Using Chat-bots for Managing Quest-based Modular Training of Engineering Students

N. I. Chernova
Foreign Languages Department
Moscow Technological University,
Moscow, Russia
chernova@mirea.ru

A. A. Mandzhiev
Foreign Languages Department
Moscow Technological University,
Moscow, Russia
mandzhiev@mirea.ru

Abstract— **The article discusses major challenges when training Engineering and IT students a foreign language. One of the experimental ways to address the issues is a syllabus based on a specifically designed system of unenforced tasks — quests.**

When dealing with engineering students, who often lack motivation in foreign language acquisition, and a somewhat limited amount of time for training, justified by the curriculum, it is crucial to base the English language course on professional and communicative challenges that a future specialist would encounter. According to this underlying principle, we have been designing a series of additional exercises - so-called quests - to further involvement of students in language acquisition as well as develop their intercultural and communicative competencies, academic and professional skills.

The strain that such diversified syllabus creates is decreased with the help of social networking means and chat bots to automate the scoring and communication processes.

Keywords— **IT for vocational training, English for specific purposes, interactive approach**

1. Introduction

Russian higher education system is in state of transition. It's USSR-developed background is gradually phased out by the modern competence-oriented paradigm [1-4]. As the experts admit, the normal continuance of a younger teaching personnel being trained and counseled by an older generation of university professors was interrupted in the 1990s by an unprecedented labour outflow in the area. This created a somewhat "generation gap" in teaching and training personnel, which is only increased with the shift to the competence-oriented paradigm and numerous education reforms in the country.
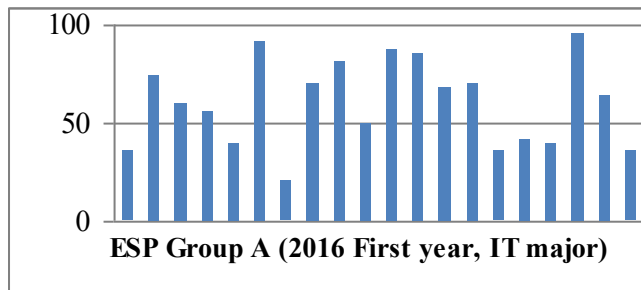

Figure 1: Example of entry test scores (out of 100) in an II freshmen class

This combination of economic and social conditions has led to a rather challenging situation for ESP teachers in technical universities throughout Russia. We have worked out a quest-based syllabus which can be considered as a next logical step in the modular approach to training Engineering and IT students. At the core of the concept there is the notion of a "quest" as a specific task that students may choose to complete if they fit certain requirements. Such syllabus may present a significant strain for a teacher, however, modern IT technologies and social networking websites provide a way to mitigate the burden [5-8].

2. Challenges of ESP Training

We shall now consider some challenges English for Specific Purposes training faces in technological universities. They can be roughly divided into the following groups: target group challenges, curriculum challenges, competence-oriented challenges.

Target-group challenges are connected with the students' various backgrounds and their educational circumstances and habits.

It is a matter of common sense that most of the students prioritize Sciences over language studies in high school to get ready for their future engineering and/or IT higher education. Moreover, their subject-oriented instruction at school favours English classes being overlooked, if not completely neglected. As a result, general level of the English language expertise demonstrated by first-year students is below average standards.

However, group compositions are usually non-homogenous in terms of command of English (Fig.1 demonstrates a typical non-uniform distribution of scores at the entry test) with no particular way to reshuffle groups according to their English expertise level.

This situation may lead to a two-fold loss of motivation among the trainees: weak students would soon be discouraged by complex requirements of the subject, while students with above-average level of expertise in the English language would quickly see low-level oriented classes as a burden. This leads to a high level of absenteeism, which peaks in the third semester of the course (one of the most crucial, however).

Another reason for low motivation of students is strongly connected to the curriculum-based challenges. First of all, engineering students' curriculum facilitates 360 academic hours of foreign language practice (roughly a half of this number is student's individual work), which means curriculum-wise the subject of English for specific purposes stands alongside PE, History and Philosophy in terms of priority. According to subjective assessment we have asked our students to conduct, the was majority of students consider

(sensibly) the subject as "less useful" than their major courses in university. More than 70% of the trainees asked admitted that when pressed in time, they would sacrifice English studies for a more pressing/important subject.

