DIGITAL MEANS IN STUDENTS' RESEARCH WORK

Makarych M.V., Ravino V.V.

Belarusian National Technical University, Minsk, Belarus, 2348843@tut.by

The article deals with the problem of students' research work while studying English. Special attention is given to those basic theoretical points and principles, which are necessary for the formation of professional skills with the help of modern digital possibilities. The article proves that investigations can provide students with access to a greater range of ideas about what is being studied and can motivate them to find new ways in future professional career. The authors report an example of students' research work during one year of the Integrated Undergraduate Degree at Engineering and Pedagogy Faculty of Belarusian national technical university. The research work includes the creating of a new linguistic data base for a text processing system.

Key words: students' research work, professional skills, digital means, a text processing system

Modern educational process in institutes of higher education obligates academic staff to prepare professionals, who are able independently update their specific professional knowledge. In accordance with an on-line tutorial on an individual plan more than quite half of loading is taken for the independent study that requires from students to have the high level of general educational abilities and skills and basic methods of research work. It is important in the conditions of modern society which becomes more global. For this reason it is not easy for teachers to carry to the listeners certain volume of actual materials, which will be memorized passively. That is why a student should independently seize new knowledge, obtain new information, process it and create completely new knowledge for employment it into the learning process.

Educational process in the university considers students' research work to be an essential element of a curriculum, and we promote the development of programs that incorporate such inquiry-oriented activities. We use the term *investigation* to describe an exploration or study intended to answer a question about the professional technological world and uncover properties and relationships among structural elements of this technological world. Investigations may involve working with physical models and events, simulations of naturally occurring processes, data that summarizes findings of research, or written accounts of studies conducted by others.

We promote the inclusion of students' investigations in an educational curriculum for two reasons:

1. Scientific work helps students to understand the nature of science through firsthand experience of scientific practices.

2. It helps students to understand scientific content by giving them direct experience with the object of study.

Because knowing and finding out are not separated in science, it is important for students to learn science in a way that is consistent with the nature of science itself. To appreciate the logic and process of scientific reasoning, and not just its results, students need opportunities to gain new knowledge by asking questions about the world of their future profession and working with problems that require the collection and analysis of evidence to formulate and support conclusions. They should understand the predictive power of scientific theories and the importance of testable hypotheses, verifiable data, and the need for skepticism in seeking to validate these theories. Investigations should be structured to support students' curiosity and creativity and encourage collaborative efforts. Carefully planned group investigations can provide students with access to a greater range of ideas about what is being studied than would be available when working by themselves, and the process of working together can be motivating to students.

Motivation is defined as an individual's wish to invest time and effort in particular behavior. The source of motivation is explained by a large variety of theoretical approaches. The self-determination theory argues a person has three inherent needs [1]:

1. The need for autonomy – the individual's need to feel his/her behavior was not imposed on him/her, but is based on the individual's requirements.

2. The need for competence – the individual's need to feel he/she is able to fulfill challenging objectives.

3. The need for relatedness – the need to love, be loved and be part of a group.

When a person's needs are fulfilled he/she will reach a higher level of motivation, while deprivation would hurt it. On the opposite side of the scale is intrinsic motivation based on interest and enjoyment. The theory claims that the more the motivation stems from intrinsic factors, the more its quality is high. Since this theory has recently become a leading theory of motivation in general and educational motivation in particular. So with the help of research work students are engaged actively in science. Investigations should, therefore, allow students to collect, sort, catalogue, observe, compute, count, graph and measure. In addition to helping students understand the nature of science, conducting investigations also helps them to acquire the skills of their professional engineering practice. Students should learn computation and estimation skills, manipulation and observation skills, critical thinking skills and how to communicate with tables and graphs. So it's very important to incorporate modern digital means into the students' research work. It is therefore a global trend to integrate digital technologies into school life at all levels of education [2, 3].

On the other hand, effective integration of digital technologies into the system of education is a part of a complex system, and is influenced by many factors as e.g. teachers` attitudes towards the technologies, their skills to use these means in their teaching practice, nature of the subjects they teach, purposes they follow, personalities of their students.

In the present work the authors report an example of students' research work during one year of the Integrated Undergraduate Degree at Engineering and Pedagogy Faculty of Belarusian national technical university. At English classes she students on specialty "Informatics" created a new linguistic data base for text processing system TRT [4]. The system was design for processing publicistic writing and the purpose of presented research was to compile the data base with additional engineering terminology to have the possibility for processing IT texts with the help of TRT.

The work was divided into two equal parts. The first half of the work included lectures on "Information technologies" and the instructions at English practical classes that provided the students with the tools they would use throughout the course, particularly in the second half that focused on carrying out the research work. The second half of the project included the following stages: collecting data, detailed translation and encoding of English engineering terms into Belarusian and Russian and documenting the above process. The object of the investigation was engineering terminology from textbooks "English. Computer Engineering" [5]. The results of the analysis were put into the vocabulary of TRT system.

The second stage of the work was the collecting of texts about new information technologies and digital equipment from periodicals "International Journal of Innovative Research in Computer and Communication Engineering", "Journal of Computer Engineering & Information Technology", "Journal of Applied & Computational Mathematics", "American Journal of Computer Science and Information Technology", "Journal of Informatics and Data Mining". All the text were downloaded into TRT data base for processing. Afterwards 20 texts were downloaded into TRT linguistic data base and processed consequently for identifying missing words in TRT vocabulary. Then the table of the words was compiled and necessary codes and translations were added. The fragment of the vocabulary with semantic codes is shown in Fig. 1.
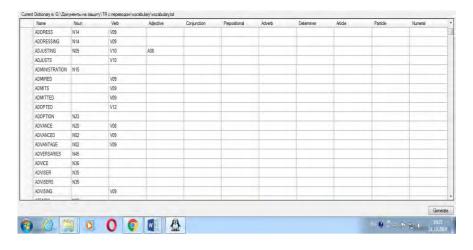
Figure 1 – The fragment of TRT vocabulary.

Created linguistic data base was tested by processing additional IT texts from the English periodicals that were mentioned above. The window with a processed text is shown in Fig.2.
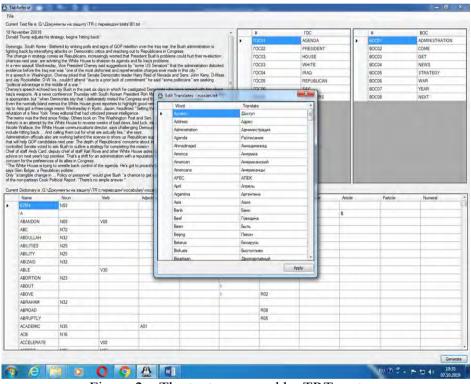

Figure 2 – The text processed by TRT system

The aim of the research was to explain the students how useful those experiences have been, allowing them to explore many techno-scientific activities within their engineering education while student as well as other transferable skills and later, up to the present, as a professional in academic environment.

So the great potential can be offered by the digital means to support current foreign language teaching. It can be beneficial for both thanks to technical advantages. From a pedagogical point of view, digital tools are considered to be suitable means to support the didactic-methodological principles of contemporary foreign language teaching. As for students, these tools can be used by them not only as an experimental tool, but also as a collaborative one. They also have the possibility to work with foreign language texts, either linear or hypertext and create their own programmable tool.

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