Designing ESP Texts for Engineering in the Saudi Context

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ABSTRACT

English has become the de facto lingua franca of the world today. It is important in many fields, including medicine, technology, and the sciences. Engineering is one significant field that uses the English language extensively. For engineering students, ESP texts are essential tools for learning the English language. This study determines whether ESP texts are readily available in Saudi Arabia and, if so, how effective they are in achieving their set goals. Further, the study discusses ways of designing more effective ESP texts. This qualitative study used a semi-structured interview with open-ended questions to gather information from respondents. The target audience was interviewed regarding their perceptions of the English texts they currently use and how to improve them. Ten universities offering engineering courses were purposively selected; then 10 engineering students were randomly selected from each. Their responses were reviewed for information relevant to the aims of this study. The results revealed that, although ESP texts were readily available, they were designed for commercial purposes and did not necessarily meet the specific needs of these engineering students. It is essential that a needs analysis be carried out before ESP texts are designed, as ESP courses should ideally employ a learner-centred approach.

Keywords: ESP, ESP text book selection, Teaching Materials evaluation,

1.0 INTRODUCTION

English for Specific Purposes (ESP) is a utilitarian English language course specifically designed to meet the English language needs of learners in relation to their specific academic fields and professions. In an ESP class, words, vocabulary and subject matter are tailored to a particular discipline. ESP courses began to gain popularity for academic and professional use in the 1960s (Lili, 2015), and ESP is now specifically required in fields such as medicine, engineering, law, accounting, business, management, tourism, architecture, and archaeology.

ESP for Engineering, designed specifically to meet the needs of engineering students, is different from English for General Purposes (EGP) and English as a Second Language (ESL), both of which focus on basic English language skills applicable to all fields of study (Hutchinson & Waters, 1987; Dudley-Evans & St John, 1998). English is the medium of instruction and communication for students studying engineering in the university. Taking most of their courses in English, non-native engineering students can face difficulties in grasping essential content. In order to master the subject, a workable command of the language has first to be achieved. English is the tool of interaction both in engineering classes and in the engineering workplace. Strong English language skills are a pre-requisite for securing a job in the profession (Al-Mously et al., 2013), and they are also a basis for promotion in most engineering establishments. This reality explains why many engineering companies design their own ESP courses to cater to the needs of their employees. Engineers need to empower themselves by developing a command of the English language, both to survive in the workplace as well as to achieve an excellent standard of performance.

1.1 Problem Statement

English for Specific Purposes (ESP) calls for an approach that depends solely upon the learner's comprehension. It has been identified as a significant learning medium for individuals who are learning English as a second or foreign language (Hajana & Adam, 2015). Given that English is accepted as an international medium of communication, it is necessary to identify tools that aid comprehension of the language (Barrett & Liu, 2016; Jenkins, 2013). ESP texts are among these tools. ESP texts play an essential role in helping students – in this case, engineering students – achieve fluency in English and mastery of their subject. Commercially available ESP texts do not fill the gap as expected. It therefore

becomes essential for ESP instructors to understand the need for specific ESP texts related to the learners' field and, consequently, to understand the factors to be considered when designing one.

1.2 Research Questions

Following a learner-centred approach to map engineering students' expectations of learning from an ESP text, the present study attempts to answer the following research questions:

1. What are the current ESP texts for engineering students used in the Kingdom of Saudi Arabia?
2. Are ESP texts for engineering students readily available?
3. How can the current ESP texts for engineering students be improved?
4. What are the requirements for designing an ESP text related to the engineering field?

2.0 LITERATURE REVIEW

2.1 Developing an Appropriate ESP Textbook

As ESP is essentially goal-oriented, any text being used in this domain must be goal-oriented as well. An ESP text caters to a specific academic and professional need (Antic, 2007). ESP texts for engineering students cater to engineering students' needs in terms of grammar, vocabulary and study skills in general. They employ a methodology that is different from the approach of EGP or ESL. Most ESP text materials are designed on the assumption that students already have a basic knowledge of English. In reality, however, particularly in the Saudi context, the majority of high-school leavers enrol in tertiary institutions without an adequate level of preparedness in English. For this reason, teachers and students begin the course with the extra burden of remedial measures aimed at achieving a workable level of communication skills, moving only later to the technicalities of the major. The focus of ESP texts for engineering students should be on the development of reading skills: interpreting lecture notes, following assignments, comprehending lab instructions and journal articles, and familiarizing themselves with technical terms in their discipline. Of late, the importance of writing for engineering students has also begun to be recognized. Students must also practice writing: writing tests, exams, reports, and so on. In addition, speaking and listening skills must be developed. Students should be able to discuss their own points of view, share ideas

with colleagues, and engage in question and answer sessions as well as presentations, both written and spoken.

