The model of securing IT competences

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Abstract

Knowledge is only the basis of the preferred core competencies of the individual and may not be sufficiently beneficial for individuals, even if they were associated with other components of competences. Acquiring key competencies is a life-long process. In order for these competencies to be developed qualitatively, we need to achieve a quality education system.
In most countries of the world, the trend is to create expectations for the result of the schools' work, we can say standards, which could be regularly controlled. From most of the products, it is required to answer to predetermined standards, and these standards or norms are strictly controlled. In schools, they do not do it. Nobody guaranteed, that the student of that school in which he learns the knowledge, skills, etc. The goal of this work is to demonstrate the importance of information and communication technologies in the educational process as one of the most important tools for enhancing the quality of education. Information and communication technologies play an important role in university studies. The aim of education will shift to improve the skill of learning, and critical thinking of the learner, improve the ability to communicate and use information and communication technologies as well as gather, analyse and use information effectively and efficiently.

1   Introduction

Currently, due to changes in Slovak Education we increasingly often meet with the concept of competences, key competences. We tend to speak about key competences as a new phenomenon in education. The term originates from the 1970s in economics where it represented a set of specific requirements for the job seeker. It was transferred to the field of education in the late 90s where it serves as a bridge between the requirements imposed by employers in the labour market and the graduate's profile. The term competence is used both in professional and common language; and ability, skill, capability, effectiveness, capacity, desired quality and others are used as synonyms for the group of terms. A person who has the abilities and skills, motivation, knowledge, etc. to carry out tasks well in a particular field is considered competent. Competence is usually applied to individuals, social groups and institutions in case they successfully fulfil requirements and achieve goals set by their environment. The theory of key competences has not yet been completely formulated and neither does a comprehensive and widely accepted definition exist. As Turek states in his publication *Key Competences*: "Competence is the behavior (activity or set of activities), which characterizes excellent performance in a specific field. Key competences are the main competences of a set of competences. They are suitable to solve a wide range of mostly unforeseen problems which allow an individual to cope with rapid changes at work, personal and social life."
According to Hrmo: „Key competences are a set of interiorized, interconnected group of acquired knowledge, skills, abilities, attitudes and valuing approaches, which are important for the qualitative personal development of the individual, his/her active participation in society, application in employment and lifelong learning.

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Another definition states: "Having competence means having complex equipment of personality, which allows the individual to successfully address challenges and situations in life, in which one is able to adequately orient, take appropriate actions and take a beneficial attitude. Key competences need to allow the individual to continuously refresh the skills and knowledge applicable in everyday life. For a person in training, not all educational activities (cognitive, training, and educative) need to be beneficial, but especially those, which are useful in standard practice, provide quality education and correspond with company requirements in the labour market. Not only the attended educative process or certificate of the attended educative process are crucial, but also the learning outcomes.

2 Areas of key competences

Education in each field should be directed toward each individual creating the following key competences consistent with their levels and scholastic aptitude (4):
- Informational
- Learning
- Cognitive
- Interpersonal
- Communicative
- Personal

2.1 Informational competences

Information technologies are key elements in building a modern society based on knowledge. Information competences are mainly information literacy and computer literacy.
Information literacy may be explicitly defined as the ability to locate, evaluate and use information in a way that makes a person an independent, lifelong learning individual; as the ability to locate, evaluate, use and communicate information in various forms, such as the integration of written, computer, media and technological literacy, ethics, critical thinking and communication skills.
Computer literacy may be viewed as the ability to address problems, which means educating and expanding the following skills:
- distinguish essential phenomena from non-essential,
- navigate in information and evaluate them,
- provide the necessary information,
- choose (evaluate) and use appropriate methods, concatenate or combine various methods to solve problems, or adapt or propose a new method, which solves a professional problem,
- express facts and their phenomena mathematically,
- carry out calculations,
- use outcomes – solve a problem.

Such worded computer literacy or information literacy is not the content of only a chosen group of subjects, which contain the expressions "computer technology and information technology" in their names, but all the subjects as a whole, the problems of which will be solved, while apart from the mechanics of using computers, the emphasis is on the thinking process, evaluation, decision, optimizing and realization (7).
In the model of securing IT competences – future teachers will have compiled a lesson plan on the basis of test results – as a recommendation on which modules they should attend, and identify the task to be carried out independently. Test results also determine which thematic areas (teaching units) and how many times repeat. The student (future teacher) based on requirements and self-awareness may develop his own, individual study plan. If s/he does not accept this responsibility, the teacher – based on the outcomes of the entry tests – can propose an optimal study plan, which the student can, but does not necessarily have to respect. The tasks are defined in a way that prepares the learner to successfully pass the tests.

