Review research paper

MATERIAL DEVELOPMENT FOR ESP: A CASE OF AN IN-HOUSE COURSE BOOK FOR MEDICAL ENGLISH

Fatemeh Ranjbaran Madiseh

Sultan Qaboos University, Muscat, Oman, Sultanate of Oman

Abstract. *The need for enhancing English proficiency is one of most significant issues tackled daily by many medical students in EFL contexts across the world. In the ESP context, the teacher has numerous roles in order to fulfill the needs of the learners, including that of a needs analyst, syllabus designer, material developer, practitioner, evaluator, and is also in charge of setting goals and objectives for the course. While ESP learners are more enthusiastic and demanding in their specialized field, it is essential to consider their opinions and set their needs first when developing material. Interests, target and proficiency levels of ESP learners usually differ, therefore, ESP material should be tailored to meet the needs of such an audience. With the rising need for more adequate content and a more efficient textbook for the Medical English II course at Iran University of Medical Sciences, this case study follows the process of developing an ESP course book for this means. Key elements of material development in the ESP context are put forth, followed by selection of content, developing exercises and activities, pilot testing the book and getting feedback from students and ESP experts, revising and implementing changes, and finally the outcome of such an endeavor. The results of this study can be beneficial on a global scale, for students in the field of medicine, instructors on the lookout for appropriate teaching content, and practitioners in the realm of material development.*

Key words: *EFL context, ESP, material development, medical students, needs analysis*

1. INTRODUCTION

Materials are the essential component to any educational program in general, and ESP in particular. Materials can include anything that facilitates and enhances the learning of language, including audio and visual aids, computer assisted resources, technology and digital tools, real objects, or performance-based activities (Tomlinson, 2012; Hyland, 2006). Since materials are used to support and enhance ESP instruction, the selection of materials has a major impact on the course outcomes. Therefore, the most predominant material is the textbook or course book. According to Tomlinson (2012), "Materials development refers to all the processes made use of by practitioners who produce and/or

use materials for language learning, including materials evaluation, their adaptation, design, production, exploitation and research (p. 153)."

Language researchers and educators maintain that a lack of identifying students' needs hampers the development and improvement of English language education in ESP (Park, 2021). Reynolds et al. (2021) investigated the English medical vocabulary strategies, needs, and difficulties of Taiwanese medical school students and found the lack of sufficient contextualized academic English writing practice with newly encountered specialized medical vocabulary, and lack of teacher feedback on the students' vocabulary use, which should be taken into consideration when developing materials for medical students. ESP teachers most often become evaluators, designers and developers of materials, simply because the available materials neither meet the needs of their students nor do they satisfy their expectations. Hence, developing materials for the ESP classroom is a trade-off between learning needs, language content and subject matter content that takes a number of issues into consideration. Topic of content, relevancy to the discipline, extent that materials reflect language of the discipline, learning goals, availability of material, required teaching equipment, and time allocation, are among issues that should be considered by an ESP practitioner (Bocanegra-Valle, 2010). There have always been difficulties and challenges with material development and content design for ESP courses. In a study by Petraki and Khat (2022), several challenges were reported through document analysis and semi-structured interviews, which included shortage of appropriate ESP training for teachers, lack of teacher motivation, students' low English proficiency and difficulties in materials development in the context of Cambodian tertiary education.

As Tomlinson (2009) puts forth, the literature reveals that many experienced authors rely on their intuitions about what 'works' and make frequent use of activities from their repertoire, which seem to fit with their objectives. Very few authors are actually guided by learning principles or considerations of coherence and many seem to make the assumption that clear presentation and active, relevant practice are sufficient to lead to acquisition. This is while Tomlinson believes that instead of selecting randomly from previous available content and a collection of existing books, they should be coherent and principles applications of theories of language acquisition, principles of teaching, actual real-time use of the target language, and results of systematic observation of materials used in class (Tomlinson, 2020). Principles that are fundamental not only for materials development but for all aspects of second language acquisition include adapting content that is more meaningful and more cognitively and effectively engaging for the learners (Tomlinson, 2016).