Designing an ESP text for engineering students requires extensive research. Considering the significant role of materials in ESP teaching and learning, Dudley-Evans and St. John (1998: 170-171) have given four reasons for selecting a text, emphasizing that it should be:

- a source of language
- a learning support
- a source of motivation and stimulation
- a point of reference

The contents of ESP texts for engineering students are distinct from those of general texts. Engineering ESP texts encourage reading of materials relevant to the engineering field. ESP texts should simulate the activities required in engineering-related fields. In this way, students' existing knowledge of the field is not only recognized but improved by the introduction of new vocabulary. Creating a simulation, in class, of what might take place in the field helps students to become mentally prepared to face the practical world of work as an engineer. ESP texts are available commercially, but ESP teachers should also design specific course materials that meet the needs of their students, or, at the very least, they should modify commercially available materials to suit their students' needs (Johns, 1990). Before an ESP text is designed, it is essential that a needs analysis be conducted.

2.2 Needs Analysis

To develop an ESP textbook suitable to students' needs, those needs have to be considered (Munby, 1978; West, 1994). The sociolinguistic model employed by Munby (1978), which has become highly influential, is generally agreed to be the first structured, detailed procedure used by language teachers to identify learners' needs. It categorizes needs analysis into Target Situation Analysis (TSA) and Present Situation Analysis (PSA) and recommends the following procedures:

i. evaluating the current situation (PSA);
ii. visualizing the desired result (TSA) (Basturkmen, 2010); and
iii. contemplating methodologies that bridge the gap between the two.

Visualizing the desired result comprises two major aspects. The first is looking at the progress students need to achieve in grammar, vocabulary and punctuation. The second is looking at the approach to context-related vocabulary. The first aspect aims at facilitating comprehension of texts relevant to the major. Attaining proficiency in English for active use in students' academic (and, later, professional) careers can be taken as the definition of "students' needs." "Learners' needs" refers to the learners' language difficulties and their learning objectives (Jolly and Bolitho, 1998). Such needs fall into three categories: necessities, lacks and wants. While the category of "necessities" primarily focuses on what students need to know in order to perform their responsibilities, the category of "lacks" includes what they do not know, or "the gaps between what the learner knows and the necessities" (Hutchinson & Waters, 1987). As for "wants," these encompass "what the learners think they need" (Nation, 2000: 2). Relating these categories to engineering students, we might find that learners already have a good command of basic English language – this is what they know – but learning report-writing and the jargon specific to the engineering context is also a necessity, and this knowledge may be what these engineering students lack.

Although needs analysis is generally carried out prior to designing a textbook, it should be an ongoing activity. ESP texts lay emphasis on this continual effort (White, 1998). Before attempting ESP courses, students should understand why they need to take the course and how they will apply their knowledge. It is imperative that students continually assess themselves by asking the following questions:

i. Why do I need to take this course?
ii. Where will I apply this learning?
iii. With whom and in what context will I need to interact using this language?

These reflections help students to adopt a more practical approach to learning from ESP texts. Unfortunately, though a needs analysis is generally routinely performed, the findings and recommendations are not always given due importance. "Carrying out a needs analysis then completely ignoring [it] is a waste of time and effort" (Adams-Smith, 1989).

2.3 Using ESP Texts

The role of ESP teachers begins with choosing suitable material; making adjustments and adaptations wherever necessary; and then, if no text satisfies in terms of suitability and flexibility, designing one. More and more ESP course materials are being designed, as commercially available materials do not always cater to specific needs (Dudley-Evans and St John, 1998). As for using ESP texts, the period of time over which they are expected to be completed is paramount. For students, however, it can be an on-going process, which should ideally last for the first two years of study; though studying ESP texts beyond the first two years of an engineering degree in the university promotes even greater English language proficiency (Alsamadani, 2017). For engineers in the field, six weeks of studying an ESP text is usually sufficient, as the aim is to cater for an even more specific need: enabling particular projects or fulfilling certain duties and responsibilities as employees (Alsamadani, 2017). However, at many engineering colleges (including the one at King Saud University, Riyadh) the ESP course is run only through two semesters.

