

IRSTI 14.35.07

PECULIARITIES AND CHALLENGES OF AN ESP COURSE FOR CHEMISTRY / BIOLOGY STUDENTS IN KAZAKHSTANI UNIVERSITIES

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This article deals with conducting English for Specific Purposes (ESP) for chemists / biologists. ESP courses focus on a specific area or discipline. This article describes the differences between General English and English for Specific Purposes (ESP). The main focus of ESP is not to emphasis on the language itself, but tries to highlight the need of a learner such as English for Engineers, Lawyers, Chemists, Biologists, Doctors and etc. On the other hand, General English refers to context that educating of the basics of grammar, phonetics, vocabulary. Furthermore, the authors share their own experiences on teaching English in a professional sphere. This article shows the importance of teaching English for Specific Purposes for particular specialties, moreover there are some difficulties listed in the article. It was noticed that the work is more enthusiastic if students have contact with their specialty, and they are able to access the specific vocabularies related to their main subjects.

Keywords: English for Specific Purposes (ESP), General English (GE), Science, Chemistry, Biology.

English turned an extensively recognized global language in different professional fields, like business and science. Knowing English is considered as a vital and useful skill for the purpose of being successful in different working environment. The main point for English instructors and students is to serve to the specific language needs whereas general language learning is more common. Foreign language is sometimes acquired for entertainment or interest, however in majority of instances adult language learners have more persuasive and special needs to study a foreign language [1].

English for Specific Purposes (ESP) courses focus on a specific area or discipline, such as engineering, law, medicine, finance, human resources, marketing or science in my case. Emphasis is given to the language and communication in a particular professional field.

During almost all our teaching experiences I have conducted only General English (GE). However, in 2017-2018 academic year, a new discipline ESP course for Chemistry / Biology specialty was given to be conducted and this year it is my third year experience of conducting ESP course for chemists and biologists. What is the difference between ESP and GE? ESP is used in particular teaching circumstances, it is an advance approach as compared to GE. The main focus of ESP is not to emphasis on the language itself, but tries to highlight the needs of a learner such as English for Engineers, Lawyers, Chemists, Biologists, Doctors and etc. On the other hand, General English refers to context that educating of the basics of grammar, phonetics, vocabulary. No doubt, both are important for students in learning English. ESP emphasizes the language and communication in a particular professional field. ESP is classified as fixed teaching approaches among English Language Teaching (ELT). It has been known for 50 years of research, use, and it is probably the leading approach in academic environment [2]. ESP is an approach which gets effective, productive, and proper concepts from different theories blending them into an integrated system. It includes some features from Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), Project-Based Learning (PBL) [3]. In addition it has its peculiar characteristics such as learner-centeredness, correlation with specialized subjects, and dwell on both designing and educating. Thus, according to Anthony Laurence ESP is

English for Specific Purposes (ESP) is an approach to language teaching the target the current and/or future academic or occupational needs of learners, focuses on the necessary language, genres, and skills

to address these needs through the use of general and/or discipline-specific teaching materials and methods.

It might sound interesting why in the given definition ESP makes use of both general and/or special field resources and approaches so they can meet learners' needs. This happens due to the fact that some assignments used in an ESP auditorium are the same to the tasks applied in ordinary General English (GE) auditoriums. For instance, sometimes students are required to produce translations and interpretations of phrases or texts in their mother tongue languages, which is a grammar translation approach [4]. Moreover, audio-lingual approach may occur when students experience specific vocabulary pronunciation practice [4]. However, ESP is known as an approach which is used in accordance with learners' necessities that is why GE methods can be applied only if they meet students' needs. In contrast, resources and approaches that are specific to the disciplines would be always selected by ESP practitioners [5].

In addition according to Hutchinson and Waters [6] ESP is not a particular kind of language or methodology, nor does it consist of a particular type of teaching material. Understood properly, it is an approach to language learning, which is based on learner need. Orr [7] defines ESP as:

ESP is English language instruction designed to meet the specific learning needs of a specific learner or a group of learners within a specific time frame for which instruction in general English will not suffice....

