

EMPLOYERS DEMANDS ON E-SKILLS OF UNIVERSITY STUDENTS IN CONDITIONS OF DIGITAL ECONOMY

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Abstract: The digital era is a society- and worldwide affair culminating in change in every sphere of people's lives and life. The people of the Slovak Republic are not exempt. Modern trends that determine employers' demands for digital literacy include the Digital Single Market, Industry 4.0, automation, and digitalization. The potential for usability of digital technologies depends on whether people can perceive their benefits, know how to handle them, and use them in practice. One of the prerequisites for an individual in the 'information society' or the 'knowledge society' is the acquiring, renewing and deepening of digital skills. Universities augment these processes. This paper analyses the primary sources of acquiring digital skills nationally and compares the digital skills of students from the University of Žilina. The proficient use of information and communications technology for problem solving, teamwork, and communication is the most required skill by employers. This study's survey results suggest that the education system does not sufficiently reflect the current demands of a rapidly changing labor market. Also, the education system does not meet students' expectations for e-skills acquired during their study and this result should be a matter of forthcoming discussions.

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Introduction

Today, information and communication technology (ICT) skills are critical for people's professional and personal lives. The emerging trends of massive digitalization, automation, and robotics are accelerating the informatization, which penetrates into all areas of society. Conceptions of the European Union have emphasized the importance of the digital economy and a knowledge-based society as well as changes in the labor market. A reason for concern is the remaining shortage of qualified labor, which can impede businesses' digital transformation, stagnate the whole of the economy and consequently, lose businesses to other countries (European Union, 2014). Digital technology has not only influenced the way people work. It has been one of the driving forces of all recent changes. It has influenced the way people communicate, create, process, and transmit information. Subsequently, it has either directly or indirectly influenced almost every area of social life – work, education, science, the mass media, and many others.

The Digital Economy

Information and communication technology is an important part of the global economy. It can be considered as a dynamic sub-sector providing opportunities for other economic divisions of the public and private sectors. Technologies help to strengthen economic growth, generate gross domestic product (GDP), create new jobs, and improve the competitiveness of the country. The 'digital economy' is a term describing the allocation of resources that extensively use ICT. This term was used, for the first time, by Tapscott (1999) in 1995 in his work 'Promise and Peril in the Age of Networked'. Tapscott defines the digital economy as one based on the interconnection of human intelligence, which consists of 12 characteristics (knowledge is power, digitalization, virtualization, molecularization, integration, disintermediation, convergence, innovation, prosumption, immediacy, globalization, and discordance). He clearly demonstrated its difference from the traditional economy (Tapscott, 1999).

The gradual development and growing use of digital technologies in the traditional economy are erasing differences between the digital and traditional economy. The diversity of definitions relating to the digital economy is obvious from the many terms used, such as 'post-industrial society', 'knowledge economy', 'new economy', and 'e-economy' (Cohen et al., 2000).

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However, most experts emphasize that the 'digital economy' is more complex than the 'Internet economy' and therefore, it is not appropriate to use it as a synonym for the 'knowledge and network economy' (Štofková et al., 2015). Initially, economic growth arose primarily from the use of personal and business facilities, then by the Internet and building of wireless networks, the use of mobile devices, and more recently with the Internet of Things (IoT) and Industry 4.0.

The European Union has developed a comprehensive Digital Single Market strategy in order to maximize the societal and economic potential of ICT. Precisely, the area of growth potential of the digital economy focuses on business innovation that requires a number of experts in 'informatization' and 'electronization' (European Parliament, 2017). According to Mesenbourg (2001), the conception of the digital economy refers to three components: supporting infrastructure (digital devices, software, and the Internet), e-business (business electronization), and e-commerce (sale of goods and services within the use of ICT and Internet). Thus, it is not a completely new economy but uses new innovative practices and ICT to achieve economic and social activities.