This study aims to give an account of the process in developing a Medical English course book comprising ten units for students of medicine, specifically tailored to their needs in their future medical profession with the aim of preparing them to become proficient in reading comprehension and vocabulary skills and better prepare for their comprehensive exams.

2. STATEMENT OF THE PROBLEM

Over the past decade, students at Iran University of Medical Sciences (IUMS) in Tehran have struggled with English and achieving learning outcomes when it came to preparing for their comprehensive exam and making use of learning content for their

future endeavors. This is while medical students are required to successfully pass nine credits of English during their first two years as medical students. This is very demanding for both students and teachers, as students come from different English backgrounds, and are not equipped with the same level of proficiency when participating in class activities. The main dilemma lies in the course materials, which do not meet the students academic and professional needs. Furthermore, materials and content considered for such courses should be selected with such precision and expertise, that all aspects of students' needs are kept into consideration. While Medical English courses comprise a fundamental component of the curriculum at IUMS, they are designed to enhance students' technical vocabulary knowledge and reading comprehension skills. For this reason, selection of appropriate material is an essential part of the course plan and syllabus design. With the aim of overcoming obstacles in teaching and learning for both teachers and students in the Medical English II course in this context, the researcher/educator has attempted to develop a course book to meet the course requirements and fulfill the students learning needs.

3. NEEDS ANALYSIS

Language researchers and educators maintain that a lack of identifying students' needs hampers the development and improvement of English language education in ESP (Park, 2021). Thus, similar to any material development endeavor the teacher/researcher conducted needs analysis prior to initiating the design of course book content. Following six years of teaching Medical English courses at Iran University of Medical Sciences and extensive needs analysis conducted during this period, the researcher/ESP teacher felt the need to develop material that would fit the context of Medical English and be suitable for enhancing students reading comprehension proficiency and vocabulary learning, while also motivating them to learn and preparing them for their future needs. It was found that the existing course books and content did not meet the students' needs and lacked motivating factors necessary to enhance student achievement.

The literature in similar ESP contexts was also studied to observe general trends for materials development in ESP. Reynolds et al. (2021) investigated the English medical vocabulary strategies, needs, and difficulties of Taiwanese medical school students and found the lack of sufficient contextualized academic English writing practice with newly encountered specialized medical vocabulary, and lack of teacher feedback on the students' vocabulary use, which should be taken into consideration when developing materials for medical students. In another study conducted on vocabulary acquisition in English for Medicine, Zafirovska & Zhaferi (2022) explored students' perspectives regarding learning strategies in Medical English courses in order to give new insight to scholars for curriculum development of English for medicine. Piroozan et al. (2016) observed the necessity to review and renew the existing course materials for medical students to enhance their motivation and learning. Vahdany and Gerivani (2016) went forth to find that medical students valued the reading skill higher than other skills, followed by the writing skill at Iran University of Medical Sciences in Guilan province, indicating the need to enrich the course material to meet their needs. Lodhi et al.'s (2018) findings revealed a huge gap between acquired competencies of doctors with their desired level of English proficiency skills. It was found that medical students need to enhance their English proficiency in order to follow lecture instructions, attend seminars and

conferences, give presentations, read articles and journals, comprehend graphs and charts, write laboratory reports, and write research papers.

In order to fill this gap of deficiencies in the existing course book to meet students' needs, this study gives an account of the process taken to develop a course book for the Medical English II course at Iran University of Medical Sciences. The book was pilot tested during two semesters of the academic year 2019-2020. Following pilot testing of the course book, the content was evaluated, both students and ESP experts provided feedback, and modifications were made.

4. CONTENT OF THE COURSE BOOK

The book includes ten units, the topics of which are selected based on the national curriculum for medical students proposed by the Ministry of Health and Medical Education in Iran. Topics for the ten units include Medical Virology, Medical Professionalism, Medical Ethics, Robots in Surgery, Chemotherapy, Multiple Sclerosis, Alzheimer's Disease, Regenerative Medicine, Nano-medicine, and Health Psychology, respectively.