ESP texts should necessarily include the following sub-headings:

i. **Report writing**

Report writing is rightly regarded as one of the essential components in any ESP text for engineering students. This is because report writing is a common exercise among engineers. There are many different types of reports, including inspection or trip reports, laboratory reports and progress reports (Beer, and McMurrey 1997). All reports are different, but they share a similar framework. The text should introduce this framework and demonstrate how it can be adapted to different purposes. Reports written by engineers include maintenance reports, shift reports, descriptions for contractors, inspection reports, specification reports and instruction reports; other documents that are written include work permits, work orders, descriptions of the state of equipment, and so on. Regarding the purpose of writing, engineers have revealed that the write-ups are usually reports submitted to supervisors (Alsamadani, 2017) and that these communications are of a formal nature. Analyzing samples of engineers' written works, the study by Alsamadani revealed that all of the documents were written in English. Further analysis revealed that the documents appeared to be deficient at the level of language, specifically as regards vocabulary and structure (Alsamadani, 2017). This confirms the necessity of preparing students with a better working knowledge of the English language. However, most of the problems encountered could be addressed by a short ESP course. An

ESP text can go a long way towards helping engineering students and professionals achieve the desired level of accuracy in report writing by covering the following important topics:

- Adhering to the proper outline of a report
- Using appropriate technical language and terminology
- Using appropriate punctuation
- Outlining a draft of ideas before beginning to write
- Editing and re-editing the final draft before submission
- Using appropriate tenses and voices

- **2.4 Vocabulary**

While many teachers associate vocabulary-learning with reading skills, there are others who think vocabulary should be a separate subject altogether, with its own syllabus and materials. ESP texts should aim at ensuring students' command of a wide variety of engineering vocabulary and ability to use it effectively. The texts should help students develop a clear understanding of words and expressions by concentrating on spelling errors, multi-word verbs, compound nouns, and so on. The study of vocabulary also involves understanding the distinctions between engineering concepts. Adequate knowledge of abbreviations and acronyms should also be emphasized. Once these aims are achieved, attaining proficiency in English language becomes much easier, enabling future engineers to judiciously use the four English language skills below.

i. **Reading skills**

Given the fact that engineers, both students as well as professionals, must read their subject material in English, it is easy to imagine how important reading is for them. The text should emphasize the ability to read engineering-related texts: engineering dictionaries; memos; graphic information, including tables, diagrams, charts and graphs; and tests and exam questions. Students should also, ultimately, be able to comprehend mathematical vocabulary and symbols.

ii. **Writing skills**

An engineer is required to do much more writing than is commonly assumed. An ESP text should emphasize proficiency in writing summaries, explanations, definitions, explanations of cause and effect, comparisons and contrasts, and translations of academic texts from English into Arabic and vice versa, as well as developing legible handwriting and accurate spelling. Students must master different kinds of writing, both technical and academic, appropriate to the different audiences they may need to address.

iii. **Listening and Speaking**

While reading and writing are usually emphasized in classrooms, listening and speaking skills are also indispensable in the field. Asking for clarification, pronouncing words fluently, and translating from Arabic to English and vice versa are crucial skills.

2.5 Evaluation

Language teachers felt that the text should give room for evaluation of learners upon the completion of an ESP course. Assessment of students after a completed curriculum is necessary to ensure proper diagnosis of students' weaknesses and ultimately to determine their degree of improvement (Javid and Umer, 2013). The design of an ESP text should depend on formal assessments, to ensure that the goal of students is not merely to achieve high grades. A functional workbook should be attached to promote the objectives of studying an ESP text.

2.6 Important Factors to Note in Designing an ESP Text

In summary, the major factors to consider in designing an ESP text include:

- Defining the time frame for completion of the course
- Carrying out a needs analysis
- Putting the Target Situation Analysis (TSA) into focus.

The following subject areas should be compulsorily included:

- Report writing
- Memos and email messages (both formal and informal)

- Vocabulary
- Grammar
- Improving reading skills
- Improving writing skills
- Improving speaking skills
- Improving listening skills
- Evaluation of students' learning of the contents of the program upon completion

3.0 METHODOLOGY

This qualitative study used a semi-structured interview with open-ended questions to gather information from respondents. The target population was interviewed to gather information on perceptions of the ESP texts students were currently using and the scope for their improvement. The study subject consisted of engineering students in the Kingdom of Saudi Arabia (KSA). A structured sampling method was used to select participants. First, 10 universities offering engineering courses were purposively selected. Next, 10 students were randomly selected from each of these universities. The total number of students who participated in this study was 100. The study employed a qualitative approach. Previous research was reviewed to gain insight into the current attitude of students towards ESP texts for engineering. For a proper field approach, a semi-structured interview was conducted to gather the responses of participants. The responses were reviewed, and noticeable and consistent observations were drawn to promote the aim of this research. Responses that stood out as containing information related to this study were recorded. The Results and Discussion section discusses the responses from participants and considers how they can contribute to the design of ESP texts.

