically anonymous, tend to make diverse comments.

Issues related to the interpersonal metafunction could be categorised in intended audience of the publication, and cultural expectations. The publications were addressed to audiences with high technical knowledge, though not necessarily experts in the specific topics. Therefore, novice researchers needed to be reminded of this possible gap in audiences' knowledge and the need to make consistent use of lexical choices, include clarifications and explanations of algorithms and acronyms that might confuse non-experts. In one case, the publication had a strong educational element (Science and Education) and it was necessary to revise terms that had specific meaning in educational jargon, so as to avoid misunderstandings. The establishment of a successful relationship between text producers and academic readers depends on the effectiveness of the writer to present an argument that appears both solid and clear. However, non-natives tend to assume that detailed descriptions of procedures and figures should be self-evident. Non-native writers need to comprehend that one of the main features of English is that, unlike Latin or Asian languages, the burden of clarity lies with the text producer rather than the readers. Consequently, novice researchers needed to polish their argumentation strategies so as to make their texts self-explanatory, by improving paragraph organisation and process description as well as fine-tuning the use of modalization in the discussion of results and conclusion.

The textual metafunction required detailed analysis of the texts to identify specific problems. While one of the strengths of these writers comes from their vast experience as readers—since both their university courses and their research prior to producing their own work demands effectiveness to recognise specific rhetorical moves, technical terms and lexical chunks—, their written productions resulted stilted and lacked consistency in terms of style. Overreliance on passive structures, short sentences, Spanish sentence structure, poor punctuation, repetition of chunks or connectors, and unsuitable collocations were the most salient issues addressed individually throughout the co-editing process.

Objectives

The objectives were established based on the student-researchers' needs. Teaching these novice researchers was demanding because of their long-term need to learn how to write following the conventions of formal academic scientific register in a foreign language—a skill that even fluent native speakers of English take years to master—and their short-term need to edit their texts within a limited time-frame to qualify for scholarships. Their long-term need could have been addressed using most of the material for scientific writing available in textbooks or specialised websites, yet the second proved more challenging as they initially expected someone to read and correct mistakes.

Theoretical Framework

The present pedagogical experience draws on the Cognitive Process theory first introduced by John Hayes and Linda Flower (1981) and later remodelled by Hayes (2012). These authors place the writer's cognitive practices, rather than the material outcome, at the centre of the composition activity. The main tenets of this theory sum up the axioms that were then explained, modified and expanded in later research:

1. The process of writing is best understood as a set of distinctive thinking processes which writers orchestrate or organise during the act of composing.

2. These processes have a hierarchical, highly embedded organisation in which any given process can be embedded within any other.
3. The act of composing itself is a goal-directed thinking process, guided by the writer's own growing network of goals.
4. Writers create their own goals in two key ways: by generating both high-level goals and supporting sub-goals which embody the writer's developing sense of purpose, and then, at times, by changing major goals or even establishing entirely new ones based on what has been learned in the act of writing.

The initial working model was made of three elements: the task environment, the writer's long-term memory, and the writing processes necessary to complete the task. Even though each of these intellectual planes appears to demand specific cognitive processes, the complexity of creative composition by expert writers demands their constant juggling and juxtaposition to address writer's micro and macro goals at each stage. The task environment defines both the *rhetorical problem* the writer is to solve and the written text itself, since writers are expected to create units of meaning with certain generic and registerial coherence as well as cohesion, which creates the demand for thoughtful integration of subsequent paragraphs, sentences and even words. Hayes and Flower's initial model considered only writer's long-term memory, whereas the refurbished model integrated the role of working memory as well. Long-term memory was supposed to comprise the background knowledge about the audience, the topic, the writing plan and the language that writers applied in the process of composition. The reworked model (Hayes, 2012) considers a whole level or resources, in which long-term memory, working memory, attention and reading are combined to facilitate the writer's execution of the text. Nonetheless, this distinction highlights that at different times one of these may prevail over others to work towards specific writer's goals.

