
NEW ENGLISH STUDY MATERIAL FOR THE BACHELOR'S DEGREE STUDENTS OF BIOMEDICINE

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Abstract

This article attempts to depict the development of the new English study material for bachelor's degree students of Biomedicine at the Technical University of Ostrava (VŠB-TUO). This material is being created in accordance with the new concept of teaching English at the Institute of Languages VŠB-TUO, which aims to reflect the needs of students of a given field, i.e. above all to build and extend their knowledge in the field of specific professional vocabulary and develop their listening and communication skills. Firstly, the article introduces briefly the institutional conditions and barriers that have influenced the choice, use and design of study materials used at the Institute of Languages of the VSB-TUO. Secondly, the overall structure of the material is dealt with. Thirdly, the criteria set for the material to be met including its technical features following from its electronic nature and interconnection with Learning Management System (LMS) are presented.

Keywords

Learning materials design; LMS; Biomedicine; ESP; Learning process.

Introduction

Teaching English at a technical university is necessarily connected with the discussion on what type of English students would benefit from most. The following lines introduce the conditions and barriers influencing the choices of the material used in the English classes at VSB-TUO.

The Institute of Languages (IL) at VSB-TUO provides language services for seven different faculties. Besides translations and teaching the Czech language to foreign students, the core of its activities is anchored in teaching four-semester English courses to bachelor's degree students of different faculties. The role of the IL is to follow the requirements given by the management of the faculties and teach English with respect to them. The criteria involve e.g. the number of students in groups, the level of English and the content. Nevertheless, the requirements set by the faculties frequently seem to contradict the latest approaches applied in foreign language teaching, the IL tries to meet them in an appropriate way. Thus, when the focus on the development of students' soft skills was emphasized in 2019 at VSB-TUO, the IL started to teach a blend of general English and English for specific purposes (ESP) [1]. The textbook International Express Upper-Intermediate [2] was implemented to develop students' presentation and negotiation skills within company settings and at the same time, discussions over technical texts focusing on the development of students' professional vocabulary were included in the lessons. However, this blend of general and ESP English has not been

evaluated by the most important participants of the learning process – the students themselves – as positively as it had been expected.

The institutional barriers coming from different views of language teachers from IL and individual faculties with respect to language education and continual student dissatisfaction with the content of the lessons led a group of teachers at the IL to take a different look at the whole situation and design pioneering tailor-made material for bachelor's degree students of biomedicine. The following chapters describe, illustrate, and explain the ideas behind the design of the new material.

1 The New Study Material for the Bachelor's Degree Students of Biomedicine

From what has been stated in the Introduction, it follows that students are often being omitted from the discussion on their expectations from the subjects they are supposed to study. As this approach might seem appropriate with respect to professional subjects, in the case of English it seems inefficient, as all students enter university with some level of English i.e. they have experience with learning it, and thus, logically, have certain expectations.

Therefore, as a course supervisor, I initiated discussions with the groups of biomedical students on what type of English i.e. general or ESP, they would consider to be more motivated to learn. They mostly agreed that studying English within the context of their own subject field would be the most beneficial and motivating for them. Their opinions regarding their motivation with respect to learning ESP also matches the citation by Milovanovic [3]

Students who learn a language for specific purposes are more motivated, because the chosen foreign language is something that is closely connected with their profession, employment and career development.

Therefore, a discussion with the management of IL was initiated and a new concept aiming to enhance students' motivation has led to the development and design of our own study material capable of better satisfying our students' needs. The following chapter presents the structure of the new English study material.

2 The Structure of the Material

The material is being designed for a four-semester English course for bachelor's degree students of biomedicine. At the beginning, there were twenty biomedical areas of study suggested by the students as possible topics of the prospective material, which were then approved by the associate professors from the Department of Biomedicine at VSB-TUO, and twelve of them were selected and elaborated in the new material.

The material is divided into four parts each containing three units that are supposed to be covered in one semester. Currently, three parts are finished, and the fourth part is now being worked on. Thus, the topics noted in Table 1 are those covered in the first nine units that have been already created in the first three parts.