4.1. Warm-up Task

A plethora of research has shown the significant impact of TED talks on enhancing students' listening skills and vocabulary retention. Liu (2022) explored whether TED talks can be potential materials for improving students' knowledge of specialized vocabulary through examining the vocabulary on the Medical Spoken Word List (MSWL) in medicine-related TED talks. Results showed that 861 out of the 895 MSWL words (96.2%) occur in the TED talks, and an average of 100 MSWL words appear in a single TED talk, suggesting that students are very likely to encounter much specialized vocabulary when viewing TED talks. A number of studies have investigated the effectiveness of using English videos from TED talks towards students' proficiency level (Abdulrahman, 2018; Astika & Kurniawan, 2020; Aziz & Ngadiron, 2019)

Each chapter begins with a warm-up task devised based on a TED talk selected according to the unit content from *www.ted.com*. The content of the videos provide students exposure to authentic material and introduce them to the topic through a range of vocabulary pertaining to the topic. TED talks have been known to be an extensive listening resource for EAP students and a number of studies have revealed that oral presentation skills and vocabulary uptake/retention levels were improved due to the use of TED talks as an ICT tool (Salem, 2019; Takaesu, 2017; Abd Aziz and Ngadiron, 2019; Maria et al., 2018; Wingrove, 2017; Abdulrahman, 2018; Siegel, 2019; Paliath and Dhinakar, 2021; Astika and Kurniawan, 2020; Karunakar; 2019; Leopold, 2016; Garcia-Pinar, 2019; Rudneva, 2023). The advantage of using TED talks for this specific course is that *www.tedmed.com* provides a wide range of presentations on areas in medicine specifically for this target audience. The first unit (Medical Virology) included a TED talk by Daniel Streicker*, "What vaccinating vampire bats can teach us about pandemics"*. A link was provided for the students, followed by an activity to write a short summary of their understanding in less than 200 words.

The following are TED talks used for the following units of the book. Atul Gawande's talk, "*Want to get great at something? Get a Coach"* for Medical Professionalism (Unit 2), *"It's time to question bioengineering"*, by Paut Root Wolpe for

Medical Ethics (Unit 3), Catherine Mohr's, *"Surgery's Past Present and Robotic Future"* for Robots in Surgery (Unit 4), Tony Wyss Coray on "*How young blood might help reverse aging*" for Hemotherapy (Unit 5), Siddharthan Chandran's, "Can the damaged brain repair itself?" for Multiple Sclerosis (Unit 6), Samuel Cohen. Alzheimer's is not normal aging – and we can cure it" for Alzheimer's disease (Unit 7), Anthony Atala's "Printing a Human Kidney" for Regenerative Medicine (Unit 8), Joy Wolfram on "How nanoparticles could change the way we treat cancer" for Nanomedicine (Unit 9), and Robert Waldinger's, "What makes a good life? Lessons from the longest study on happiness" for Health Psychology (Unit 10). There are numbers of other TED talks available related to each topic, however these were specifically selected with consideration of length and content relevancy to be shown and discussed during class. In some cases (time allowing), after the TED talk is played in class, a number of volunteers are asked to summarize the content and then they are given a chance to participate in a class discussion on the topic and present any comments or questions they may have.