2.2 Learning, cognitive and interpersonal competences

The development of learning competences mainly supports the knowledge of learning styles, which sum up preferred practices of teaching and learning in a particular period of life of an individual, who develops, changes and improves from basics individually. Learning competences involve readiness to learn as well as to teach, motivation, a deep approach of learning, and the whole process of learning.

Cognitive competences involve critical and creative thinking, problem-solving. Problem-solving is closely linked to the ability of critical and creative thinking. As a result, we can avoid many and more unnecessary errors while thinking.

Interpersonal competence means the effective coexistence and cooperation, where you need:

- ability to work in a team (group) – cooperation (joint responsibility of the planning, organizing, operating and evaluating a team; development of leadership and management skills),
- empathy (empathizing with the emotional state and situation of other people)
- solving conflicts through peaceful means – assertiveness to enforce the rights, needs and interests (not being a passive and manipulative object),
- creating and maintaining harmonic and progressive interpersonal relationships (respecting the ethics of proper manners, responsibility and morality in terms of good relations with other people, mutual understanding and helping others),
- creating intercultural systems based on constructive negotiations, compromises, tolerance and pluralism (acceptance and recognition of the difference in human views, opinions, values, faith, ethnic origins, various cultures, different areas of expertise, and thus the ability to live in an alien environment – as a manifestation of ethical conduct),
- developing the democratic civil system, respecting human rights and basic freedom, peacekeeping (effort not to fight and rule over others), and keeping a healthy environment.

2.3 Communicative and personal competences

The basis of communicative competences is expressing adequately to the situation in writing and speech, listening carefully, and reading with comprehension. The EU requires everyone, who lives in the countries of the European Union the knowledge of two foreign languages.

Personal qualities of individuals should promote the effective functioning of the society through coexistence and cooperation, develop authentic personal and work life. Personal competences involve self-awareness, self-control, as well as self-motivation and commitment.

3 Teachers' competences

There are several different views on the classification of key competences. These competences have been dealt with by many authors, like Belz-Siegrist, Helz, Turek.

Apart from the already mentioned key competences Turek states the following competences of teachers:

- Professional: the teacher as guarantor of scientific bases, subjects of his/her own approbation,
- Psycho didactic: the teacher as an individual, creating pleasant conditions for learning
- Communicative: the teacher as an individual, using an appropriate level of verbal and non-verbal communication with students, parents and colleagues,
- Diagnostic: the teacher is able to diagnose problems of students,
- Planning and organizational: the teacher is able to plan his/her actions,
- Advisory and consultative: the teacher is able to help and advise the parents of his/her own students,
- Self-reflexive: the teacher is able to evaluate and modify his/her own educational activity.

Apart from the mentioned competences some countries also develop cultural awareness, labour and business competences, and health education. Due to their small representation in studied foreign systems, these systems are not dealt with any closer in this paper.

4 Quality of education

In the field of education, quality may be understood as a normative category, which may be expressed by the following indicators: quality of educational processes, educational institutions, the educational system is functioning (optimally) / or the production of these processes and institutions. It can be prescribed to certain conditions (e.g. educational standards), and therefore be objectively measured and evaluated (8).

Factors determining the quality of education

- The curriculum
- Teaching methods, procedures and means implemented in the educational process,
- Forms of knowledge verification,
- The independent creative activities of students and their involvement in research,
- Internationalization of education,
- Personal, spatial and informational assurance of the educational process,
- Securing the study literature for subjects of the study, and more.

Using the concepts of quality and efficiency are indeed very frequent, but often, without a clearer definition. Especially with the introduction of globalization, the concept of quality occurs in virtually all areas of human activities, including education. Education is a service provided by an educational institution. Firstly, it is important to note to whom this service is intended and what its purpose is. Furthermore, it is imperative to understand that learning cannot be assumed clearly from an economic standpoint. The level – quality of education may be evaluated, but more subjectively, qualitatively than objectively and measurably, continuously and long term. The specifics of higher education is its 'optional nature (4)'.

In education, the term quality (quality management) refers to several elements, mostly to:

- **The educational system**: the basis is the quality of the country's (region's) educational system, its goals, philosophy, educational content, the structure of the educational system, principles of management and financing of education, incorporation of children, youths and adults into the educational system, the ability to achieve the qualification, flexibility and openness of the educational system. To increase the quality of the educational system in a certain country, international comparability of its performance is needed through international surveys, such as PISA, TIMISS and so on.
- **School (school facility):** We explained above that the degree of quality (decrease in population – the struggle for students, funding per pupil, etc.) is the key to the survival (existence) of schools. Each school ought to develop its own quality management system, which would apply to all proceedings pending at the school and would include all school staff as well.
- **Teaching process:** The teaching process is the most important of all processes at school and therefore its quality is a crucial element for the quality of schools. The quality of the teaching process in the subjects they teach can also increase the individual teacher (group of teachers) if the school has still not implemented quality management.
- **Learning of pupils and students**: The quality of learning of pupils and students is the culmination of efforts to increase the quality of education. The aim should be to make pupils, students acquire rational ways of learning - learning competences, to be aware of their preferred learning style and implement it, as well as metacognition and also meta-learning to implement an in-depth approach to learning. The result should be a strategically focused student, someone, who wants to take responsibility for managing their learning, which is learned, and can manage their own learning, which is able to optimize their learning in school, out of school and after their school era. Such pupils and students have the greatest chances of success in the current, constantly and rapidly changing world because they will be more successful in lifelong learning.