Tab. 1: *Parts and topics*

Part 1	U1 Biomedical Engineering	U2 The Human Body	U3 Hospital Information System
Part 2	U4 Telemedicine	U5 Robotic Surgery	U6 Nanorobotics
Part 3	U7 Biomaterials	U8 ECG and the cardiovascular system	U9 EEG and the nervous system

Source: New study material

Each unit begins with the definition of its study objectives that is usually followed by the text, vocabulary, skills & functions, and grammar sections. The overall structure of a unit looks as follows:

- study objectives
- text 1
- vocabulary
- text 2
- skills and functions
- grammar

However, the approach to this layout is not binding, as it is often the case that students get quickly familiar with it and know what to expect, which in time gets dull. Therefore, the material does not always present the individual sections in the same order as stated above nor does it adhere to the necessity to have all the sections included in all the units. Thus, e.g. Unit 2 dealing with the human body starts with the pictures and indicates the human body parts and organs, and then the human body systems are presented as short extracts. Moreover, taking advantage of the fact that all the texts included in the material are provided with audio recordings, some texts are presented in the form of listening exercises. This systematic, yet not repetitive approach to the layout could keep students more alert and focused throughout the semester.

Each unit of the material forms a unified whole, whose intention is on the one hand to connect the topic of the unit with the knowledge students have already acquired either at a secondary school or in their specialized subjects at university. This objective, on the other hand, extends the original topic of the unit to create a logical whole that has an overlap with a specific linguistic function and/or grammatical phenomenon.

Therefore, for example Unit 1 presents a text on the biomedical field and focuses on the development of students' vocabulary, not only in relation to their future career, but also in relation to the names of subjects that students study at the university. This vocabulary section is then followed by the skill & functions part developing their proficiency related to job interviews. The grammar part, which follows, deals with the formation of questions related to the job interviews and the revision of the general question formation principles can be found in the online LMS course that is also part and parcel of this material. The individual features of the material are described in more detail in the following chapter.

3 The Features of the Study Material

When compiling the material, the authors focused on finding out the preferences of a target group of students who will use it in their language seminars. Specifically, it concerns how students work with texts in seminars and which types of display they prefer when working with the texts. During this observation period (1 year), it was found out that students could be divided into two groups. The first group uses a tablet, laptop, smartphone, etc. to display materials. The second group prefers to work with printed sheets, in which they make graphic notes by hand.

Today, language textbooks of the classical format are not very popular among students. The reason may be a certain predictability when working with them, governed by a traditional methodological approach which is usually based on a grammar syllabus, as well as their bulkiness (most are printed in an A4 format). Another reason may be the inapplicability of the texts or their lack of connection with their field of study.

Therefore, the authors tried to adapt the final format of the material to both above-mentioned groups. For the final placement of materials, a university digital repository in our case “DSpace” was chosen. Downloading the material in electronic form will allow students to choose their target textbook format according to their preferences or even combine them.

As authors, we also wanted to take advantage of accessible means at our disposal at the university such as LMS Moodle and think about its interconnection with the new material.

The above-mentioned students’ preferences and drawbacks of the traditional textbooks gave birth to the demands the authors want the new material to meet. The authors wanted to elaborate those demands that are mostly omitted in the traditional textbooks as they are published and set to be used in the English classes worldwide and thus cannot offer the unique features tailor-made study material can be directly designed for. The outline of the basic features of the new study material following from the authors’ demands is given below. Their detailed description is elaborated in Chapters 3.1-3.3.

The material:

1. is based on the work with authentic texts provided with audio recordings,
2. is content and vocabulary-based,
3. looks upon grammar in terms of its function,
4. is interconnected with LMS Moodle at VSB-TUO and fully available.

3.1 Tailor-Made Material with Authentic Texts Provided with Audio Recordings

The material is based on the work with authentic texts or their extracts. All the texts used in the material were adapted from the websites and copyright permission for non-commercial use was granted to us.

The importance of the work with the relevant authentic texts is self-evident. Students encounter the language as it is used within their subject field. The material advances from the semi-professional texts of an intermediate level to professional texts of an upper-intermediate level in terms of their content as well as the vocabulary used. The texts are usually divided into two or three shorter parts each containing between 350 – 600 words, as from our observation it follows that students find reading long texts discouraging.

All texts are accompanied with authentic recordings by a native speaker. This is a frequently missed feature in traditional textbooks of higher-level English. However, for our purposes, this feature seems to be crucial as we often teach students whose levels of English differ. Not only do the recordings provide us with wider possibilities to work with the texts as listening exercises, as mentioned in Chapter 2, they also meet students’ different learning styles and help them by providing correct pronunciation.

While designing the material, special attention was also paid to the order of the topics chosen. The authors wanted the order of the topics to match the biomedical study program offered at the university as closely as possible. For instance, Unit 2 dealing with the human body is taught during the first semester of English, since we know that during this semester students also study anatomy. This tailor-made feature of the material can help students by reinforcing their ability to remember the new vocabulary.

