Towards the Adoption of ESAP-based Language Instruction for Undergraduate Students of Botany

Saritha M
Sanatana Dharma College (S. D. College), University of Kerala, India
sarithamvrindavan@yahoo.com

Bindu Nair
Sanatana Dharma College (S. D. College), University of Kerala, India
binduanil8802@gmail.com

(First received: April 25, 2024; accepted: September 23, 2024)

Abstract

English for Specific Academic Purposes (ESAP) envisages the tailoring of English instruction to the peculiarities and specific demands of students' majoring discipline. Different disciplines place their own demands on English language resources. Therefore, the first step towards adopting ESAP based instructional strategies is to identify the peculiarities of a given discipline and its specific demands on the English language. This reflective article approaches English instruction for undergraduate students of Botany in the non-native context of Kerala, India from the ESAP perspective. The aim of this paper is to identify the peculiarities of Botanical discourses. Capitalizing the input provided by teachers of Botany and the analysis of Botany textbooks, we draw conclusions regarding the writing genres in Botanical discourses to be transacted in the ESAP based English sessions.

Key words: English as a Second Language (ESL), English in Higher Education, English for Specific Academic Purposes (ESAP), Genre Analysis, Genre Pedagogy, English for Botany Students

Resumen

El inglés con Fines Académicos Específicos (ESAP) prevé la adaptación de la enseñanza de la lengua inglesa a las peculiaridades y demandas específicas de la disciplina de especialización de los estudiantes. Las diferentes disciplinas imponen sus propias exigencias a los recursos del idioma inglés. Por lo tanto, el primer paso hacia la adopción de estrategias de enseñanza basadas en ESAP es identificar dichas peculiaridades y demandas específicas disciplinares sobre la lengua meta. Este artículo reflexivo aborda la enseñanza del inglés a estudiantes universitarios de Botánica en el contexto no nativo de Kerala, India, desde la perspectiva ESAP. El objetivo de este artículo es identificar las características distintivas de los discursos botánicos. Capitalizando los aportes proporcionados por profesores de botánica y el análisis de los libros de texto de botánica, extrajimos conclusiones sobre los géneros de escritura en los discursos botánicos a abordar en las clases de inglés basadas en ESAP.

Palabras claves: inglés como lengua segunda, inglés en educación superior, inglés con fines académicos específicos, análisis de género, pedagogía de género, inglés para estudiantes de Botánica

Introduction

Given the world-wide spread of English and the use of English as the medium of instruction (EMI) in higher education, even in non-English speaking contexts, English for academic purposes (EAP) research now bears unprecedented significance. EAP has further been divided into English for general academic purposes (EGAP) and English for specific

academic purposes (ESAP). To Flowerdew (2016, p. 7), "while EGAP is concerned with the provision of English for students in all fields of study, ESAP is focused on the needs of students from specific disciplines". Within its purview, ESAP research has the analysis of student needs in specific disciplines and the application of resultant insights in developing materials and pedagogy for its beneficiaries.

Studies in applied linguistics illustrate that there are considerable differences between disciplines in terms of language demands: "particular linguistic features and communicative practices are associated with specific disciplines and students need to develop competency in these linguistic features and practices in order to study effectively in their disciplines" (Peacock and Flowerdew, 2001, as cited in Flowerdew, 2016, p. 8). Hence, ESAP research holds the key to making language instruction easier and more effective in higher education contexts where discipline specificity is vital. ESAP practices are of even more significance in non-native EMI higher education contexts where students are not so well-versed in English as to grasp the nuances of discipline specific language without consciousness raising.

This paper reflects on the case of entry level undergraduate Botany students in the non-native EMI context of Kerala, India, and analyses the language used for undergraduate study in Botany to arrive at conclusions on the different genres that need to be dealt with while engaging ESAP based English language sessions.

The Language of Science

Goldbort defines Scientific English as "a communication tool, a culture of writing, and a plain and readable manner of writing with specific compositional strategies and uses of language —all of which permit the community of scientific researchers to conduct its professional affairs" (Goldbort, 2006, p. 1). Having defined language as a tool of science, he goes on to assert that everything that scientists engage in, from note taking to publishing and teaching are actualized through language (Goldbort, 2006). The main function of scientific writing is to provide factual and precise information, in a way that is clear, concise and explicit. Redundant, repetitive and unimportant information is not acceptable in the sciences. The tone of scientific language is formal and objective.

