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The education of students of the academic discipline of Safety and Healthcare with the support of informational and communicational technologies

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Abstract

The creation of suppositions for the workplace safety and healthcare needs to create and to keep in work more systems of precautions. The scientific preparation of the students studying the discipline of OHS that happens in the Facility of Technical and Informational Technologies includes the education of desired pedagogical knowledge needed for the function of the Safety Technician. From the view of educational process the main point is focused on the problems of interactive and multimedia teaching methods, scientific and content handling of the education via multimedia, beside witch higher attention of students is expected against the studies and also their creative thinking is highly supported.

Keywords:
educational support
education of safety and healthcare
key competences in OHS
multimedia support of education

1 Introduction

Improving the health and safety at work has a significant economic importance because answering the questions related to occupational health and safety in the workplace delivers optimalization of the working process, increases the confidence of employees, brings a reduction of losses and higher productivity, efficiency and quality of work. Therefore, it increases not only the prosperity of the company, but also the society as a whole. Currently, for the management of the enterprises (particularly in the framework of integrated systems) it is necessary to educate specialists in this area, who will be able to deal with current issues in the field of Occupational Health and Safety using their knowledge and skills acquired during the studies of this, in accordance with the valid international and national legislation of the globalized world (www.akredkom.sk).
The supposition of secure of safety during work, for a complex defense of a human during the working process and on the workplace, for the sustainability of life and health, it's physical, mental and social comfort needs the creation and sustain a system of many remedies. The scientific preparation of the students studying the discipline of OHS that happens in the Facility of Technical and Informational Technologies includes the education of desired pedagogical knowledge needed for the function of the Safety Technician. It is important to achieve the needed level of professional competence of safety technician and to achieve the elementary abilities that will be efficiently used in the profession.

From the view of educational process the main point is focused on the problems of interactive and multimedia teaching methods, the application of e-learning course to the education, the support of real time experiments and their use in the educational process, teaching scientific and content handling of the education via

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multimedia. It is expected from students that their attention against studies and self-study will be higher and also their creative thinking is highly supported.
Preparation of qualified experts in the field of Occupational Health and Safety (OHS) is provided by the university education realized by the accredited study fields at all three levels of university education - bachelor degree, master's or engineering degree and doctoral degree.

After the Bachelor's degree the graduates in the study program „Occupational Health and Safety“ at the Department of Technology and Information Technologies will be able to analyze problems and opportunities available in various areas of safety, to design and to implement OHS systems, they have ability and skills to integrate the OHS system into other systems (e.g. environmental, quality management, etc.) or to integrate the other systems into OHS system (safety management system of the precaution of major industrial accidents). This requires knowledge in the business, the organization and the management.

In the theoretical field the graduates of Occupational Health and Safety acquire especially:

- essential facts, concepts, principles and theories related to OSH, basic information about valid legislation in Slovakia as well as the EU related to OHS issues,
- ability to assess and analyze risks as well as to choose the appropriate methods for this analysis,
- ability to define procedures and propose appropriate measures for minimizing the risks to their acceptable level based on the theoretical knowledge and practical experience,
- Prerequisites to evaluate the stress factors affecting safety at work and productivity of people and to assess adverse effects of stress factors.

Obtained knowledge is being developed in continuity with practical skills focused mainly on the ability to:

- specify, design and implement OHS systems,
- evaluate these systems under the general attributes of OHS,
- implement the requirements of the laws and regulations in OHS systems,
- Manage and improve OHS systems as well as to apply appropriate means for improving the overall level of OHS (Depešová – Tomková, 2013).

