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INFORMATION AND COMMUNICATION TECHNOLOGIES IN TECHNICAL UNIVERSITY

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It is today almost obvious to say that information and communication technologies (ICTs) and the Internet have changed our life. In last decades computers evolved and became us friendly due to the introduction of special input devices and graphics user interfaces (GUIs). It gives an opportunity of their implementation into all spheres of our life. Therefore ICTs are widely used in the educational field and adopted for a teaching process.

Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) to teach students the knowledge and skills they need in the 21st century.

To effectively harness the power of ICTs to improve learning the following essential conditions must be met [1]:

• Students and teachers must have sufficient access to digital technologies and the Internet in their classrooms, schools and institutions.

• High quality, meaningful and culturally responsive digital content must be available for teachers and learners.

• Teachers must have the knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards.

While ICTs in educational process should aspire to no less the trajectory of the development for institutions programs they should be appropriate to the level of resources including expertise and leadership. They particularly may be effective in technical universities at all stages of teaching technical students. Innovative techniques have also spread to the world of teaching foreign language. The development of productive skills as well as and the formation of communicative students' culture creates the main tasks of teaching foreign languages. This article will review the examples of approaches for engineering education through ICTs at English classes.

It is important to prepare for the university's subject called "Foreign Language" (particularly English) high quality products where the practice of using an informational technology has never been highly developed and where the number of specialists who are working on the problems of creating and implementing learning multimedia materials for the foreign language still remains insufficient. Our personal experience gained during the period of organizing and conducting numerous meetings, international conferences and seminars proves a lack of linguistic competence of the Belarusian students. Communication and even professional oriented in the Internet chats and forums becomes ineffective due to poor knowledge of foreign languages. Modern digital equipment such as multimedia screens, video projectors and networks have brought new opportunities for mass and more effective language learning connected with the organization of the foreign language environment and visualization of the physical or informational objects of the language. Therefore it is necessary to refine a great number of issues in foreign language teaching including the whole process of creating teaching curriculum with implementation informational technologies in it.

As the first step of teaching process is creating systematic curriculum we have a good look at special software an Assistance Tool called *TEATIME (TEacher's Assistance Tool for the design and generation of MAETIC dEvices)* which helps a teacher to design his own pedagogical device [2]. The produced device uses Web 2.0 tools and includes a pedagogical method, which provides a support to learners for the acquisition of professional knowledge and know-how. It also dedicates to the training of professional know-how according to a collective project-based pedagogy. *TEATIME* helps teachers to formulate their needs (assistance in the design) and relieves them from the sometimes tiresome and repetitive tasks related to the deployment of a teaching device (development assistance).

The TEATIME tool consists of 3 software components which are shown in Fig. 1.

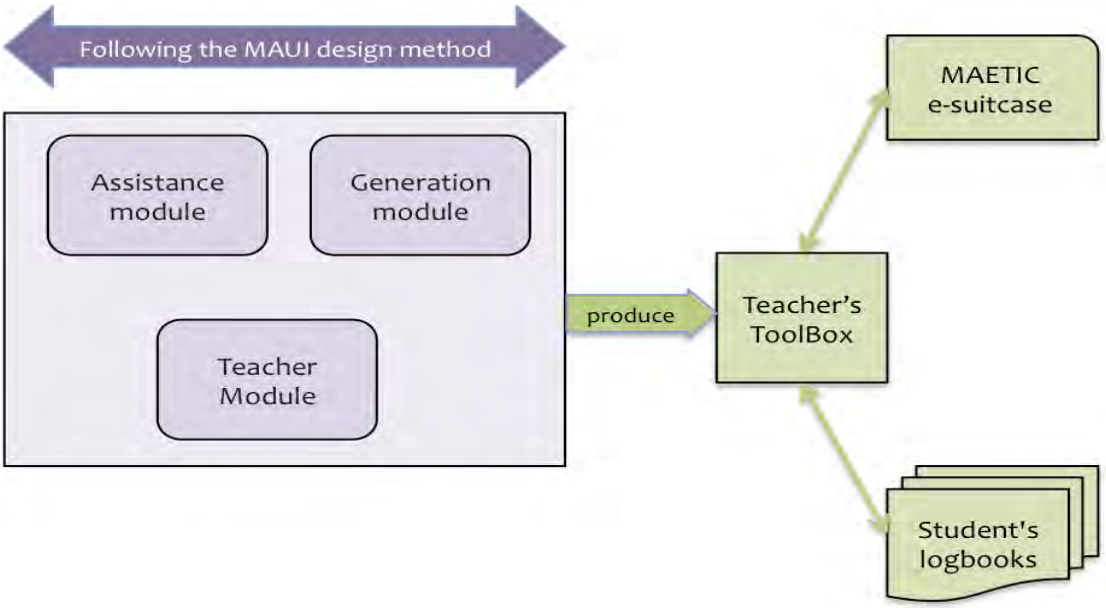

Figure 1 – The layout drawing of *MAETIC* model

The *Assistance Module* helps to define the pedagogical device (according to the teaching context) thanks to provided information (e.g., the duration of the Teaching Unit and the number of students involved). This module allows the teacher to design a device that meets his choice. The module will query the teacher to determine the organizational constraints of his teaching [3].

The *Generator Module* called prototyping generates the technological environment specified by the teacher. It produces the *MAETIC* e-suitcase, the logbooks of students (Weblogs) and the Toolbox of the teacher. The necessary information for the generation was previously entered.

The *Teacher Module* adapts the generated device and the authoring tool to the preferences of the teacher (thanks to his profile).