Martin (2003) identifies experiment, explanation, report, biography and exposition as key genres in science writing. He discusses each of these genres in great detail. Experiment is the symbolic representation of scientific method that enables scientists to write their research. It includes the aim, methods, results and conclusions. Explanations, according to Martin, are small reports. They are well organized and consist of a large number of action verbs. They may be used to teach specific concepts. Report is a more descriptive style of writing that helps in organizing information like classification, composition, etc. Biography focuses on the life and contributions of scientists. Exposition seeks to justify a position on a controversial topic. This advanced genre helps students develop understandings of scientific argument.

As Goldbort states, "Using scientific English to communicate plainly and readably requires certain compositional strategies, from the level of words and phrases to that of sentences and paragraphs…" (2006, p. 16–7). According to the author, objective and precise scientific English is obtained through "making congruent pronoun references; using passive versus active wording; using tense precisely; using concrete versus abstract wording; denoting versus connoting; using numerical expression; articulating action and narrative focus; ensuring logical continuity; and avoiding unnecessary, useless, and dense language" (p. 18).

According to Barber (1962), scientific writing has distinctive features like long sentences, complex noun and adjective phrases, abundance of non-finite phrases, subordinate clauses, etc. The author states that such writing also includes many infinitive clauses, relative clauses, passive voice and frequent use of the simple present tense. Similarly, Strevens (1977),

referring to the diction of science, points out that scientific language involves numerous roots and affixes from Greek and Latin.

Halliday and Martin (2003, in de Oliveira & Lan, 2014) discuss how science organizes information using complex clause structures and unique scientific lexicon and grammar. Informational density, technicality, abstraction and authoritativeness are some of the properties of science writing according to Fang and Schleppegrell (2008, in de Oliveira & Lan, 2014). Through an analysis of the corpus of school science textbooks, de Oliveira (2010, in de Oliveira and Lan, 2014) identifies specific language demands in reading and writing science. Use of scientific terminology, special use of connectors, everyday words with specialized meanings, noun groups with zigzag structuring, etc. are among the properties identified by her. She also points out that in scientific language lexical content is accumulated in expanded noun groups creating high lexical density.

The aforementioned peculiarities set the discourse of science apart from everyday use of language. Scientific language is unique in terms of its audience, context, purpose, degree of objectivity, genres, as well as lexico-grammatical features.

Academic Genres in Undergraduate Study of Botany

Smith (2019) defines genres as "social actions used to achieve a particular purpose, for a particular audience and context" (p. 6). His work deals in detail with the genres that students encounter in undergraduate studies. Along the lines of Martin (2003), who classifies science writing genres, and Rose (2015), who distinguishes between factual and procedural genres, Smith identifies patterns of description, explanation, recounting and exposition as they appear in academic text types like essays and reports. Essays, according to Smith, may be subdivided as description essay, process essay, comparison and contrast essay, cause and effect essay, argument essay, and classification essay. Reports may be classified as experimental reports, business reports, case study reports, progress reports, etc. Other academic genres include posters, research proposals, theses/dissertations and abstracts. His work elucidates each genre in terms of its purpose, context, content, stages and rhetorical features. Smith's framework of genre description has been used for examining the genres of Botanical discourse in this paper.

The major genres in Botany, whose comprehension is pivotal to the learning of the subject, appear in textbooks and lab manuals used for undergraduate study. Students are expected to comprehend them and also produce them in their notes, assignments, lab records and examinations. The expected audience for students' writing is their own teachers, who judge their level of understanding and expertise from their textual productions. Hence, reading and writing these genres at the undergraduate level serve the twin purposes of learning and evaluation. As gathered from interviews with teachers, the major content areas covered in the discourse of Botany include description of flora, explanation of natural phenomena, elucidation of natural processes/cycles, hierarchical classification of flora, descriptions of experiments, procedures and instruments, etc. The academic genres used for the purpose are mostly essays, short essays and reports.

Table 1. Content Areas and Writing Genres in Botany

Content Areas	Writing Genres
Description of flora	Short descriptive essays
Explanation of phenomena	Short definition essays
Description of natural processes/cycles	Process essays
Structure and functions of instruments/ machines	Short descriptive essays, experimental reports
Procedures	Process essays, experimental reports

Experiments	Experimental reports
Hierarchies/ Classifications of flora	Classification essays

Description of Flora (Short descriptive essays)