2 Pedagogic qualification of the safety engineer

An integral part of the professional specialization of the safety engineer, among others, is to implement trainings in OHS, to work effectively as a team member, to understand and quantify the basic elements of the problem, to organize his own further education, to maintain contact with the progress in his discipline, to use the scientific and research knowledge.
Qualified training of the students - future security technicians - requires an adequate preparation aimed, among other things, on the acquirement of the necessary pedagogical skills for the implementation of the trainings in OHS. The aim of the education and training in OHS is to introduce new methodical approaches for the protection of employees and to promote a high level of OHS.
An essential part of the training of students in the field of Occupational Health and Safety realized by the Department of Technology and Information Technology at the Faculty of Education (Constantine the Philosopher University in Nitra) is to ensure the necessary teaching skills for the execution of the safety engineer role. Among his competences there is also education and training of employees under the Act No.124/2006 §27, according to which the safety engineer has the responsibility to train on safety rules, principles, potential risks at work. With regard to the required competences of the safety engineer as a lecturer it is necessary to provide him a training in the field of the basic teaching skills during his study so that he is able to give the acquired professional knowledge to the trained persons (Perichtová – Kordošová, 2005).
After graduating from the Bachelor's course in the Occupational Health and Safety the acquired competences will allow the graduates to execute the professions such as safety engineer, engineering inspector, labour inspector, professions in the municipality and in the state administration.
For the comparison this form of study and the study program in the Occupational Health and Safety (OHS) can be found not only at the Department of Technology and Information Technology of Constantine the Philosopher University in Nitra but also abroad in similar fields of study, especially in the following countries and their universities: Netherlands – Delft University, Germany – BUGH Wuppertal, France – University Colmar, Australia – La Trobe University, Australia – Flinders University, USA- The University of Alabama, USA –

University of Michigan, USA – University of Washington, Canada- Queen's University - Kingston, Ontario, Finland – University Tampere, Czech Republic – VŠB TU Ostrava, etc. (www.akredkom.sk).

3 Information technologies in the Occupational Health and Safety (OHS) studies

The achievement of positive results in education is currently closely related to the modernization and efficiency of the educational process. Multimedia application into the training of the OHS specialists brings significant changes in the quality of education in the praxis. Introducing innovative methods and forms into the education with the application of multimedia affects the modernization of education on the required level.
Meaningful connection of new information and communication technologies with conventional forms of education by using high-quality educational content and interconnection of students and teachers in a shared digital space appears to be the appropriate means to positive effect on the quality of the education process. Information technologies with their didactic possibilities are the resources that can be very successfully and effectively used in acquiring the necessary educational skills.
Based on the result analysis from the application of ICT into education we can conclude that the computer aided teaching and the use of e-courses can effectively complete the other methods included in the education. In addition, the computer aided methods allow each student to progress at his own pace, to repeatedly analyze the key points of the subject, to repeatedly observe investigated events and processes, to use tests for the feedback and other activities for verifying the level of knowledge acquired, all of this not only in school area but also outside the school.

The design, creation and use of multimedia tools in the educational process as well as the availability of appropriately elaborated e-textbooks are important especially because the course structure of the OHS study program consists of specific learning areas, which requires suitably methodically prepared educational materials.
From the research perspective of the learning process the attention is currently focused mainly on the issue of interactive multimedia teaching, integration of e-learning in education, support of remote experiments and their implementation into education, professional and contentual mastering of teaching by means of multimedia. The implementation of multimedia into the teaching is expected to increase the interest of students in self-study and boosting their creative thinking in solving the tasks given. The successful application of the interactive multimedia learning assumes the implementation of the latest elements of ICT into education, the creation of a new quality of teaching, the improvement of distance education, the preparation of attractive study materials on CD media and web sites (Kozík - Feszterová – Bánesz, 2009).
E-learning has brought a new rate of addressability, personalization and collaboration which would not be possible without this technology. E-learning technologies bring a dynamic element in education, they change the learning environment, classes, laboratories, they bring a new dimension in education and force all organizations to change the approach to education. The process of the education management and preparation is significantly improved by the use of electronic management system tools for team production of the education content. Theses and teaching texts which form the base of education are stored as an electronic document. They are given to students on CDs or they are saved on company Internet or Intranet network. The LearningManagementSystem and LearningContentManagementSystem (LMS and LCMS) are usually used for the communication and cooperation among the participants.
Although the ICT role is the most important in the e-learning education we cannot overvalue it at the expense of solving pedagogic issues and indispensable role of teachers in the educational process.

