

CHALLENGES ENGINEERS-TO-BE ENCOUNTER IN READING SPECIALIZED TEXTS

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In the endeavor to find the most efficient ways to enhance learning of English for Specific Purposes (ESP) by engineering students, we have focused on exploiting the specialized text as the most peculiar way of conveying scientific and technical knowledge in academic settings. However, specialized text comprehension is often hindered by text structure itself, for instance, text layout, abundance of domain related terminology used in “science-specific” grammar structures, or students’ lack of experience to tackle expository/subject-oriented texts. The present article discusses challenges students encounter in specialized text reading highlighting the main difficulties students struggle with. It also brings up the peculiarities of the technical text, which make this piece of writing difficult to cope with.

Key words: *specialized text, English for Specific Purposes, reading competence, struggling readers, reading strategies.*

In academic settings acquisition of domain related knowledge is mainly done through the written text. Specialized text, by all means, serves as “a vehicle of information” in content-area subjects, at the same time it is a valuable didactic material in ESP teaching, being a source of linguistic structures and a model of reproduction. In order to use efficiently specialized texts in teaching ESP, one must be aware of what a *specialized text* stands for and what its main linguistic features are. According to Cambridge dictionary, *specialized* means relating to

one particular area or designed for a particular purpose[17]. In English, the terms *specialty text* and *specialized text* are used interchangeably. We will use the second term, specialized text (hereinafter referred to as ST), to refer to technical texts and scientific texts, the ones used widely in engineering higher education. Cabre defines ST from two perspectives, professional and analytical. From the professional point of view, „*specialized texts* are language productions, oral or written, which occur in professional communication, the objective of which is exclusively professional”[4]. Therefore, specialists use ST to interact with colleagues within their professional community or to search for domain specific information. However, from the analytical point of view, Cabre evokes three types of requirements STs shall meet:

1. Discursive conditions: the type of communication being specific to specialized situations
2. Cognitive conditions: the theme being treated and the way it is being treated
3. Linguistic conditions: general textual conditions (precision, conciseness and systematicity), the macro and micro textual form, and especially the lexical units specific to the domain text[4].

The generally agreed feature of a technical text is its objective nature, since its main purpose is to convey objective information on a technical subject. Requirement for clear representation of information for recipients who use it for professional purposes results in employing of some conventions, such as similar syntactical and morphological structures, set expressions and style of most technical texts.

Philippe Thoiron claims that specialty texts have a poor reputation for being difficult to read by the novice. This reputation is based on sound arguments, one of which is “the reader’s conceptual competence in the field of specialization of the text” [16]. Particularly, conceptual competence implies not just knowing the word meaning by the reader, but having a conscious view of its meaning [10]. In fact, any text, whether specialized or not, whatever the level, presupposes a certain degree of conceptual competence on the part of the reader.

According to the American Association for Supervision and Curriculum Development, cited by Pickett and Lester, “*Reading* ... is not a simple process that is mastered once and for all. As the student moves into the organized bodies of knowledge with their own technical terminologies and special vocabularies, in short their languages, he must to a degree learn to read again” [14]. As the area of English written text has extended greatly in the technological era, there has increased the demand for more advanced reading skills in professional environment, consequently, engineering students need better language skills besides their qualifications in STEM (science, technology, engineering, mathematics). Unfortunately, most first-year students struggle with ST comprehension. Actually, many students have a limited reading ability and either superficially exploit ST or give up reading texts that pose problems. There is a range of impediments to successful ST reading, such as:

- 1. Lack of subject matter knowledge:** lack of knowledge in the field comes as a consequence of poor professional orientation of students while in schools, a major drawback of our educational system.
- 2. Concept-dense content of ST:** abundance of scientific and specialized terms, as well as poor awareness of students about rhetorical organization of the text, discourages students to exploit ST. The privileged status of literary genres in school curriculum results in students’ incompetence to deal with expository texts in academic settings.
- 3. Gaps in foreign language general knowledge:** scarcity of necessary linguistic resources, for instance poor vocabulary, lack of grammatical and rhetorical structures also create barriers to text comprehension.
- 4. Inadequate use of reading strategies:** some readers do not read enough in L2 to have developed efficiency in reading or, they may not be able to generalize their strategies to content-area literacy tasks and lack instruction in and knowledge of strategies specific to particular subject areas [3].

5. Lack of background knowledge: all language processing requires world knowledge, therefore, it is essential in reading too. According to Alderson, the activation of such knowledge is fast and automatic, and without such processes, language comprehension would be slow and laborious, if it could take place at all [1].

The effect of the above stated deficiencies generate students' frustration, particularly if the learning material exceeds by far their background knowledge and their ability to comprehend the overall meaning of ST, it causes students to act passively in most of their language classes, it also reduces their motivation. Grabe and Stoller argue that readers encountering comprehension difficulties either try to understand the text by using a slow mechanical translation process or, alternatively, they can make an effort to form a situation model from past experiences and try to force the text to fit preconceived notions. Authors observe that in the second situation, students activate inappropriate background information leading to poor comprehension [9]. The burden of helping students to overcome these difficulties, of course, falls on the shoulders of language teachers. Therefore, elaboration of the methodology of using ST as a means of enhancing English language learning by the engineering students is stringent. Teaching students to benefit fully from ST reading in developing their professional communication competence is the objective of our research study.

In attempting to tackle the ST reading issue, first, we will analyze ST peculiarities in terms of potentially confusing grammatical patterns as well as problematic lexical units, and not the least the rhetorical or organizational cues.