Authors Benito, de Juan, Gómez and Mochón (2015) provide a comprehensive view of the digital economy. The authors regarded the heterogeneity of the whole as made up of different businesses with a distinct place in the value chain of a country's economy. The digital economy is understood in two ways. On one hand, the digital economy is not only an ICT sector but consists of four homogeneous components: infrastructure, the Internet content and services, software and information technology services, and application equipment. On the other hand, the digital economy as a heterogeneous sub-sector generates economic sectors' outputs with varying characteristics.

The dynamics of digital technologies and their global platform are associated with fast transformation. This changes not only the way people work but at the same time, requires continuous education opportunities in the area of digital skills. Each technology wave is linked to potential impacts affecting economic activities carried out by the commercial sector and state support (Informatizácia, 2014).

Obtaining Digital Skills

Today's society involves a strong connection between the use of digital technologies and the quality of life. The state support of informatization is a reaction to the global economy demands. The effective involvement of digital technologies sustains growth and competitiveness for businesses and institutions. However, the involvement of digital skills of an individual who creates value for the society in this way is questionable. Therefore, digital skills are considered a social inclusion factor in all important areas, such as education, working life, social life and communication with the state. Enhancing digital skills, from an economic point of view, represents a means to a better placement on the labor market, improved human resources and assured competitiveness of the state, organizations, and individuals as a workforce. It is necessary to define the key needs of the market at the political level and to increase the efficiency and accessibility of appropriate forms of education and learning in the empowerment of digital skills of students as well as through lifelong education.

According to the Strategy of Digital Literacy (2015), there exist these possibilities to develop and obtain digital skills:

- Developing an individual's level – through trial and error
- Enhancing digital skills through informal communities and interest groups
- Formal education through official courses and teaching

Developing an individual's level is the most beneficial way. Particularly, as it is based on practical everyday needs that adjusts to the pace of receiving new information. This method is effective only in the case of immense motivation, simple accessibility to equipment and documentation, and at least the minimum level of digital skills to allow the use of modern education forms, e.g., e-learning, webinars. These assumptions can create a significant gap between the young generation and seniors of the population (Štofková & Štofko, 2014). Learning in informal communities is a partial solution. Informal communities combine authority of a lecturer and a team that have common goals. Education is based on a joint solution of individual questions and subsequent observing and imitating of others in the community. The social ties of the participants and the multiple training of the acquired digital skills in the collective are positive factors for motivation. This form can be available both online and offline (Štofková et al., 2015). The last, and often not, highly effective form is formal education. It is a part of institutional education and is often criticized for slow responses to changes in the labor market

and to unsystematic training. However, it is a primary resource where an individual can learn about the need to develop digital skills and it provides the initial impetus for self-development (Soltis et al., 2016).

The Current Situation Analysis

The demand for digital skills is growing exponentially. On one hand, citizens need appropriate and adequate skills to benefit the state's economy, and on the other hand, they need it to take advantage of market opportunities. For these reasons, the required level of digital skills differs among individuals. Also, it is not possible to meet the growing demand.

More than 756 000 ICT professionals will be needed by 2020 within the Digital Single Market, according to the Digital Skills and Jobs Coalition. The current unemployment rate among young Europeans is almost 20% and approximately 45% of citizens have insufficient digital skills. Therefore, according to Digitálna Koalícia (2018), the European Union has developed the following activities to adequately address the challenges of the new economy:

- Educate and train young people in the area of digital skills with the aim to increase the number of ICT professionals by involving women
- Increase skills and retraining of the workforce with regard to the application in new jobs opportunities
- Modernize education and training systems with a focus on building digital competencies and skills at all levels of education,
- Increase and develop digital skills level for all citizens so they can actively participate in building the modern society and social inclusion.

The project 'Digital Opportunity 2018–2020', which is directly responsive to the demand of employers, arises from the above-mentioned activities. More than 40% of businesses in Europe claim that they have problems finding suitably skilled people. In the academic sphere, students and fresh graduates within the labor market obtain practical experience and verification of acquired skills. Their improvement in specific ICT skills for areas such as cybersecurity, 'big data', quantum technology, machine learning, web design, online marketing, and software development leads to improvement of their employability (European Commission, 2017).