4.2. Reading Comprehension Passages

Reading passages were selected from authentic texts from recent medical journals and publications, such as *Mim's Medical Microbiology and Immunology* (Goering et al., 2019) (Unit 1), *Learning medical professionalism – the application of appreciative inquiry and social media* (Hsieh et al., 2019*) (Unit 2), www.medscape.com (Unit 3)*, *Your robot surgeon will see you now: Autonomous systems are beginning to equal human specialists at precision surgical tasks* (Elizabeth Svoboda, 2019) *(Unit 4), Young blood rejuvenates old bodies: A call for reflection when moving from mice to men*, (Hofmann, 2018) (Unit 5), *Multiple sclerosis–a review (Dobson & Giovannoni 2019) (Unit 6),), The Small Guide to Alzheimer's Disease (Small and Vorgan, 2020) (Unit 7), Electric phenomenon: A disregarded tool in tissue engineering and regenerative medicine* (da Silva et al., 2020) and *Novel Biomaterials for Regenerative Medicine (Chun et al., 2018)* (Unit 8), *Multifunctional phototheranostic nanomedicine for cancer imaging and treatment* (Gao et al., 2020) and *2D layered double hydroxide nanoparticles: Recent progress toward preclinical/clinical Nanomedicine* (Cao et al., 2020) (Unit 9), and *What are the keys to a longer, happier life? Answers from five decades of health psychology research* (Johnson and Acabchuk, 2018) and *Gratitude–more than just a platitude? The science behind gratitude and health (*Schache, 2019) (Unit 10).

4.3. Pre-Reading Activity

Prior to the reading passage in each unit, two or three reading questions are posed as an engagement activity for the students. The students are asked to answer and discuss the questions in complete sentences. The pre-reading questions serve the purpose of motivating students to read and find out the answer to each question.

4.4. Post reading activities

The first exercise after reading the passage is to define new vocabulary items. As students are provided with a list of 20 key items for each unit, they are required to learn definition, parts of speech and write sample sentences for each new word. This activity

also involves pronunciation practice, as the words are phonetically spelled out to place emphasis on correct pronunciation.

The main activities of the lesson begin with reading comprehension, including 5-6 items for each unit. This is followed by the word formation exercise, which is comprised of two sections. The first part is table completion for missing parts of speech to be filled into the table. The same words are used in the next part for sentence completion, which include 10 sentences for each lesson. Most units include a matching exercise, in which a table is given to match the words in column *a* with their equivalent in column *b*. The aim of this exercise is to practice learning synonyms for the words in the passage. The cloze passage includes 15 items and is mainly focused on both vocabulary and grammar. The text of the cloze passage is once again retrieved from the scientific literature related to the unit topic. This section is followed by a grammar focus and an activity to practice that particular grammar point, through a short paragraph writing exercise.

5. COURSE BOOK EVALUATION

Pilot testing, also known as class testing or trialing, is supported as an effective means of evaluating the efficiency of materials developed (Stoller et al., 2006; Tomlinson, 2003; Stoller and Robinson, 2018). One of the main merits of pilot testing is that incongruences between course aims and materials developed are revealed, thus providing the opportunity to implement corrective measures and revise the content. It is best to take into consideration the potential feedback and expert opinion of subject-matter colleagues on the timely inclusion of certain topics or the relevance of certain activities when evaluating materials. In the event of a pilot study, the ideal condition is to obtain perceptions and feedback from learners as potential or actual users of certain materials (Stoller et al., 2006). In short, both expert colleagues and learners may be extremely insightful in helping ESP practitioners match, following Dudley-Evans and St. John's (1998) terms, carrier content (i.e., the subject matter) to real content (i.e., the specific language).

Following this notion, after completing the development of ten units for the purposes of instruction in the classroom, the researcher conducted a pilot study with two Medical English courses at Iran University of Medical Sciences (n=48). Student feedback was obtained through semi-structured interviews after the complete duration of the course and teaching unit content (n=12). The interview questions consisted of both general and detailed items about the course book. The researcher opted for semi-structured interviews in order to allow the interviewees to open up and speak their mind and express what they genuinely thought about the course book. Interview question included, but were not limited to: What are the benefits and drawbacks of the course book (English for Medical Sciences)? What sections need improvement? Are there sections that should be added or omitted? To what extent do the reading passages and content add to your knowledge? Should the level be more simple or difficult? To what extent do the activities help you in the learning process?