4.0 RESULTS AND DISCUSSION

The gathered responses were collated and reviewed for consistency. Concerns that occurred repeatedly were taken to be important to students.

When asked if ESP texts were generally available, one of the most common responses was, *"The book is available in the school as well as in bookshops,"* suggesting that most of the texts used by engineering students were commercially available ones. The implication is that

these ESP texts are not designed by the students' instructors and thus may not particularly align with any needs analysis conducted by the particular ESP instructor. Moreover, one can never be sure of the fact that these ESP text books actually address the specific needs of the students.. As G. White (1998, p. 73) points out, "published materials of any kind have to cater for a very wide range of possible users, which means that they cannot address any individual student or group of students directly." The ESP textbooks most commonly used (often only in part) include *Oxford English for Electrical and Mechanical Engineering* and *Cambridge English for Engineering.* When students were asked what they expected to learn from an ESP textbook, they listed, as expected, all English.language skills, with sub-skills including pronouncing words fluently; translating from Arabic to English and English to Arabic; summarizing engineering-related texts; comprehending mathematical vocabulary and symbols; using engineering dictionaries; understanding memos; presenting graphical information (tables, diagrams, charts, graphs) accurately; reading, understanding and answering test and exam questions; reading journal articles; writing reports and using tenses appropriately.

Of the four English language skills, students placed strongest emphasis on writing. This is typical of most engineering courses and professions that require the extensive use of English: students and professionals alike usually emphasize the quest to learn English writing skills. On a similar note, a study conducted on medical students (who also use English extensively) revealed that students performed most weakly in writing (Fouad & Bashir, 2017). This suggests that ESP texts may emphasize receptive skills over productive ones, with the effects manifesting in students.

Generally, students consider an ESP text to be effective if it helps them achieve the competitive global standards of linguistic competence. They expressed something on the lines of gaining *"...a good working knowledge of English Language, which will ensure that I am able to defend my skills in a global work environment"* and that *"...I can communicate with teammates effectively*" and generally "*improve my chances of working beyond the Kingdom of Saudi Arabia"*. This finding is highly comparable with the results of the study carried out by Alfehaid (2011).

Others remarked that *"I have not searched for ESP texts and cannot determine if they are readily available or not*." This large group of students includes those who depend on course materials designed and provided by their ESP instructors. In King Saud University

Engineering College, for example, out of the four ESP courses (E110, E 109, E 108 and E 107) only the last mentioned course uses a text book. (Oxford English for Electrical and Mechanical Engineering)

The responses above show that the material presented in engineering students' textbooks needs to be accurate, clearly defined and not peripheral. The manner of presentation is also important. Students are more satisfied if they are able to figure out tasks using in-class activities and by engaging in discussion. Further, figuring tasks in terms of real-life situations helps students get a feel for the working fluency of the language. Experts agree that language should be embodied in real-life situations, including reading comprehension, making use of inferences and debating. Such tasks stimulate students and promote learning.

When a curriculum is designed, the process should be guided by research on teaching and acquiring a language for a specific use. The principles of teaching mentioned by Diaz-Rico (2008) and Greenberg (2004) include "direct teaching, repetition, and initiating a thoughtful process." Other subtle techniques, like considering the diversity of learners, incorporating different learning styles, and motivation, also play an important role.

Because learning a language is important, it is crucial that in designing the curriculum due importance is given to learners' existing level of proficiency. Material selection, in particular, involves evaluating the effectiveness of learning materials for each and every category of student. Proper cognizance of the needs of learners in ESP courses, and the specific forms and functions required to be taught, are the two factors that should determine the selection of ESP materials.

A lot of ESP materials for engineering are based on cognitive skills. Robinson (1995) has emphasized the importance of cognitive skills in ESP textbook design. A cognitively-designed textbook focuses on the need for students to develop abilities based on active and conscious manipulation of ideas. Understanding of a language cannot be acquired unless the mental representation of a concept is concurrently taught. A cognitively-designed ESP text deals with the *what*, *how* and *why* of the topics students need to learn.