3.2 Content and Vocabulary-Based Material

The material is designed to build and extend students’ professional vocabulary and develop their listening and communication skills. Following Webb & Nation [4] in their citation that

Part of a good vocabulary pedagogy involves making sure that activities include plenty of repetitions of the target vocabulary...

the material places considerable emphasis on the practical acquisition of professional vocabulary through a diverse range of communication and written activities that ensure the vocabulary is being repeated. Most of the exercises and tasks were inspired by books by Webb & Nation [4] and Hewings & Haines [5].

Vocabulary is also looked upon as the bricks that students learn to lay one next to each other according to certain rules. The exercises are designed to practice the vocabulary within the thematic context of the units and following the Lewis's [6] lexical approach which stresses the importance of

raising students' awareness of and developing their ability to chunk language successfully

focus on practicing whole phrases rather than individual terms.

From the very beginning, the students also get acquainted with the word formation (WF) processes in English. The material emphasizes the importance of raising students' awareness of the word derivation and compounding, as these two types of WF processes are essential in understanding how medical and technical vocabulary is built up. In addition, it is the understanding of the basic principles of WF that can help students learn medical and technical vocabulary in a more efficient way. Some exercises focusing on practicing the terminology have also been recorded by native speakers to ensure that students know how to pronounce the terms correctly.

Another focus in terms of vocabulary is related to the work with so-called confusing words i.e. words close in meaning such as disease-illness-sickness. These words usually cause a lot of trouble to students as they can sometimes be used interchangeably, but sometimes they cannot as the context differs. Table 2 shows the overview of the topics covered by the vocabulary sections.

Tab. 2: *Topics of vocabulary sections*

Unit 1	Word derivation – suffixes	
Unit 2	Word derivation – medical plurals	
Unit 3	Word derivation – medical prefixes, stems and suffixes	Confusing words – department-ward-unit-clinic
Unit 4	Confusing words – equipment-device-instrument-machine	Confusing words – disease-illness-sickness-disorder
Unit 5	Word derivation – suffixes for surgical procedures	Mind maps – revision of the vocabulary (U1-U5)
Unit 6	Word derivation – metric prefixes	Confusing words – medicine-drug-medicament-remedy-cure
Unit 7	Chemical Elements	
Unit 8	Word formation – compound adjectives	
Unit 9	Word formation – compound nouns	

Source: New study material

In addition to practicing the vocabulary covered in the texts and exercises of each lesson, students can use the online set of phrases and terminology that are prepared for them in the Quizlet application. This enables them to practice the vocabulary in a fun way.

Skills & functions sections that are inspired by those found in the textbook *International Express Upper Intermediate*, serve as a kind of transition section between vocabulary and grammar. These sections are approached in three different ways in the material. Firstly, they serve as a natural development of the topic of the unit (Unit 1 Job interviews). Secondly, they are gradually preparing students for the final presentations they are expected to give during the fourth semester, so they build up students' presentation skills by making them prepare short presentations from the very beginning of their studies and getting them familiar with different types of presentations. Thirdly, they aim to develop students' professional vocabulary in relation to the skills they will supposedly need. Table 3 gives the overview of the topics covered in the Skills & functions sections in the nine units.

Tab. 3: *Topics of skills & functions sections*

Unit 1	Job interviews
Unit 2	Short presentations
Unit 3	-
Unit 4	Recommendation emails
Unit 5	Pecha Kucha presentations
Unit 7	Agreeing / disagreeing
Unit 8	Describing devices
Unit 9	Following and giving instructions

Source: New study material

3.3 Material Working with Grammar in Terms of its Function

The functional approach to grammar is related to the names of Halliday & Matthiessen [7] and views language as a tool for communication, where the primary function of language is to convey meaning in different contexts. It emphasizes the interplay between language structure and its communicative purposes.

Following this idea, the material is designed to cover only those grammatical structures that are found in the texts or those that are somehow logically expected to be used in a certain context. Thus, instead of working with preliminarily selected grammatical phenomena, students deal with those grammar structures that are frequently found in the texts or those that are intrinsically connected or follow from the context/topic of the unit. We consider this approach very fruitful as working with grammar structures in this way, gives students a clear picture of:

- how the grammar is used,
- in what context, and
- why i.e. what is achieved by using it.

Rather than explaining grammar rules, we want the students to see and experience within the context of their subject field the way the grammar is naturally being used. Table 4 shows the grammatical phenomena covered in the nine units that have already been created.