5.1. Students feedback

Results of semi-structured interviews with the students indicated promising results of the benefits and advantages of this newly developed course book. Student 1 stated that she had a very good experience studying this course book because it contains interesting

reading passages and exercises. She stated that during this semester her reading has improved a lot. One suggestion was to have other types of activities, suggesting that the cloze exercises mainly focused on parts of speech, and would be better to include important idiomatic phrases used in the medical context to help students remember them. As reported by Student 2, a website for practical medical idioms in use could be the focus of one such activity (https://idioms.thefreedictionary.com/medicine). Student 3 stated that, "For us, falling into a routine of repetitive set of activities helped save time, but I'm afraid the lack of diversity in the order and the types of questions might bore the less obliged audience. She also added, "Also, what I'd suggest you do is to put two different readings level-wise and determine each reading level of difficulty with numbers".

Student 4: "Something I mentioned in my answer sheet as well is that pre-reading questions need to be more general, to serve the purpose of motivating audience to read and find out the answer to each question. But instead of that, each question seemed to be directly linked to a specific answer within the text. This is my personal opinion maybe I'm not being very academic but the things that tickle my sense of curiosity most and make me keep on reading are those that genuinely make me wanna find the answers to." She continued by providing an example: "1. What are the disadvantages of protein-based and polysaccharide-based biomaterials? First off, I don't know what polysacha blah blah even is, let alone know the disadvantage and what not. See, this is a "post-reading" question. A more appropriate question (again imho) would be this: what do you know about tissue engineering and it's purpose?"

Such feedback received from the students gave the researcher greater insight into the students' needs and expectations, resulting in a modification of some activities and eventually overall revision of the course book.

6. DISCUSSION

Language teaching materials developed in-house by teachers have the potential to meet local students' needs so that they have a greater impact on students' learning (Al-Busaidi and Tindle, 2010; Tomlinson, 2013). Course material developed in-house can be tailored around the needs of the students of the specific context - both for assessment purposes and their future career and academic needs. These materials can address the learners in the context of their own specialized field of study and their own culture, with a focus on their content which is up-to-date and authentic to the learners, meanwhile avoiding the main drawback of global materials, which 'in trying to cater for everybody,... and end up engaging nobody' (Tomlinson, 2013, p.152).   It was with this in mind that the researcher/practitioner decided to develop and tailor in-house materials suited for the Iranian medical students studying technical English courses at the tertiary level.

In a previous study in the Gulf context (Bahumaid, 2008), there was a criticism of global EFL materials as representing only a certain 'middle-class view of the world', being culturally inappropriate, and unsuited to local teaching and learning styles. This leaves the teacher with a challenging task of developing suitable material, considering that Hutchinson and Waters (1987) believe teachers are not equipped with the knowledge and training on how to write materials.

7. CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH

Writing a course book is indeed a challenging and arduous task. It requires a lot of time, energy, and concentration for the writer. One of the main obstacles for developing the present course book was finding the appropriate reading passages to meet both the students level of proficiency and keep them engaged and motivated in the learning process. According to Tomlinson (2012), there is no perfect course book, because each course book is used in different situations by different students who have various objectives, needs, wants, proficiency level, and cultural background. However, each course book needs to be evaluated from time to time in order to pin point its deficiencies and improve them. In this in-house material development study had one major advantage, that is, the researcher/teacher who developed the course book was able to pilot it throughout the course for two semesters and come to understand its strengths and weaknesses, thus leading to modifications that helped refine the content. As put forth by Masuhara (2006), material writing is an invaluable process for teacher development, as proven in this case. Developing the present course book was an eye-opening experience for the researcher/teacher, which also enhances the teaching process. While the book was being developed, there was quite a bit of uncertainty as to what extent it would arouse the students' interest and stimulate the learning experience. However, after two years of use in the classroom, the results have been quite astounding.

Future research could look into assigning the ESP learners to take part in the design and development of in-house material. For example, Munir (2019) devised an activity in which she assigned learners to design a textbook as their classroom projects. This enhances not only students' knowledge, creativity, and teaching skills in the ESP area but also it promotes students' individual and social values, motivates learners, and develops their higher order thinking and creativity skills.

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