Maurizio Gotti claims that specialized language possesses all the lexical, phonetic, morphosyntactic and textual resources of GL, but is distinguished from the second for its quantitatively greater and pragmatically more specific use of such conventions [8]. A prominent distinctive feature of ST is its extremely compact syntactic structure. Omission of articles, prepositions, phrasal elements in ST is due to the need of conciseness. There are other linguistic devices that make the sentence denser, such as avoiding of the relative clause by substituting it with adjectives obtained by means of affixation (Workable metal=metal which can be worked.); using a present participle as an adjective (A robot controls the moving line. = ... the line which is moving); preference for nominalized forms (A day and night weather observation station.= A station where people observe weather day and night), etc. [8] According to David Crystal, cited by Nagy, "the features of *science specific* grammar are long sentences with a complex internal structure (sentences based on noun phrases), and the use of passive constructions. Moreover, there is an overriding concern for impersonal statement, logical exposition and precise description." [13] All the same, Copeck et al. referring to technical text reading acknowledge that though it is „hard to grasp”, in scientific circles "technical text" means writing which is more tractable because 1) it lacks figurative language and can be understood in its literal sense, 2) there is also a "science-specific" grammar. i.e. the language of science prefers very accurate and unambiguous expressions, which leads to a higher rate of repetitive expressions, to the frequent use of relative pronouns or adverbials [7].

As to lexical features of ST, there is a consensus among researches that the most typical peculiarity of specialized text/technical text is its terminology. *Technical terms* consist mostly of noun phrases containing adjectives, nouns, and occasionally prepositions; rarely do terms contain verbs, adverbs, or conjunctions. [18]. Monoreferentiality, precision and transparency are some of important features of specialized lexis. Having carried out a series of studies on ESP reading, Andrew Cohen and his fellow researchers have underscored the reality that knowing the technical terms is not a sufficient condition for successful reading of specialized material. It was, in fact, the non-technical terms that created more of a problem. The area of difficulty arises because non-technical terms may take a new meaning in a particular field, and they may be used by the authors in contextual paraphrase to refer to the same concept [6].

Experience has shown, however that much of the difficulty in reading comprehension is attributed to the structure of the writing due to readers' inability to use rhetorical and organizational cues. Most technical texts have well-defined structural elements, such as units, chapters, sections. "Dividing the text in this way makes it easier to cover all of the highly technical information and provides excellent infrastructure for contriving classifications and lists that help clarify the concepts further [20].

For instance, Copeck et al give a narration-like definition enlisting the characteristic features of a technical text, as follows: "A technical text is quite likely to have an *identified topic* on which it *is focused*. It will *communicate knowledge* about that topic in a *serious and objective* manner, developing its thought in a *logical, orderly* way. This produces a document with a *hierarchical organization* in which information can be *accessed at random*. Sections in such documents often bear *titles or headings*. Authors typically use *terminology* specific to the domain and avoid *colloquialisms* and *humor or invective*. Their writing is likely to use *same-sense domain verbs* and to make *generic references* (talk about classes rather than individuals). Technical texts frequently have an *introduction and a table of contents or index*. They may use *citations* but avoid *quoted dialogue*. Material may be presented with *special fonts or punctuation* or according to some commonly understood *convention*. It avoids *vague terms* or *figurative language* and tends to use *explicit analogies, unambiguous references* and *nominalizations*.

A number of syntactic characteristics suggest technicality. Technical writing uses few *interrogative or imperative* sentences, but sentences incorporating some form of "*be*" are common. Statements are often couched in the *third person* and the *present tense* and employ *subordination suggesting cause* and effect. *Binders and hedges* are used to knit the narrative together. Writing can be dense: *ellipses are frequent, particles or emphatics* rare [7; 409]

It has long been thought that knowing how texts are organized- what sort of information to expect in what place- as well as knowing how information is signaled, and how changes of content might be marked- might be of importance in facilitating reading. Nevertheless, Alderson accepts that knowledge of text features ought in principle help a reader process information, still, the author maintains that there has been surprisingly little empirical research into student's knowledge of text type/genre [1].

Certainly, illustrating systematically the linguistic and rhetorical organization of ST can be fruitful in overcoming ST reading difficulties. Planning our reading lessons is essential, and we need to set clear objectives and appropriate tasks that will ensure developing sufficient competence in English to read ST freely. Besides, in order to produce active reading attitude, language teachers shall focus on the following issues:

1. Raising students' awareness about the need to develop their reading competence. There should be increased students' motivation for reading by mirroring real-life situations and skills (getting learners ready for reading by providing a context, a purpose and necessary language input);
2. Boosting their confidence by teaching reading strategies, such as predicting, ignoring unknown information or accepting the gaps, understanding textual and extra-textual cues (visuals, graphs, figures, tables, legends), re-reading the text from different perspectives, etc. For example, Chung and Nation suggest teaching technical vocabulary by means of general vocabulary strategies, such as recognizing technical words, interpreting definitions, relating senses of non-technical terms to a core meaning, and learning word parts [5]. Moreover, breaking a complex text down into manageable excerpts becomes less overwhelming for struggling readers.
3. Working on gradual release of dependability on the teacher, and eventually the student using the information independently.

Conclusion: Given the fact that nonnative speakers of English around the world frequently need to read specialized English language material as part of their university studies, in our opinion, a well-developed reading competence is a must-have skill. We are aware that at

the end of university studies students should develop different ways of approaching specialized texts, different ways of positioning themselves in relation to this type of writing, different ways of comprehending writing as a way of constructing meaning. Having scrutinized the challenges first-year students encounter in ST reading, we are firm in our determination to work at elaboration of the methodology of using ST as a means of enhancing ESP learning by the engineering students.

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