Tab. 4: *Grammar topics covered in the material*

Unit 1	Questions
Unit 2	Passive voice
Unit 3	Have / get sth done
Unit 4	Present perfect simple
Unit 5	Relative clauses and their transformation to -ing clauses
Unit 6	Noun combinations – English / Czech translation
Unit 7	The use of articles in a medical context Gerunds and infinitives
Unit 8	Nouns used in the singular or plural only within the biomedical context
Unit 9	Word order

Source: New study material

The only exception to the above-described approach to grammar structures in the material is the grammar chapter on word order in Unit 9. This was included in the material intentionally as any other sound grammar structure has not been found in the texts of this unit. Thus, following our professional experience we decided to include a revision of the principles of English word order as this grammar phenomenon seems to be problematic for the students.

All grammar exercises are based on the sentences taken from the texts or are created within a biomedical context. This is a very important feature of the material. By presenting the grammar within the biomedical context, it enables students to repeat the vocabulary and thus reinforce how to remember it as well.

As mentioned in Chapter 3.1, we teach students whose level of English differs. Therefore, the grammar section is further developed in the LMS Moodle course where students can find grammar explanations, links to grammar websites, additional exercises, and a compulsory grammar e-learning course that they must complete.

3.4 Fully Available Material Interconnected with the LMS Moodle

By observing our students, it was found out that they work with information in a bit different way than preceding generations used to. They prefer absorbing information not through extensive texts, but through visual perceptions. They watch videos with key notions that capture their attention, making them want to quickly search for more details and verify the information. They use communicators to share interesting things within their social group. These are some of the reasons why they almost always carry headphones, a smartphone and have enough data services available.

Bearing the above observations in mind, the material was linked with the course in LMS Moodle, where audio and video recordings, e-learning modules, or signposts to websites or recordings on other platforms are located. Each link was processed in the form of a direct link for students using electronic devices so that they could view the required material by clicking on it. For those who prefer material downloaded in a paper PDF format, the links in the form of a QR code were made, so they could use their smartphone to view the desired material and play the recordings. You can see the link and QR code in Figure 1.



2. Complete the following sentences with a suitable word from the text. Then listen and check.

[Listening 1.2](#)



- 1) You should have the ability to _____ and contrast your options.
- 2) Hospitals employ engineers to _____ the deployment of high-tech equipment.
- 3) You should be computer _____ and possess the ability to easily learn new _____ software.
- 4) Entry level salaries within medical engineering _____ from £24,907 to £30,615.
- 5) High-tech equipment of all kinds may be used in GP _____ and patients' homes.

Source: New study material

Fig. 1: Exercise link and QR code

For this solution to be viable, several principles must be observed. The material must be placed in the repository in an electronic form. In this case, updating it before the start of each semester is very simple. To place practical e-learning activities, it is necessary to use one of the LMS environments. A necessary condition for the storage of materials must be the invariance of the identification code under which these materials are placed. If this condition is met, then any correction provided according to the instructions of the course supervisor will be simple and centralized, as well as the replacement of materials for newer versions and updating texts and materials. It will also be possible to respond flexibly to any valuable feedback from students, who can thus become co-creators of the materials intended for their education.

Linking the material with the course in LMS Moodle extends its use considerably. Firstly, it gives teachers and students more possibilities in terms of using and completing the exercises and tasks as some of them are specially designed to be completed in the LMS course, see Figure 2.



1. Work in groups of three. Use the internet to find out about the working conditions and salary range of biomedical engineers in the Czech Republic. You have 15 minutes to note down your findings in LMS.

[Working conditions and the salary range of Biomedical Engineers](#)



Source: Unit 1 of the new study material

Fig. 2: Task to be completed in an LMS course

Secondly, the electronic version with links as well as the PDF format with QR codes gives students a unique opportunity to have all the materials discussed and used in the lessons available at any time. This is one of the most important features of the material as there are students for whom watching videos and completing the associated exercises may be very demanding. Now, this material gives them a much greater opportunity to go through the videos and exercises again in case they need to repeat it.

The accessibility and connection to LMS Moodle is also viewed as another feature that could possibly enhance students' motivation. Though the material is designed for them, we would also like the LMS Moodle course to become a place for students that they can co-create in the future. This idea of co-creation is inspired by the concept of self-regulated learning (SRL) [8]. Though its implementation into teaching practice should be solved on the scale of the Institution, the authors consider the new study material to be a small stepping stone that can implement at least one feature of the SRL concept into practice i.e. to use useful teaching material in which students understand why they are learning the content they are.