Most ESP texts also take grading into consideration. Lower-level ESP texts concentrate primarily on general communicative competence. Such start-up ESP texts give extra weightage to vocabulary and grammar. While vocabulary and grammar are not excluded

from ESP texts for engineering students, texts pitched at a higher level go on to discuss major concepts relating to the engineering field.

An ESP text is not complete without a syllabus design. A competent ESP text essentially corresponds to a specific syllabus design. An ESP textbook for engineering students should cover effective technical communication skills. More specifically, it should cover the following English language skills (Dahbi, 2016).

I. **Speaking:** Efficient communication skills that will make it possible for students to successfully participate in conferences, make phone calls and answer interview questions, amongst other things.
II. **Reading:** Read journals, business documents and manuals in their field of study while comprehending the messages therein.
III. **Writing:** Write professional e-mails, reports, and CVs and cover letters effortlessly.
IV. **Comprehension:** Comprehend lectures delivered in school, at conferences, and so on.

Assessment in collaboration with material development is particularly crucial in an ESP setting. An initial assessment test should be given before students start using course material. It is desirable that a proper needs analysis is carried out before course materials are designed. This will help ensure the appropriateness of the selected materials through evaluating students' performance in tests and exams.

English for Academic Purposes has redefined our perception of ESP specialists. As stated earlier, no textbook can be relied on completely; ESP practitioners need to possess the knack of developing their own innovative materials. Most experienced professionals in Saudi Arabia rely on a combined strategy, both adopting and adapting materials. Instead of going through the lengthy process of designing an entirely new syllabus, they prefer to follow the prescribed one, while making necessary adaptations. Adaptations can be achieved by adding (expanding or extending), deleting (subtracting or abridging) or modifying (rewriting or restructuring, simplifying or reordering.) Engineering students in Saudi Arabia, in large numbers, admit that judicious adaptations can be very useful in the following cases.

- A particular grammar item is not given enough coverage.

- The communication factors being the top priority, grammar items do not follow proper order.
- Students do not relate to particular reading passages.
- Comprehension questions are too easy or too difficult.
- Subject matter is inappropriate for the age or intellectual or cultural background.
- Visuals or illustrations are not acceptable culturally or spiritually.
- Audio materials are difficult to manage because of class size or technical matters.
- No proper accompanying tests are included in the text.

The role and influence of textbooks has been the subject of a great deal of research (Tous and Haghighi, 2014). The role of textbooks is clearly pivotal: they are professionally designed to meet the changing focus of learners and they are a means to an effective mode of teaching and learning. They also save instructors time and provide a focused time-frame for teaching. The topic of textbook research and evaluation has been exploited by many researchers. A text material calls for periodic evaluation to ensure that it does in fact possess the values it was designed to have. Three methods have been mentioned for textbook evaluation: impressionistic, checklist and in-depth. The checklist method is thought to be the most common and most reliable vehicle of textbook evaluation. This method consists of a specific number of criteria. Researchers and scholars like Cunningworth (1995) have developed a number of quick reference checklists For evaluation and selection of ELT text books.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions and Recommendations

The students interviewed, by and large, agreed that the ESP texts (prescribed textbooks or locally collected material) they were currently using were fairly adequate for academic purposes. A large number of them stated that they would like to see the main thrust of ESP being placed on technical writing, given that writing reports is an essential part of fieldwork in the engineering discipline. Also, they stated that they would like to see greater emphasis given to technical vocabulary in its context. After all, it is the simulation of an engineering environment that distinguishes an ESP text from a general academic book.

ESP texts (in the form of assigned textbooks) were readily available, though this fact speaks more to their commercial viability than their academic worth. It is felt that needs analysis

before designing an ESP text, and regular evaluation during and after its completion, should be more conscientiously carried out.

It was remarked more than once, during the course of this study, that no textbook is ever perfect. However, as we cannot do away with textbooks, the best approach is to accept the genre in spite of its imperfections.

5.2 Limitations

This qualitative study gathered comprehensive information on the expected content for designing an ESP text. It is, however, limited by its level of generalization. It viewed all engineering courses as a whole, even though engineering programs are diverse. However, it is still effective in its generalizations because all of the sub-disciplines within engineering are to a certain extent similar. Further studies can make a greater effort to refine these findings according to the specific sub-fields of engineering: mechanical, civil, electrical, and so on.

This study also takes the whole of Saudi Arabia as a homogenous entity. If we were to consider variables like urban and rural populations, the findings might change.

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