Secondly, the very nature of training engineering and IT students dictates much larger group sizes than that generally considered efficient when practicing a foreign language: the average group size in MTU (IT major) is 24, which is double the size recommended for language learning. This puts enormous strain on teachers as well as drastically limits the actual time a teacher can dedicate to an individual trainee.

Thirdly, in MTU foreign language appears as a subject only in the first and second years of studying, which puts the trainees in a somewhat awkward position, when they have to learn English for Specific Purposes without a clear understanding of their future profession and/or major courses.

All these factors make it really hard to establish solid foreign language environment.

The third group of challenges — competence-oriented challenges —are represented by the objectives Russian Federal educational standard sets. Bachelor education is becoming more and more profession-oriented with the set of competences. This means English for Specific Purposes has to adapt, inclining to a more interdisciplinary approach.

Furthermore, the IT industry is rapidly developing, forcing teachers of ESP to constantly adapt the content of their syllabus to meet the need of trainees.

3. CONCEPT OF A QUEST-BASED SYLLABUS

Keeping these challenges in mind we have been developing a syllabus based on a widely known idea of quests in the video gaming world. So, what is a quest? We consider a quest as a specific task that a student can independently choose to complete if required conditions are met for a certain reward.

We have developed a series of individual and team quests to increase motivation and facilitate developing of specific and general professional/academic skills and expertise.

There are three major types of quests a teacher can introduce: language-oriented, profession-oriented, extra-classroom activities. Certainly, designing these tasks is a creative process and a particular quest can fall into more than one category. For example, quests that require a presentation as an output are aimed at developing language skills as well as professional ones [9-11].

As far as scoring is concerned, the rewards can be adjusted on the go, according to specific training conditions of a particular group of students, their background, motivation, etc. General guidelines are to keep the maximum number of points (for all the quests on offer) at 160-260% of the "Excellent mark threshold". The lower the maximum is the harder it is for the students to achieve the goal, as rewards are less valuable. Figure 2 demonstrates an example of total points distribution in comparison to the Excellent mark threshold for a group of 24 first-year students of IT department. Pay attention, that "extra" quests constitute only 50% of the score needed for the

excellent mark, making it impossible to pass the exam without any actual language work.

The concept of a quest is well-known by young students, so teacher can painlessly exclude a quest or change its parameters to avoid or impede its abuse by the students. the only requirement is to set scoring fair and transparent, which would lead to higher motivation and involvement.
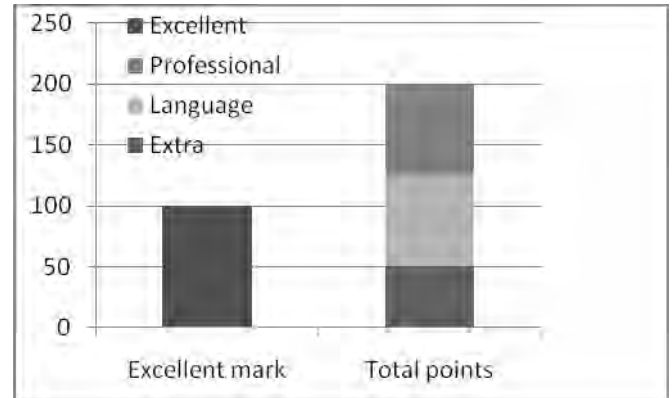

Figure 2: Scoring for group A (Freshmen 2016, IT major)

The "extra-classroom" quests are designed to stimulate a student to broaden his/her mind by doing something only vaguely connected to language learning and/or their major studies. Such tasks may include various subjects in a broad spectrum of human interest and this is where we have found a perfect place for intercultural communication training in a syllabus that is seemingly purely concentrated on IT or Engineering rather than Humanities and Ethics. Furthermore, according to the survey conducted by the end of the previous semester, 45% of students welcomed such distraction from their daily training routine and would be glad to involve themselves in tasks not related to Sciences, Engineering or Mathematics.

Professional/academic quests are designed to be interdisciplinary and motivate the student to learn more about his/her future profession and share the knowledge with course-mates [13-15]. They also train students practical skills that their future job or academic career will require.

As an additional feature to boost motivation we have introduced a team-based scoring subsystem. The group is divided into teams of 6 and some of the rewards from individual quests depend upon whether one's teammates have completed the assignment too. By utilizing such peer pressure technique, we have managed to reduce absenteeism (from 30% of students absent down to 10%) and stimulate students to participate more actively in classroom activities.