Conclusion

This article presents the new English study material for the bachelor's degree students of biomedicine. It describes, explains, and illustrates how the ideas behind the design and development of the material manifest themselves in the material's structure and features. It was also stated that the material is not yet completed as its final 4th part is still being created. The individual parts of the material are expected to be published one by one, as the first part of the material is going to be implemented in the English seminar for biomedical students in the summer term of the academic year 2023/2024. The individual parts themselves are going to be made available on the DSpace of VSB-TUO.

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NOVÝ STUDIJNÍ MATERIÁL PRO VÝUKU ANGLIČTINY PRO STUDENTY BAKALÁŘSKÉHO STUDIA BIOMEDICÍNY

Příspěvek se pokouší zachytit vývoj nového anglického studijního materiálu pro studenty bakalářského studia biomedicíny na Technické univerzitě v Ostravě (VŠB-TUO). Tento materiál vzniká v souladu s novou koncepcí výuky angličtiny na Ústavu jazyků VŠB-TUO, která si klade za cíl reflektovat potřeby studentů daného oboru, tj. především budovat a rozšiřovat jejich znalosti v oblasti specifické odborné slovní zásoby a rozvíjet jejich poslechové a komunikační dovednosti. V příspěvku jsou nejprve stručně představeny institucionální podmínky a překážky, které ovlivnily výběr, využití a podobu studijních materiálů používaných na Ústavu jazyků VŠB-TUO. Dále prezentuje strukturu a organizaci celého materiálu. A nakonec jsou představena kritéria, která má daný materiál splňovat, včetně jeho technických vlastností vyplývajících z jeho elektronické povahy a propojení se systémem řízení výuky (LMS).

NEUES STUDIENMATERIAL FÜR DEN ENGLISCHUNTERRICHT VON STUDIERENDEN DER BIOMEDIZIN IM GRUNDSTUDIUM

Der Beitrag versucht, die Entwicklung des neuen englischen Studienmaterials für Bachelor-Studenten der Biomedizin an der Technischen Universität Ostrava (VŠB-TUO) zu reflektieren. Dieses Material wird in Übereinstimmung mit dem neuen Konzept des Englischunterrichts am Institut für Sprachen der VŠB-TUO erstellt, das darauf abzielt, die Bedürfnisse der Studenten eines bestimmten Fachgebiets zu reflektieren, d.h. vor allem ihre Kenntnisse im Bereich des spezifischen Fachvokabulars aufzubauen und zu erweitern und ihre Hör- und Kommunikationsfähigkeiten zu entwickeln. Zunächst wird kurz auf die institutionellen Bedingungen und Hindernisse eingegangen, welche die Auswahl, den Einsatz und die Gestaltung, der am Institut für Sprachen der VSB-TUO verwendeten Lernmaterialien beeinflusst haben. Zweitens wird die Gesamtstruktur des Materials behandelt. Drittens werden die Kriterien für das Material, einschließlich seiner technischen Merkmale vorgestellt, die sich aus seiner elektronischen Beschaffenheit und der Verknüpfung mit LMS ergeben.

NOWE MATERIAŁY DYDAKTYCZNE DO NAUKI JĘZYKA ANGIELSKIEGO DLA STUDENTÓW STUDIÓW LICENCJACKICH BIOMEDYCYN

W artykule podjęto próbę zaprezentowania rozwoju nowych materiałów dydaktycznych do nauki języka angielskiego dla studentów studiów licencjackich na kierunku biomedycyny na Uniwersytecie Technicznym w Ostrawie. Materiały te powstają zgodnie z nową koncepcją nauczania języka angielskiego w Instytucie Języków Obcych Wyższej Szkoły Górniczo-Hutniczej – Uniwersytetu Technicznego Ostrava (VŠB-TUO), która ma na celu uwzględnienie potrzeb studentów danego kierunku, tj. przede wszystkim budowanie i poszerzanie ich wiedzy w zakresie specyficznego słownictwa specjalistycznego oraz rozwijanie ich umiejętności słuchania i komunikacji. W artykule najpierw krótko przedstawiono warunki instytucjonalne i bariery, które wpłynęły na wybór, wykorzystanie i formę materiałów dydaktycznych stosowanych w Instytucie Języków Obcych VŠB-TUO. Następnie omówiono strukturę i organizację materiałów. W zakończeniu przedstawiono kryteria, jakie dane materiały mają spełniać, w tym ich cechy techniczne wynikające z ich elektronicznego charakteru i powiązania z systemem zarządzania nauczaniem LMS.