Thus *TEATIME* helps teachers to formulate their needs and relieves them from tiresome and repetitive tasks related to the building of a teaching device. In order to realize this work, the tool asks the teacher to determine the constraints of the teaching unit (time constraints, space constraints, project of the institution, evaluation modalities, pedagogical resources, number of sessions, etc.) and his technological preferences.

In the present work the author reports an example of using software *TEATIME* during one year of the Integrated Undergraduate Degree at Engineering and Pedagogy Faculty of Belarusian national technical university. With the help of mentioned software a pedagogical scenario for speciality "Vacuum Technology" was generated. The students of this speciality study a course "Technical translation" comprising mechanical, chemical, material science and even the new vacuum technology implementation. Those tasks were carried out within activities going at practical English classes. It was a very interesting work and took the time of two semesters. The aim was to explain the students how useful those experiences have been allowing them to explore many techno-scientific activities within their engineering education.

The work was divided into two equal parts. The first half of the work included lectures on special subjects and instruction that provided the students with the tools they would use throughout the course, particularly in the second half that focused on the implementation professional knowledge into practice. This way software *T-FLEX CAD* which is used at the classes of engineering graphics helps students at their English classes to create parametric models of investigated objects. For example unit "Magnetron" contains a lot of specific information in English. To make the process of study easier the students were offered to draw the model of magnetron using software *T-FLEX CAD* (Fig. 2).

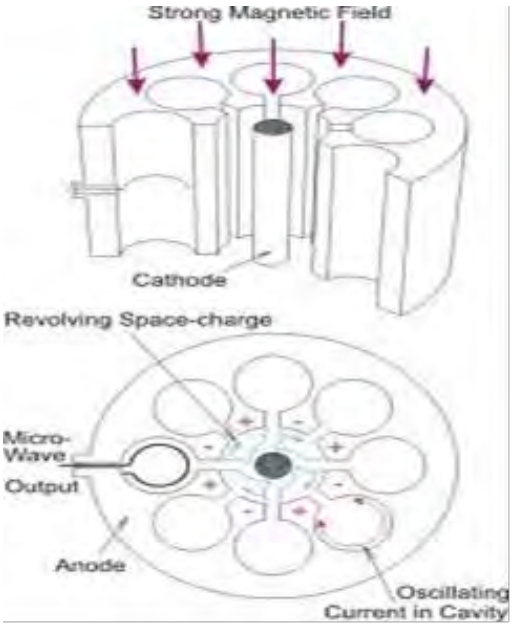

Figure 2 – Magnetron model

3D model not only makes investigated object visible but also allows student to apply language skills for making English labels of the component names. More than that this simulation model can help students to create a unified mode of operations for all types of the object and design situations that use similar geometry. In whole simulations are modern student-centered teaching methods requiring the students' involvement and active participation in the simulation process to operate the system. Therefore students can develop their interdisciplinary skills such as decision-making, problem-solving, divergent thinking, interpersonal and communication skills. That is why this methodology should be widely used in technical universities for engineering students.

Nowadays ICTs aid plenty of resources to enhance the teaching skills and learning ability. But these resources can not only provide learners with modern educational software they also allow students to create their own informative resource. Engineering education involve a great part of scientific and technological novelties. That is why students have to read a lot of specific professional texts and take advantage of them. So text processing software should be also used in a technical university. For instance we have implemented into educational process software TRT at English classes. This program processes a number of English texts and represents their meaning in the form of a table abstract [4]. Figure 3 shows the front page of a program TRT with the loaded text. There is a vocabulary with semantic codes at the bottom of a page. If the database of a program doesn't have a new professional term it can be added into it by a user.

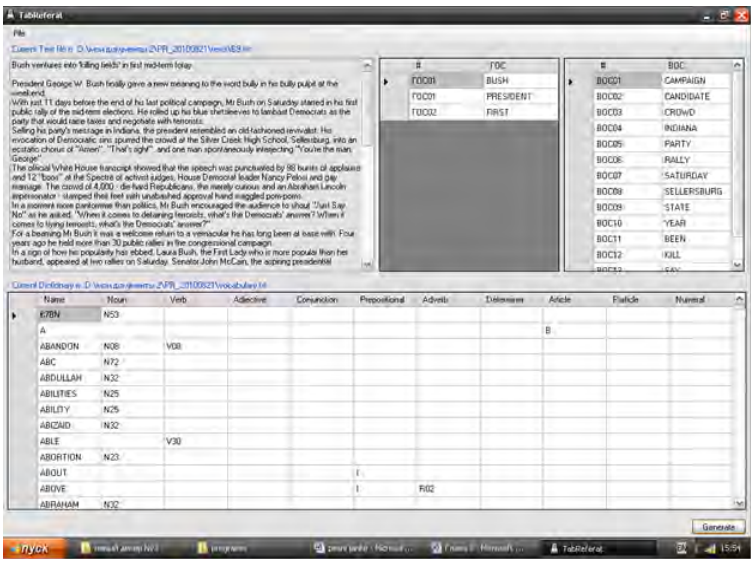

Figure 3 – The front page of TRT program

Making a conclusion it should be said that the learning resources are being widen. Now with this vivid and vast technique as part of educational curriculum, learners are encouraged to regard computers as tools to be used in all aspects of their studies. In particular they need to make use of new multimedia technologies to communicate ideas, describe projects and order information in their work. The students found this kind of learning to be more interesting and motivating than having conventional classroom teaching. So it is very important to create an innovative setting in technical university to help students master their professional skills.

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