Some of the quests provided are team quests, and the rewarding points are distributed among the team members according to their decision. Completing these activities would also train teamwork, time-management and leadership skills. The following table provides some examples of quests (tasks):

Such quests can easily and effectively replace home assignments — we believe that competition and peer pressure are great motivators — if the teacher chooses to set deadlines for particular quests. The quest system also appears to be a

great tool to create a situation of success via various tasks that students can be interested in, exceeding those that are limited by their curriculum.

Tab 1.

	Individual quests	Team quests
Language-oriented	Compose a short test for your fellow students to check their knowledge of Past Simple/Present Perfect tenses	Break the code with linguistic methods and decipher a letter
Professional/Academic	Write a real CV for yourself and apply for a suitable position in the IT sphere	Present an IT start-up idea and a business plan for its realization to a group of "investors"
Extra	Take a "selfie" with a painting in an art gallery, post it in a social networking website; comment it with curious facts about the painting	Intercultural communication training

In general, such flexible concept is designed to address the above-mentioned challenges: by letting the students to decide whether they will do a certain task or not, we try to stimulate their individual work, develop professional and personal responsibility. Meanwhile, in order to complete most of the quests students also have to apply knowledge and skills that go beyond their usual foreign language practice, gaining hand-on experience and establishing a more detailed vision of the world outside the university.

4. CHAT-BOT FOR QUEST-BASED SYLLABYS IN ESP

The concept we have described originates in modular approach to teaching ESP in an Engineering class[16-19]. However, the modular approach itself was rather hard to realize, meaning that an even more "personalized" quest-based syllabus may require a lot more effort from a language teacher already overloaded with large groups and enormous additional workload. Thus, we have come up with a way to somewhat decrease the strain by automating the scoring and quest-distribution processes via a chat bot in the most popular social networking service among our students – vk.com (Vkontakte has 99.8% of all our students as their loyal customers).

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!score
!givequests
!check file.docx
!hometask
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Figure 3: List of user commands available

The bot itself uses built-in free API to communicate with students. Like any other user of the website, it can send and receive messages, post announcements, etc. Students connected to assigned chat rooms may control the bot with commands enlisted in Figure 3. The bot can announce the student's current score, provide him with a list of quests available, receive and save (tagged) file for the teacher to check or give instructions for homework (if any).

The overall structure of the whole system is given below.
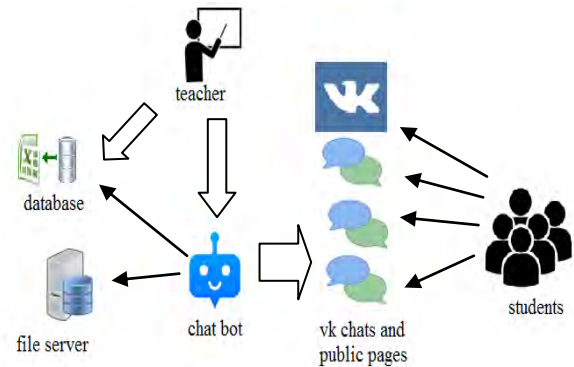

Figure 4: The simplified chat bot operation scheme

As one can see in Figure 4 the teacher has a priority control over the database, file server and the bot itself. The bot provides communication between the users and the database, stores files in the file server and maintains the VK public page — a news bulletin for the whole community of students.

The scheme allows the teacher to distribute the assignments according to the schedule, group ID, student name, etc. It also allows one to automatically collect the results of students work on the file server and provides students with up-to-date information about their status ensuring transparency and establishing additional communication routes with the teacher.

We are planning to broaden the system by including support of hashtags, multimedia resources and a more detailed syllabus.

5. CONCLUSIONS AND DISCUSSION

In the article we have discussed the present challenges and issues that teaching English for Specific Purposes usually involves in modern technological universities. Lack of motivation and contrasting levels of expertise seem to be the major issues we could address. Moreover, Federal standards dictate a more professionally oriented training to be introduced.

Overall, we can say that introduction of the experimental quest-based syllabus was positively accepted by the students. We are especially proud that the process of programming and testing the bot was carried out by our own students, indicating that at least some of them got highly motivated and are eager to pursue their own professional goals in the field of IT.

The recent survey has demonstrated a much higher subjective impression on the subject of ESP (64% of students claimed their interest in both ESP and their major courses has risen). In addition, the teamwork subsystem has dramatically reduced absenteeism (overall, only one student out of ten skips a class sporadically). The game-infused atmosphere facilitates both cooperation and competition, leading to a whole new level of training.

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