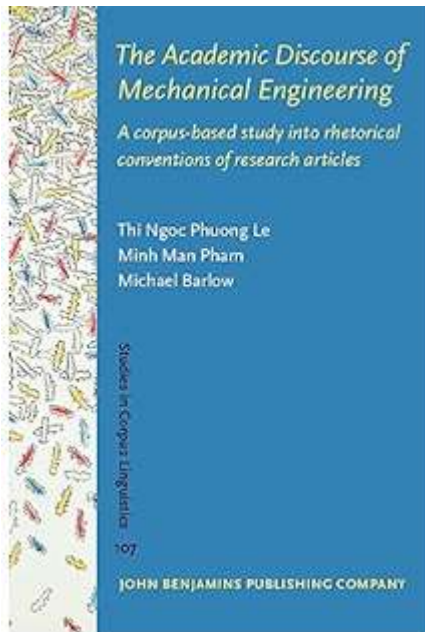


BOOK REVIEW



HOW DOES LANGUAGE REFLECT AN ENGINEERING DISCIPLINE?

Thi Ngoc Phuong Le, Minh Man Pham and Michael Barlow. THE ACADEMIC DISCOURSE OF MECHANICAL ENGINEERING: A CORPUS-BASED STUDY INTO RHETORICAL CONVENTIONS OF RESEARCH ARTICLES (2023), Amsterdam/Philadelphia: John Benjamins. 320 pp., ISBN 978-9-027-25450-4 (EBK); ISSN 1388-0373. <https://doi.org/10.1075/scl.107>

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Mechanical engineering is a highly diverse and versatile field of engineering that deals with the design, manufacture, installation, and operation of engines and machines as well as with manufacturing processes (McGregor Ross & Fleetwood Baker, 2024). It can be regarded as the backbone of the technical and technological progress of human civilization. For centuries, it has shaped our modern society and has had a powerful impact on every aspect of our lives. Mechanical engineering encompasses many sub-disciplines, such as mechanics, thermodynamics, materials engineering, manufacturing engineering, automotive engineering, aerospace engineering, marine engineering, robotics, mechatronics, biomechanical engineering, etc. Hence, one can imagine how broad in scope and quantity the mechanical engineering lexis can be. Also, the mechanical engineering discourse is a large pool of rhetorical conventions and devices used by mechanical engineers both in their oral and written communication. Still, a review of the literature reveals that studies on the mechanical engineering discourse are scarce. In comparison to other disciplines, e.g., computer science or health science, and in terms of rhetorical structures in particular, the discipline of mechanical engineering is relatively under-researched. The book *The academic discourse of mechanical engineering* by Thi Ngoc Phuong Le, Minh Man Pham and Michael Barlow is therefore a valuable contribution

to the research on this particular discourse. The focus of the authors is on the rhetorical conventions used in mechanical engineering research articles to examine how the knowledge-making principles of the disciplines are expressed.

In the Introduction, the authors explain the rationale and the aims of the study. They embarked on the adventure of investigating the academic discourse in mechanical engineering based on the statement that “each discipline develops its own epistemic principles for defining knowledge and for what constitutes compelling evidence and persuasive arguments” (p. 1). Focusing on the phraseology, the investigation aims to analyse the organisational pattern of the whole mechanical engineering article, and not only of some of its parts, as done in some previous studies – e.g., Cotos et al. (2017) examined the method section of research articles, or Omidian et al. (2018) focused on research article abstracts.

Chapter 2, “Theoretical frameworks”, deals with move analysis and phraseology as the two major theoretical concepts the book draws upon. After presenting genre analysis and move analysis as proposed by Swales (1990, 2004), the authors explain the research perspectives motivated by the model and methodological issues and research foci associated with the move analysis study. The second part of this chapter focuses on the distributional approach to phraseology, based on Sinclair’s (1987) work on lexicography, terminology, methodology, structures, functions, and communicative functions linked to rhetorical moves.