Description of flora in the form of short descriptive essays is a staple of taxonomy learning and research in Botany. Taxonomy involves the identification, naming and classification of flora for which this genre is inevitable. Description of flora follows a set pattern beginning with the description of roots and progressing to the shoot, flowers and fruits of plants. This type of content is best presented in the description essay format typical for explaining characteristics of physical objects. Writing in the description essay is objective and focuses on the observable and measurable aspects such as size, colour, shape, arrangement and position, as is necessary in flora description. Other aspects such as function, structure and properties of different parts of a plant are also dealt with. The stages of this genre include introduction, main body and conclusion. The basic physical attributes are presented first followed by more complex aspects. Description of flora is done in the simple present tense and uses adjectives typical of the botanical discourse such as 'elongated', 'caducous', 'persistent', 'intermittent', etc. Adjectives of Greek or Latin origin like 'polypetalous', 'gamosepalous', 'gamopetalous', 'apocarpous', 'syncarpous', 'adnate', etc. are also used in the process of description. Position words and expressions like 'posterior', 'anterior', 'dorsal', 'ventral', 'adaxial' etc, also characterize this genre.

Explanation of phenomena (Short definition essays)

Explanations of biological phenomena (e.g., parasitism, commensalism, osmosis, decomposition, plant cognition, soil erosion, etc.) in the form of short definition essays are common in undergraduate level Botanical studies. Descriptions of phenomena occur mostly in studies of plant physiology, cytology, genetics and ecology. The most significant component of this genre is the definition of the biological phenomenon under consideration. Definition consists of the identification of the phenomenon followed by a relative clause showing its characteristics. Supporting ideas in the essay are organized using etymology, exemplification, comparison, contrast, classification, description, etc. The essay progresses through the stages of introduction (which includes the definition), body and conclusion. The present tense is predominantly used in this text type. Phrases like 'refers to', 'is known as', 'is called', 'deals with', etc. are commonly used in this genre. It may include descriptions of objects and explanation of processes as sub elements.

Description of natural processes/cycles (Process essays)

Description of natural processes/cycles like photosynthesis, carbon cycle, etc. in the form of process essays is common in the undergraduate study of Botany. Such texts are abundant in plant physiology, cytology and studies of ecology. This genre presents a series of stages to explain how something happens. This genre follows the conventions of the 'habitual process description' where the aim of the writer is to give information to the readers regarding a habitual/natural process rather than to give directions for a process to be performed. The essay proceeds through the stages of introduction, body and conclusion where the body describes the process in great detail. Usually, a paragraph is set aside for each stage of the process described. The stages are described chronologically. This genre uses the simple present tense and verbs like 'occurs', 'combines', 'forms' 'generates', 'contracts', 'relaxes', 'absorbs', 'evaporates', 'condenses', etc. Sequence transitions like 'first', 'to begin with', 'next', 'afterwards' and 'finally' are inevitable in this genre. Time signals including 'after a few hours', 'at the same time', 'meanwhile', 'in the meantime', among others, are also part of the process essay. This genre is mostly accompanied by diagrams or flowcharts to elucidate the stages of the process.

Structure and functions of instruments (Short description essays, experimental reports)

Presentation of the structure and functions of instruments/machines (e.g., simple and compound microscopes, centrifuge machine, etc.) in the form of short descriptions can occur either as independent pieces or as sub-elements in laboratory reports. The genre involves the description of tools/instruments in terms of components and functions. As in other description essays, this text type also involves detailed examination of physical features like size of the objects. The components of the machine/ tool are described with reference to their role in the overall functioning of the unit. The purposes of machines and the technique applied in using the equipment are described in detail. The sentences are in simple present tense and expressions of position like 'above', 'below', 'at the bottom' or 'at the top' are frequently used. The texts are usually accompanied by diagrams showing the structure and functions of the tool/machine. In an experimental report, descriptions of instruments appear in the apparatus section.

Procedures (Process essays, experimental reports)

A procedure description can appear either as an independent text type in the form of process essays or as a sub-element in experimental reports. Procedures described in Botany can range from simple lab procedures like taking and mounting sections, to multi-staged procedures in horticulture and tissue culture. Procedures in short process essays follow the conventions of 'directional process description' whose aim is to guide the reader through a series of stages in a procedure. The reader may perform the procedure as per the instructions given. The description of procedure may use the imperative sentence types or the passive voice in some cases. Transition words indicating the link between various stages, like 'first', 'to begin with', 'next', 'the next step is', may be used for clarity. Within an experimental report, procedure description is a subsection which explains the steps of the experiment in detail. Undergraduate students are expected to write detailed procedures in their lab records.