4 Preparation of qualified experts in the field of Occupational Health and Safety (OHS)

To manage the required criteria of the study and to obtain competencies needed for the achievement of knowledge and skills of graduate in Bachelor degree of the OHS study program with the support and application of information and communication technologies there are subjects of the study in the OHS study

program for students at the Department of Technology and Information Technologies of Faculty of Education (Constantine the Philosopher University in Nitra) through which the students gain necessary skills and abilities needed for managing their profession and success on the labour market. It is mainly about subjects Information and communication Technologies and Information techniques in risk analysis.
The subject Information and Communication Technologies leads students after its competitions to understanding of basic terms in creating and editing text in a text editor, to the realization of the work with a text editor, to making their own text documents, to understanding of basic terms in the creation and editing of presentation in a presentation tool, to the realization of the work with a presentation tool, to the creation and presentation of their own presentations. As part of completing this subject/course the student will gain experience with text editor, basics of proper text writing, text editing – deleting, adding the text, font and paragraph formatting, work with ruler, styles. It is very important for the safety engineer to manage the methodology of creation and interpretation of the presentations, basics of creation of the presentations, working with the text in presentations, presentation design, using the patterns and adding objects into presentations because one of his tasks is to realize education trainings (Depešová, 2011).
ICT applications in the job of safety engineers are embedded in the subject of Information techniques in risk analysis. Completion of this course tends to achievement the abilities on the basis of which the student learns to find and work with information sources in OHS, he learns the way to transform the information into the technical documentation. The student is able to solve the assignment with computer simulation, search and use information sources in the field of safety, their availability and use by using the application. The use of interactive tool for risk searching and mapping ESENER and the application of processed outputs into the technical documents are important skills acquired by student. The student will manage to process the databases useful for the risk analysis, to apply selected programs in OHS, to use programs Dialux, ALOHA, RULA, etc. for calculating and predicting the health and safety risks by completing this subject (Hašková – Tureková – Depešová, 2015).
Besides the above mentioned subjects that are directly aimed at obtaining the required competences in the field of information and communication technologies, they are applied to the education by the means of electronic teaching materials, e-learning courses. The courses are prepared for teaching the subjects:

- Applied mathematics and physics,
- Machines, mechanisms and machine parts,
- Materials and technology,
- Graphical communication in technology,
- Application of information and communication technologies,
- Occupational Hygiene,
- Introduction to Occupational Health and Safety.

The teaching realized with the ICT support is more attractive for students, new quality of teaching is being formed. Meaningful interconnection of information and communication technologies with traditional forms of learning, using high-quality educational content, appears to be an appropriate means for positive influence on the educational process.

5 Conclusion

Increased attention of scientific research is currently focused on the field of educational technologies. If we consider that the application of information and communication technologies in education supports positively the innovative and student-oriented way of education, it is necessary that every educational institution considers building of the technological infrastructure, asks for the consistent use of ICT in educational process, adapts to the requirements of IT environment. One of the basic tasks of current education is to create and implement such a system of education which will encourage the student to obtain the necessary habits and skills to work rationally with the gained information important for the development of his competencies applicable on the labor market in real life. The aim of education in OHS is to obtain necessary information for the safe execution of work activities but also knowledge about the principles of safe behavior and actions of employees at work.

The issue of Occupational Health and Safety has a significant social importance. Its solution will optimize the working process, increase safety and improve the working comfort of employees, bring reduction of economic losses in production, allow to achieve higher productivity, efficiency and quality of work, it means it will contribute to economic and business growth of the company (Kozík – Lukáčová, 2010). Preparation of specialists in this area requires workers who have to gain the knowledge and skills during their study on the basis of which they will deal with current issues in the field of Occupational health and safety under the existing international and national legislation.

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