Building on the information presented in Chapter 2 regarding move analysis and phraseology, Chapter 3 moves to the rhetorical features of mechanical engineering articles. First, an overview of the mechanical engineering discipline and sub-disciplines including the research methods and epistemological and sociological properties of mechanical engineering are provided. Then, the role of the informants – i.e., disciplinary consultants – is explained and the corpus is presented. The additional insights given by mechanical engineering informants, albeit only four of them (all of them lecturers in mechanical engineering, having published in national and international peer-reviewed journals), increase the value of the study greatly. Many linguists know that it is not easy to implement the method of consulting experts in a linguistic study for a number of reasons, so having reliable feedback from academic specialists undoubtedly yields more comprehensive results.

The corpus that the study draws on consists of a large number of representative samples of texts, namely, 120 mechanical engineering research articles. The articles are equally distributed across two sub-disciplines (mechanical systems and thermal-fluids engineering), three research traditions (experimental, theoretical, and mixed methods), and two publication periods (2002-2006 and 2012-2016). While constructing their corpus, the authors considered many factors, including corpus population (the type of language being investigated), sampling frame (the listing of population members from which a representative sample can be chosen), sampling method (how items are selected), corpus size, sample size

(how many texts are included in the corpus) and sample type (whether extracts or full texts should be included in the corpus) (see pp. 42-49), resulting in a well-designed corpus.

The two strands of research carried out in two studies are presented in the next chapter “Methodology”. Study 1 examines the properties of rhetorical structures and the phraseological profile in mechanical engineering research articles. The authors delineate the move analysis approach to the identification of rhetorical structures and the move analysis procedure for processing and analysing the data, including the phases of model development, model testing, and model validation. Study 2 examines the variation in the rhetorical structures and their content realisations on the levels of sub-discipline, research paradigm, and publication period. These intra-disciplinary differences are studied in terms of the range, frequency, and length of the communicative categories.

The authors divided the text they were analysing into meaningful fragments based on content areas within the text and the judgment and interpretation of their rhetorical functions. The basic unit of analysis was the sentence, however, the sentence was also further broken down into smaller fragments which could be annotated more than once with different moves/steps. One of the strengths of the study is the meticulous methodology and the careful step-by-step process used to extract n-grams (fixed recurrent multi-word units), which also included the manual check of automatically identified multi-word units – in this case, it was checked whether 4-grams were meaningful.

In Chapter 5, the authors present the prototypical framework of communicative functions in the mechanical engineering journal articles, the properties of this framework (range, length, frequency, embedding, sequence, and cycle of the communicative categories), and the structural properties – i.e., the main rhetorical features of the mechanical engineering research articles and the interconnections between language use and socio-epistemological properties of the discipline. Being the core chapter, the details of the IM[RD]C (Introduction, Methodology, Results-Discussion, Conclusion) framework of communicative functions for mechanical engineering research articles are given, with numerous moves and steps of each of the functions presented in a comprehensive table. This tabular presentation allows the reader to analyse each function and compare the use of moves and steps in different functions (see Table 15, pp. 79-85). Each move and step are analysed and presented in detail. For example, in the function “Introduction section” the moves are: featuring general knowledge and the literature informing the study (Establish a territory), identifying areas to which the study makes contributions (Identify a niche), and introducing the specifics of the study (Address the niche). Each of these moves has several steps – e.g., Move 1. Establish a territory includes Step 1. Make topic generalisations; Step 2. Refer to previous research; Step 3. Make suggestions; Step 4. Claim centrality; Step 5. Review previous research; Step 6. Evaluate the previous research. An accompanying figure gives also the range and length of the moves/steps in the introduction section (see Figure 11, p. 91).