5 The concept of the information society

Information society from the point of view of an ordinary person is a society where the work with information is an everyday activity. Some different information and communication technologies (ICT) are used to work with

information, that means, the methods, procedures and means such as computers, electronic diaries, mobile phones, and so on.

From a social point of view, an information society is a society in which informatics and information and communication technologies are becoming an economic force, identifying and transforming the entire social system and acting as a means of creating new social, supraclass and supranational structures fundamentally altering the mechanisms of social development.

Challenges of the information society and further directions of development have been the subject of a number of papers at the international and national level. The following ones have an important role within the frame of documents of national character:

- Policy of Informatizing Society in the Slovak Republic for the years 2012 - 2015 with a view to 2020.

- National Action Programme of Society Informatization

- Millennium - National Programme of Education in the Slovak Republic for the next 15 to 20 years (10-13)

Information Society was firstly taught at the J. Selye University in the winter semester of the academic year 2019/2020. Since the subject of Information Society was not included in the accredited programs, the content of the course was divided into several subjects. Most of the topics were included in the basic subject of Information and Communication Technologies, taught in the first years of education at the Faculty of Economics of Janos Selye University. Part of the topics appears in the continuing subject of Information and Communication Technologies II. The subject of Informatics is taught for only one semester at the Faculty of Economics so only four modules of Information Society are taught by means of presentations. Individual modules were evaluated on the basis of tests that had to be passed by all the students as the procedure within the exam. Tests were carried out in the Moodle environment where the teacher could exactly evaluate the different parts and process the percentage of success. Thematic unit on e-learning has found its place in the subject Didactics of Informatics, which is an organic part of the Master Teacher Training program. Thematic unit on legal standards of information society forms a part of the subject called Law and Ethics s in the Use of Information and Communication Technologies.

5.1 Course: Developing information literacy

From our previous experience of working with students and execution of subjects in the first years, it shows that students come to college with ever-improving skills in ICT. Not always, however, are these skills sufficiently comprehensive and are usually associated only with general information literacy. Our aim is to develop these skills in students and shape subject information literacy.

The course will take the form of e-learning as part of the subject Information Society. Since we believe it is necessary to convey to the students the following information as soon as possible we have chosen Information Society as a reference subject, due to its concentration on first-year students in the faculty of education.

The course is made up of five modules, each of them containing two chapters. Modules that are used as a proposal for teaching e-learning courses have specifically defined instructions for studying, introduction, module objectives, content and performance standards, instructional text, summary, auto-test, additional literature, conclusions and bibliographical references (4).

- Module 1   a. The main concepts of Information technologies
  b. Using the computer and managing files
- Module 2   a. Text processing (Word processor)
  b. Spreadsheet Calculator (Spreadsheet program)
- Module 3   a. Electronic presentation
  b. Information and communication
- Module 4   a. Graphic editor application
  b. Database system
- Module 5   a. Information society
  b. Algorithms and algorithmization

Individual modules are completed with a self-test summarizing the discussed curriculum. After the successful completion of this test, students will be able to advance to the next module. At any time frame of the program students will be able to use electronic consultations (5).

The study support of each module is divided and structured so that the acquisition of knowledge and the creation of knowledge by the study participants work with maximum efficiency. Efficiency lies mainly in the fact that the

study participants can fully engage in the study of the educational content because it is not constrained by directed learning, as the study text includes features allowing rapid and accurate auto-regulation. Participants in the study, after applying for the subject (course) receive the study materials.

6 Conclusion

Knowledge is only the basis of the preferred core competencies of the individual and may not be sufficiently beneficial for individuals, even if they were associated with other components of competences. Acquiring key competencies is a life-long process. In order for these competencies to be developed qualitatively, we need to achieve a quality education system.

In applying for an e-learning course the process of initial motivation, the evaluation and classification of individual modules, and the process of exposure to the new curriculum are bound to be dealt with.

For teachers to lead their students to the use of the internet in the learning process, they need to gain computer and information literacy, which means that they will get to know, understand and be able to explain the basic concepts of information technology, the use of a personal computer (PC) and work with data sets, work with a PC's word processor, create and work with tables, charts, figures, create and work with a PC's databases, create presentations, obtain information and communicate via the PC, i.e., to operate with the internet, create web pages, and handle e-mails.

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