The level of writing processes—originally comprising planning, translating, and reviewing grounded in self-reflective monitoring—evidences most alterations in the latest model. The sub-processes in the original model have been re-organised to create a level of process, in which the writer takes the role of proposer, evaluator, translator and transcriber of ideas and material; and a level of control that replaces and enhances the previous monitor function, including the influence of personal motivation, the current writing plan, background writing schemas, as well as the most complex and flexible of all cognitive processes: goal setting, which determines the specific cognitive processes necessary at each stage in view of the need to follow a plan, transcribe ideas or edit any aspect of the text to suitably solve the rhetorical problem.

In the light of the cognitive theory of writing, I understood that these writers had *translated* both their ideas and texts from Spanish to English. This double translation was certainly problematic and even more cognitively demanding than Flower and Hayes' initial conceptualisation, as they explain that "(t)he information generated in planning may be represented in a variety of symbol systems other than language, such as imagery or kinetic sensations" (1981, p. 373). That was the first form of *translation* for these researchers, which was certainly a challenge given the level of abstraction and complexity of the topics. Then they had to cope with a second instance of *translation* from their native to the foreign language, which Flower and Hayes include in the same process, as their analysis explores the competences of native speakers of English: "The process of translating requires the writer to juggle all the special demands of written English, (...) lying on a spectrum from generic and formal demands through syntactic and lexical ones down to the motor tasks of forming letters" (1981, p. 373). The latter was indeed problematic, because of their limited knowledge of the conventions and resources

of the English language. Editing for greater grammatical accuracy, collocations and punctuation might have corrected immediate errors, but my non-expert interpretation of their texts might have resulted in subtle changes of meaning that might have undermined their eventual publication. Therefore, the usual process of revision (questionnaires, peer feedback, editing for grammar and mechanics) used with other EFL learners had to be redefined to meet publication deadlines. As revision for content was usually monitored by academic tutors, the novice researchers' needed guidance on how to become expert writers with the assistance of a language teacher.

I decided to approach writing instruction collaboratively (Hunzer, 2012) and integrate technological resources that allowed learner independence. Co-editing is a scaffolding technique that helps novice writers gain awareness of the writing process by revising and explaining their intended meaning, build language sensitivity by discussing and practicing particular aspects of formal scientific register, and expand their working memory by making use of technological tools. In this context the writing teacher functions as an extra cognitive resource that enhances learner's working memory, prompts critical reflective reading and suggests strategies and resources instrumental in dealing with particular linguistic issues.

The procedure

The process of co-editing was carried out using the material the novice researchers were working on at any time, once they and their research supervisor or tutors had agreed on the content of a text.

1. The class required the novice researcher and writing teacher alternate in reading aloud the document from their computer screens. In some cases, we edited the same document using Google Drive, but it could prove distracting to have two people writing at the same time.

2. If the ideas were not clear, the novice researcher would explain the content in Spanish. During the initial stages, it was necessary for researchers to provide lengthy explanations on their research topics, because I lacked specific scientific field expertise. In time, the topic in general became clearer for the teacher and captions for algorithms and charts were easier for the novice researchers to explain.

3. Paragraphs were first edited to enhance unity of ideas and cohesion. Students were taught thematic transition in paragraphs and transitional words and phrases. As logical paragraph organization became the norm, students got used to including topic sentences and identifying supporting ideas and details.

4. Sentence level issues were isolated and microteaching was provided, in most cases students were then given homework on grammar, vocabulary or punctuation using self-correction software (*Longman Exams Dictionary*², *New Oxford Practice Grammar Advanced*³, *Macmillan English Grammar in Context Advanced*⁴, *The Blue Book of Grammar & Punctuation*⁵, among others). Then main topics were standard syntax and

² Longman (2006). *Longman Exams Dictionary with CD-ROM (paper)*. Pearson ESL.

³ Yule, G. (2008). *New Oxford Practice Grammar Advanced with Key and Multi-ROM pack*. OUP.

⁴ Vince, M. (2008). *Macmillan English Grammar in Context Advanced with Key + CD ROM*. Macmillan.