Experimental reports

Experimental reports help scientists to perform experiments, interpret data and share their findings with other scientists, and they are considered the most important form of communication in the sciences. An experimental report includes the background of the experiment and the reason for conducting it, i.e., the aim of the experiment. It should detail the apparatus, procedure, results and findings of the experiment. The various stages in the laboratory report are the preliminaries (title, abstract, contents page), introduction, main body, conclusion and end matter. However, students normally use the shortened form of experimental reports in their lab records, consisting of the purpose, materials, procedure, results and conclusion. This genre makes extensive use of the simple present/past tense depending on the time of reference of the experiment. Objective language is used. Terms such as 'investigating', 'calculating', 'measuring', 'demonstrating', 'analysing', etc. are used in the preliminaries (title, abstract, contents page). The introductory or theoretical part uses expressions like 'according to', 'the law states that', etc. Sequence transitions and time signal words are used in the case of this genre as in the case of process essays.

Hierarchies/classification of flora (Classification essays)

Botanical studies involve the classification of flora based on characteristic features (e.g., angiosperms and gymnosperms). It is a staple of taxonomy studies. Therefore, classification essays are the most suitable genre for representing such hierarchies/classifications. It introduces the criterion/criteria for classification in the initial phase followed by the placement of flora in respective categories/groups. When there are multiple criteria of classification, each paragraph

covers a particular criterion. The genre predominantly uses the simple present tense and applies expressions like 'classified as', 'grouped into', 'placed in', 'grouped on the basis of', 'classified according to', 'divided', 'sub-divided', etc. Transition phrases like 'the first type of' and 'the next category' are also common in this genre. Classification essays often include descriptive paragraphs detailing the familial characteristics of flora. These paragraphs are replete with adjectives portraying the physical characteristics of flora types.

Conclusion

The content and genres mentioned are inherent to the discourse of Botany. Mastery of these genres would enable students to engage successfully with the disciplinary content. Apart from the genres, the use of general scientific terminology and, specifically, that of terms of Latin and Greek origin were identified by the interviewees as features of Botany discourses. Teachers were assertive in pointing out that English teaching at college level should definitely take into account the demands of the target group's discipline. Discipline-oriented English sessions, according to them, would develop greater interest for the learning of English and, at the same time, improve students' engagement with disciplinary content. These teachers shared first-hand knowledge of the fact that the current local curriculum is not based on discipline-specific language learning strategies. Thus, it would be advisable to have the main curricula of English in colleges in India—though it might also be the case in other countries of the world—reformed in tune with ESAP strategies.

References

Barber, C. (1962). Some Measurable Characteristics of Modern Scientific Prose. In F. Behre (Ed.), *Contributions to English Syntax and Philology* (pp. 21–43). Almqvist and Wiksell.

de Oliveira, L. C. (2010). Enhancing content instruction for ELLs: Learning about language in science. In D. Sunal, C. Sunal, M. Mantero & E. Wright (Eds.), *Teaching science with Hispanic ELLs in K-16 classrooms* (pp. 135–150). Information Age.

de Oliveira, L. C., & Lan, S. W. (2014). Writing science in an upper elementary classroom: A genre-based approach to teaching English language learners. *Journal of Second Language Writing*, *25*(September), 23–39. https://doi.org/10.1016/j.jslw.2014.05.001

Fang, Z., & Schleppegrell, M. (2008). *Reading in Secondary Content Areas: A Language-Based Pedagogy*. University of Michigan Press ELT.

Flowerdew, J. (2016). English for Specific Academic Purposes (ESAP) Writing: Making the case. *Writing and Pedagogy*, *8*(1), 5–32. https://doi.org/10.1558/wap.v8i1.30051

Goldbort, R. (2006). *Writing for Science*. Yale University Press.

Halliday, M. A. K., & Martin, J. R. (2003). *Writing science: Literacy and discursive power*. Routledge.

Martin, J. R. (2003). Literacy in science: Learning to handle text as technology. In M. A. K. Halliday & J. R. Martin (Eds.), *Writing science* (pp. 184–222). Routledge.

Peacock, M., & Flowerdew, J. (2001). *Research Perspectives on English for Academic Purposes*. Cambridge University Press.

Rose, D. (2015). Genre, knowledge and pedagogy in the 'Sydney School'. In N. Artemeva and A. Freedman (Eds.), *Genre studies around the globe: beyond the three traditions* (pp. 299–338) Inkwell.

Smith, S. (2019). *Academic Writing Genres: Essays, Reports & Other Genres*. EAP Foundation.

Strevens, P. (1977). Special-Purpose Language Learning: A Perspective. *Language Teaching & Linguistics: Abstracts*, *10*(3), 145–163. https://doi.org/10.1017/s0261444800003402