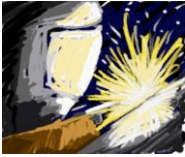

I would like to share my own experience in teaching ESP for chemists / biologists. Basically, I wish to start with problems and situations that were great effort for me. First of all, it is the attitude to chemistry as I was not skillful at this subject at school and moreover I was not experienced enough to teach ESP since I had been teaching only General English. The second obstacle I faced was the absence of resources (course materials). There are a huge range of materials related to Chemistry or Biology itself, but unfortunately I could not find appropriate English for chemistry or biology course book. The third difficulty I challenged was diverse level of students in the group. Some students graduated Nazarbayev Intellectual Schools (NIS) or Bilim Innovation Lyceum (BIL), and others came from ordinary rural schools. According to the test results there were approximately 45% of A1-A2 level students, where 13% were given as beginners, 25% as elementary and only 8% as pre-intermediate level, and just above of half were B1-B2 level, that made 54% of intermediate level students.

It was a great dilemma for me how to deal with all of them in the same auditorium of 6 lessons a week. So, the classes were broken into subclasses: 2 classes were dedicated to English for Biology, 2 classes to English for Chemistry and 2 classes to General Grammar and Vocabulary topics such as at chemist's, at the airport, in the bank, etc.

Here are some methods that were used on the lessons:


- To have instructional / conversational dialogues / role plays;
- To use drawings, pictures, mind maps, presentations to support the spoken word;
- To read texts can be done individually, in pairs or in small groups and different kind of exercises can be used or generated by students themselves such as true/false, agree/disagree, match pairs and etc. As it was mentioned previously, we could not find a course book for the lessons, and we had to make up texts ourselves. We looked for materials on the Internet. Some of the sources were downloaded from www.chem4kids.com site. Even the title of the site is chemistry for kids; however it is for everyone who is looking for information on matter, atoms, elements, periodic table, and reactions. In the table #1 below it is shown the example of text about the first element on periodic table – Hydrogen and information where it can be found that was taken from www.chem4kids.com. Different tasks may be given for students according to the element: they have to read the whole text, understand its comprehension, work with unknown words, or they might be given only the part of information and students have to introduce, present his/her topic to the opponent or whole group in 3 to 5 minute-time.

Table 1 - The first element on periodic table – Hydrogen and its usage

 <p>HY-DRO-GEN: Let's start our tour of the <u>periodic table</u> with hydrogen (H). Why start with hydrogen? Hydrogen is the first element in the periodic table and the most basic and common of all elements in the Universe. Scientists use the letter "H" to represent hydrogen in chemical equations and descriptions. Over ninety percent of all the <u>atoms</u> in the Universe are hydrogen atoms. By mass, hydrogen makes up about 75% of all matter in the Universe. Hydrogen atoms are also the smallest and lightest of all the atoms with only one electron and one proton in a common single hydrogen atom (called protium). Although it has been around forever (possibly the first element to ever form), it took a chemist named Antoine-Laurent de Lavoisier to name it in 1783. The name hydrogen comes from the Greek word "hydro" which means water (H₂O) and the word "genes" which means creator. Lavoisier showed that hydrogen was in all water molecules after discovering that water was created when hydrogen burned in air. In addition to water, you can find hydrogen closer to home in every organism, blowtorches, and low temperature freezing processes. Farther away from home, you will find it in all stars, including the nuclear reactions that power the Sun.</p>	<p>Where is Hydrogen Found?</p> <p>Welding: Sometimes you see someone working with a blowtorch to cut or welding to bring things together. Those processes need gases that can burn very hot. In welding, electricity splits hydrogen molecules and when the atoms recombine, huge amounts of heat are released</p>  <p>The Sun: One of the elements that makes the sun burn so brightly is hydrogen. While hydrogen burns really easily on Earth, the burning hydrogen on the Sun and other stars is the result of nuclear reactions that rely on <u>isotopes</u> of hydrogen.</p>  <p>Rocket Fuel: Hydrogen is awesome as a rocket fuel because of all of the energy released. The hydrogen is compressed into a liquid form(H₂) and stored in tanks. It is combined with liquid <u>oxygen</u> (O₂) to create the most efficient reaction and release of energy.</p>  <p>Plants and Sugars: Hydrogen is in all plants and living things in general. Sure we all have water, but there are also sugars generated through plant photosynthesis. That's why animals eat plants... For the <u>sugars</u> and energy-filled compounds. [8]</p> 
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• Afterwards, the vocabulary comprehension might be checked with the help of various games for instance some of them are listed below:

- Hangman is the letter guessing game. Students are shown a set of blank letters that match a word or phrase (f. ex.: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _) related to the chemistry/biology terminology and they have to guess what these letters are to find the hidden word(s). If students pick a letter that is in the word, a sound is played and the letter is revealed from the blank letter (f. ex.: P _ _ _ _ _ _ _ _ _ _ s _ _ _ _ _ _ _ _ s _ s _); however,

if they pick a letter that is not in the word then a stickman is drawn slowly part by part (f. ex.: ). With each wrong letter guess, the man is drawn more and more, and when the man is finished, he is hung and the game is lost. On the contrary, if you find the word before the man totally hung it means you successfully complete the game (f. ex.: Photosynthesis). In addition students could be asked to define the revealed word (f. ex.: Photosynthesis is the complex process by which carbon dioxide, water, and inorganic salts are converted into carbohydrates by green plant, algae, and certain bacteria, using energy from sun and chlorophyll).

- Bingo is an incredibly fun game to play in class. There are a lot of different types of bingos and you can create your own customized Chemistry/Biology Bingo. Draw a 2x3, 3x3, or 4x4 grid with specific vocabulary words in the boxes. Read the definitions of the words out loud. Students cross the words that match the definition they hear. The student who crosses all words should shout out the word 'Bingo'. Afterwards, they all together check the words with their definitions and if everything is correct the winner gets a prize. For example in the given tables the first definition matches for 'Cholesterol' word.

Arthritis	Cholesterol	Cancer
Cardio vascular	Infections	Sedentary

1.To eat much of it is deposited on the walls of the arteries and can block them.
 2.The painful inflammation of a joint may require surgery
 3.They can easily be spread from one person to another
 4.Disease which affects the circulation of blood is particularly common with people who are overweight
 5.Too much exposure to the sun can cause skin _____
 6.The type of lifestyle when you don't get enough exercise.

Figure 1 - **Bingo on disease topic of ESP classes for chemists and biologists**

- Taboo is a verbal game with teams that are referred as Team A, Team B, or Team C. Teachers can create exact number of cards for each number in a group. Each team in turn selects a person in their team to be a clue – giver. The clue cards have clue word on the top of the card and taboo words listed below the clue word. Clue-givers have to explain the clue word in one-minute time without any taboo words in one of their clues. If a taboo word is used or the time is expired then the team is not given a point and this point goes for opponent team. The winner is declared by the team with the most points.

CONDENSE	EVAPORATION	LIQUID	MELT	GAS
<ul style="list-style-type: none"> • Change • Cool • Water • Gas • Liquid 	<ul style="list-style-type: none"> • Change • Heat • Solid • Gas • Forces • Condensation 	<ul style="list-style-type: none"> • Far apart • Vibrating • Solid • Gas • Close • Pattern 	<ul style="list-style-type: none"> • Move • Vibrate • Energy • Break • Solid • Liquid 	<ul style="list-style-type: none"> • Far apart • Vibrating • Liquid • Forces • Melted • Attraction

Figure 2 - **A set of taboo cards on states of matter**

- Chinese whispers is a very popular game that can work in the classrooms. Students have to sit in a circle or stand in a line. Special words, phrases or information is whispered into the ear of a person sitting or standing on the right side. The last player says the word/phrase loud out so everyone can hear and check if the word is similar to the initial one. The main purpose of this game is to present new vocabulary in an amusement way. Moreover, it helps to develop active listening skills.

- Breaking phrases into smaller words technique help students to find as many smaller words as they can find in pairs or smaller groups. For instance, from the phrase ‘Carbon Dioxide’ given below there are some smaller words can be made.