⁵ Straus, J., & GrammarBook.com (2024). *The Blue Book of Grammar & Punctuation*. [Online]. GrammarBook.com. <https://www.grammarbook.com/>

word order, use of commas and semicolon, types of verbs, relative clauses, participial clauses, passive voice, cleft-sentences, inversion and nominalisation.

5. Sentences were edited to improve intelligibility by using different syntactic features: effective subordination, necessary emphasis, marked structures only when appropriate; and parallel constructions asyndetic coordination.

6. Sentences were edited to polish lexical choices, such as use of classifying rather than qualifying adjectives, dependent prepositions, collocations and words with negative connotations. For this stage we used *Corpus of Contemporary American English*⁶, *Longman Grammar of Spoken and Written English*⁷, *Oxford Collocations Dictionary*⁸ and online thesauri.

Assessment

To assess the teaching procedure designed to suit the students' needs, the novice researchers were surveyed (See Appendix) on their opinions, attitudes, and perceptions. They had to identify their perception in relation to the needs identified, answer questions about their background knowledge prior to starting the course, tick objectives achieved along the writing instruction through co-editing, and provide general comments.

The collected answers suggest that co-editing was an effective scaffolding strategy that novice researchers valued both for its immediate results and long-term impact. The acceptance and eventual publication of their research articles provided immediate feedback for both the disciplinary content and their use of English in their academic fields. The weekly frequency of the co-editing sessions allowed for specific aspects to be dealt with in class and researchers could then work on their own on grammatical exercises and self-editing; thus, they gained confidence in using specific dictionaries and resources. The survey results highlight satisfaction in the expansion of linguistic resources and strategies for self-correction and self-expression. Surprisingly, they felt they were able to employ their language skills not only more accurately but also more creatively to convey their ideas. Nonetheless, their focus on language meant that they failed to fully reassess their perception of the cognitive processes involved in writing in a foreign language.

Long-term writing objectives were met by focusing their attention on different aspects of texts at different moments, so they could initially address content, then organisation and finally linguistic aspects of their productions; in that way, it was possible to create a sense of progress that matched their scientific mindset. Moreover, they incorporated specific writing and learning strategies as part of their communicative skills, which allowed further independence as users of the English language and future experts in their academic field.

Conclusions

Academic and scientific writing in English pose particular intellectual challenges to non-native speakers of English. Postgraduates and researchers may trudge through their scientific field to prove their expertise and gain recognition within the international academic arena, while juggling limited linguistic and strategic resources to communicate their ideas. As this initial experience suggests, co-editing can effectively aid novice researchers, as they could both meet the publication demands and schedules of their post-

⁶ <https://www.english-corpora.org/coca/>

⁷ Biber, D., Johansson, S., Leech, G., Conrad S., & Finegan, E. (1999). *Longman Grammar of Spoken and Written English*. Pearson Education Limited.

⁸ Oxford University Press (2009). *Oxford Collocations Dictionary with CD-Rom*. OUP.

graduate programmes, as well as expand their writing skills, yet the technique proved more taxing and time-consuming than initially expected for both teacher and learners. Although this editing methodology challenged initial expectations on the part of the writers, they eventually valued the possibility of personalised instruction and long-term improvement in their general linguistic competences. Academic boards in charge of designing postgraduate programmes, particularly in the field of Computer Sciences, could certainly benefit from this experience and evaluate the possibility of including academic writing in English so as to better equip novice researchers to deal with the communicative challenges ahead.

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Appendix

Survey results:

Expand your vocabulary-	100%
Gain awareness of grammatical choices and choose the most suitable for the genre	100%
Practice grammar patterns in a meaningful context	100%
Improve your general understanding of academic writing	100%
Enhance your capacity for critical reading	100%
Produce more accurate texts	100%
Gain awareness of the rhetorical situation (context, speaker, audience message, and purpose) in texts in general	50%
Gain awareness of the writing process	50%
Improve your strategies for self-correction	100%
Use specialised dictionaries	100%
Enhance your creativity	100%
Improve your general writing skills	100%