To present the phraseological profile of the mechanical engineering academic papers, in Chapter 6 the authors fully describe the structural and functional categories and sub-categories of the n-grams extracted from the individual sections, including a linguistic analysis of n-grams. The structural categories are noun phrases, prepositional phrases, adjective phrases, verb phrases, anticipatory *it* phrases, adverbial clauses, and adjective clauses, while the functional categories are research-oriented phrases (referring to quantification, procedure, location, literature, instruments, description and background), text-oriented phrases (specified as transition, structuring, relation, objective, inferential, framing, elaboration, comparative, citation, causative, background and assignment), and participant-oriented phrases (referred to as stance and engagement). Regarding the phraseological properties, the correspondence between structures and functions is studied. The investigation has revealed that there are not only similarities but also many subtle differences between the structural and functional profiles of the n-grams in this study and those in previous studies dealing with linguistic use in other disciplines, showing also that “linguistic and rhetorical conventions in mechanical engineering carry features considered to be the norm in the wider academic world” (pp. 192 & 194). The chapter concludes with an insight into the cohesive links that constitute the mechanical engineering text, which can help develop a cohesive and coherent mechanical engineering text and construct the disciplinary discourse.

The focus of Chapter 7, entitled “Rhetorical variation within the mechanical engineering discipline”, are statistical results of the quantitative analyses regarding the range, frequency, and length of the communicative functions across the sub-corpora – i.e., across the article sections “Introduction”, “Methods”, “Results-Discussion”, “Conclusion”, and “Other functions”. Further, the differences on the three levels – sub-discipline, research tradition, and publication time – are looked at in more detail to result in a summary of the intra-disciplinary structural and linguistic variations and explanations for the distinctive features. Once again, the benefit of using the whole research article in the examination of the rhetorical variation, instead of particular sections, has become evident, as new insights into the interactions between different epistemologies operating within mechanical engineering as a discipline and rhetorical practices have been obtained. As the authors claim, the practice of knowledge-making in mechanical engineering can be characterised as “something dynamic, uncovering its constant state of evolution, not only diachronically but also extending across text types” (p. 234).

In the last chapter, the authors summarise the key findings from this study, highlight the contributions of the book, and discuss some implications and limitations, proposing also some areas of research for future studies. I find the following findings particularly interesting and important: on the one hand, the identified rhetorical features of the mechanical engineering research articles reflect the universal characteristics of academic writing in different disciplines, but on the other hand, although the research space in mechanical engineering research articles is created with elements similar to those in other disciplines, the weight to these

elements is attached in a rather distinct way. As to the variation in publication date, it has been found that contemporary mechanical engineering researchers “focus more on demonstrating the rigour of the methods and the veracity of knowledge claims, and develop a more structured and organised paper” (p. 240). They also minimise the authorial presence to stress the empiricist nature of the methods they used communicating the credibility of their methods and the results derived from these methods. Still, the authors conclude that the research article genre is far from being a monolithic construct, and mechanical engineering articles possess many rhetorical elements specific to the discipline.

While presenting the use of language in terms of rhetorical structures and their linguistic correlates in mechanical engineering academic papers, this book is a valuable addition to the literature on the academic discourse of mechanical engineering. It is a comprehensive account of communicative categories and their relationships across the whole mechanical engineering research article and not only in particular article sections. The linguistic choices every author of a research article makes in the field of mechanical engineering are determined both by rhetorical functions and disciplinary conventions. Therefore, I very much appreciate the fact that the book also links the rhetorical features to the knowledge structure and social aspects of the mechanical engineering discipline.

As an ESP practitioner, I believe the findings of this study can primarily help ESP teachers in the design of English for academic purposes courses for graduate and postgraduate students of mechanical engineering, but they can also help in developing teaching materials for mechanical engineering ESP courses at any study level. ESP teachers teaching English to students of other engineering disciplines, such as electrical engineering and civil engineering, can also benefit from the findings of this study. Finally, I agree with the authors who are aware of the limited pedagogical use of the empirical results that there is no direct translation from the results of the study to classroom activities. This, however, does not reduce the value of this book in any way; instead, it offers an avenue for future research.

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