◎ CARBON DIOXIDE

CAR	CAN
BONE	CAD
ROB	CARE
OXEN	ON
DOOR	NICE
DIODE	ODD
BOND	ODOR

- Stop the bus is an amazing game that helps students to revise vocabulary and can be used with any level and age by changing category headings. Students are concentrated to find an appropriate specific term beginning with the set letter. The first player/ pair/ team to finish shouts out ‘Stop the Bus!’ For example to check the knowledge of chemical elements on letter ‘M’ the table can be filled with information as follow. (see figure 3)

ELEMENT	USAGE	PROPERTIES	DISCOVERY INFO	COMPOUNDS	#OF ELECTRONS	ATOMIC MASS
Mg - magnesium	Medicine Chlorophyll molecules; Camera flash bulbs;	Purified is very light, silvery metal;	Chemist named Davy isolated and purified in 1808	MgO – Magnesium Oxide; MgCl ₂ -- Magnesium Chloride;	12	24.31 AMU (atomic mass units)

Figure 3 - An example of ‘Stop the Bus’ game on chemical elements

- To learn definitional information should aim to engage students in actively thinking about words, and how these words can be used in their specific field. The meaning of a new word should be explained to student rather than just defined with the help of dictionary that might be difficult to comprehend for some students. It is better to characterize the new word and its usage, as well as explaining the meaning words with everyday language that is understandable and meaningful to students [9].

- Project work done by students on different relevant specific materials that were uploaded on social networks. Each uploaded material should be supported with text written by students and related vocabulary items have to be presented.

- One more thing I would like to mention about is www.readworks.org [10] site which provides cognitive science - based audio texts with questions that can be done anywhere at any relevant time for students, of course they only need to meet the deadline. It really engages students to read a lot. I created a classroom and managed to follow me. Every week I send them audio texts to read and listen so, afterwards I can track the progress at any convenient time for me.
- To consolidate the whole lesson you may take a 3(5)-minute Hydrogen quiz as given below. For weaker students it can be multiple choice, for stronger it might be open questions.

From own experience I have found out that games, project work, reading comprehension, everything that has direct connection to the students’ specialty are really very exciting for both teacher and students. Although, there are not many course books on English for chemistry-biology students teaching methods that were presented above are motivating students. By playing fun educational games, reading specific texts, by accomplishing project work, students can practice and review key chemistry/biology terminology in English without the boredom which is usually encountered when doing General English paper-based gap-fill exercises on generic topics. Students like subject specific tasks and they learn a lot of particular information in professional spheres while they are doing this work. We notice that when students have contact with their specialty, the work is more enthusiastic and they are able to access the specific vocabulary related to their main subjects.

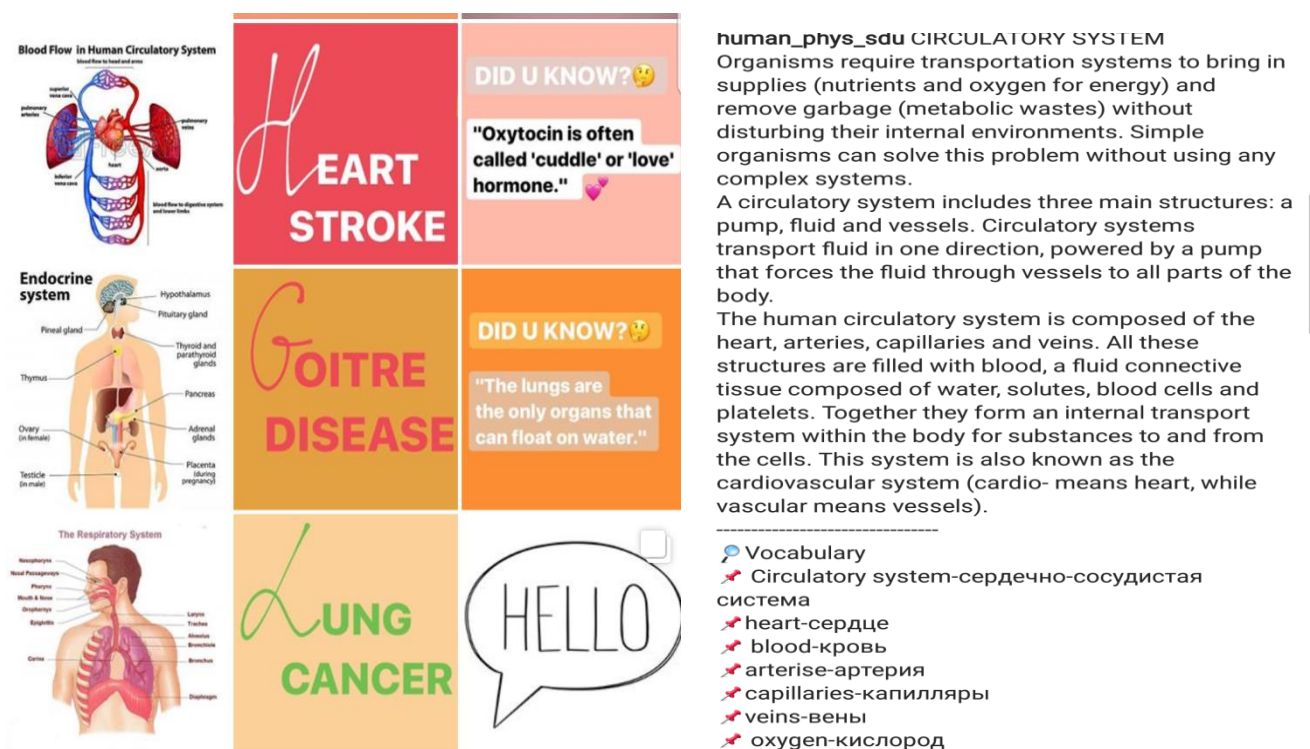


Figure 4 – A project work of the first-year students: human_phys_sdu (Instagram page)

WHAT YOU NEED TO REMEMEMBER

- How many electrons does a normal hydrogen atom have?
 - One
 - Two
 - Three
 - Four
- Which of these hydrogen isotopes is used in nuclear reactions?
 - Maximonium
 - Triplium
 - Deuterium
 - Monoatomic
- How many neutrons does an average hydrogen atom have?
 - One
 - Two
 - Zero
 - Four
- When hydrogen forms atomic bonds, what types of bonds does it make?
 - Single
 - None
 - Double
 - Triple
- The 'hydro' in hydrogen is Greek for ...
 - Water
 - Weightless
 - Flammable
 - Cold
- Hydrogen (H) makes up about what percent of all mass?
 - 50%
 - 75%
 - 25%

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Table 1, Figures 1, 2, 3, 4 are generated by author.

Химия / биология мамандығында оқитын студенттерді арнайы мақсаттарға арналған ағылшын тілін оқыту тәжірибесі

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Бұл мақалада химия / биология мамандықтарына арналған арнайы мақсаттарға арналған ағылшын тілі оқыту тәжірибесі қарастырылған. Арнайы мақсаттарға арналған ағылшын тілі инженерия, заң, медицина, қаржы, экономика, маркетинг немесе және ғылым сияқты нақты салаға немесе пәндерге бағытталған. Автор арнайы мақсаттарға арналған ағылшын тілі мен практикалық ағылшын тілінің айырмашылығын қарастырып, кәсіби салада ағылшын тілін үйретуде өз тәжірибесімен бөліседі. Бұл мақалада белгілі мамандықтар бойынша кәсіби ағылшын тілін оқытудың маңыздылығы, сондай-ақ курс барысында кездесетін кейбір қиындықтар көрсетілген. Оқу кезеңінде студенттер өздерінің мамандықтарымен тікелей байланыста болғандығы, олар үлкен ынта-жігермен жұмыс істегендігі, сонымен қатар олар өздерінің негізгі тақырыптарына қатысты белгілі бір терминдерге қол жеткізе алатындығы туралы атап өтілді.

Түйін сөздер: арнайы мақсаттарға арналған ағылшын тілі, практикалық ағылшын тілі, ғылым, химия, биология.

Особенности и трудности преподавания профессионального английского языка для студентов химии и биологии

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В статье рассматриваются особенности преподавания специального английского языка для студентов, изучающих химию и биологию. Английский язык для специальных целей сосредоточен на определенной сфере или дисциплине, особое внимание уделяется языку и коммуникации в определенной профессиональной сфере. Описываются различия между общим английским и английским для профессиональных целей. Автор делится своим опытом преподавания английского языка в профессиональной сфере. Показано значение обучения профессионального английского для конкретных специальностей, описываются некоторые трудности в преподавании курса. Было замечено, что студенты, имея непосредственный контакт со своей специальностью, работают с большим энтузиазмом, усваивая специфическую терминологию в рамках изучения основных тем.

Ключевые слова: профессиональный английский язык, практический английский, наука, химия, биология.

Received 18 December, 2019

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