The Slovak labor market currently needs more than 13 000 ICT specialists, according to the IT Association of Slovakia (ITAS, 2017) The professional public and employers require education that is adapted to current and prospective labor market needs. Therefore, the Digital Coalition was created to mobilize organizations and institutions of the private, public, and non-profit sectors to cooperate in solving a lack of digital skills. The aim is to secure the acquisition of sufficient digital skills with regard to its productivity and employability (ITAS, 2017).

Research results can help to improve education and prepare graduates required by the labor market in the digital age. Hence, this paper aims to establish how students of the University of Žilina obtain their digital skills. It also maps IT areas that students of the e-commerce and management field of study lack the most in the education

Data and Methodology

An electronic questionnaire was developed and a survey of 122 respondents aged 18–26 years was conducted in February 2018. Ninety percent of the respondents had had work experience. The questionnaire covered three areas:

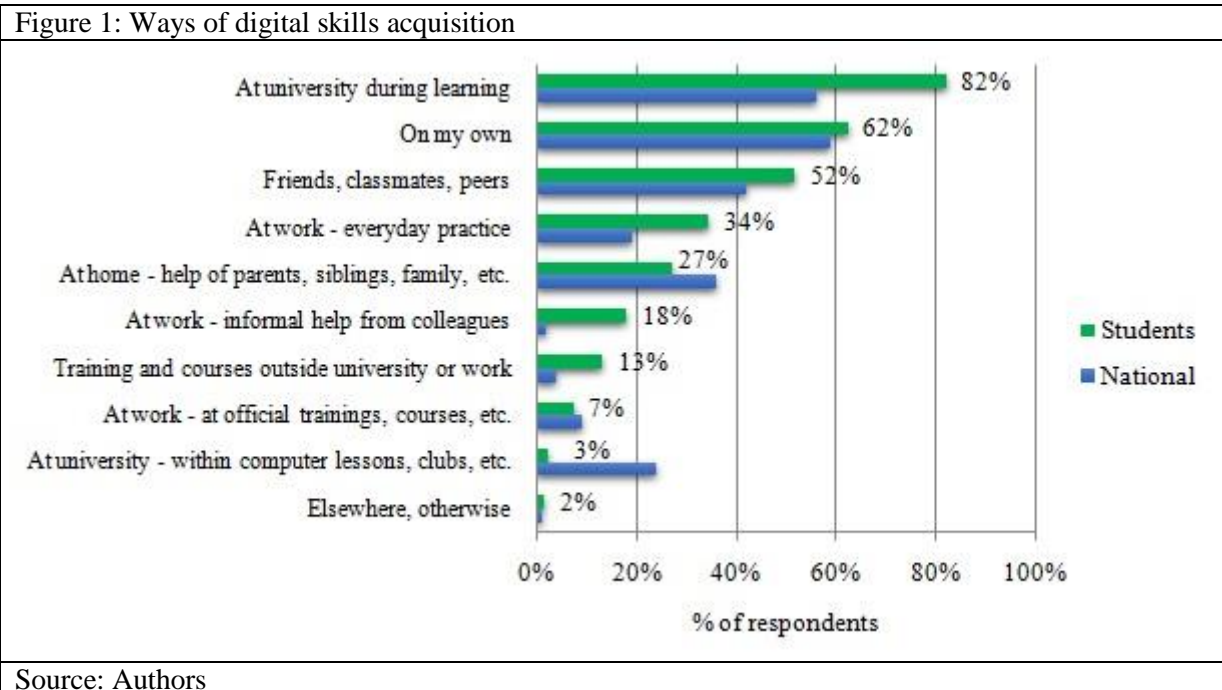
- Establishing how students obtained new digital skills
- Identifying the area of digital skills that students lack the most
- Subjectively assessing the level of their own digital skills

The information obtained from respondents was categorized with intention of comparing the research results with that carried out at the national level (Velšic, 2017).

Results and Discussion

The results shown in Figure 1 indicate that the university fulfils its primary role as an educational institution. Eighty-two percent of respondents from the University of Žilina consider teaching as a dominant area where they acquire and adopt new digital skills. Since it is in the interest of the state

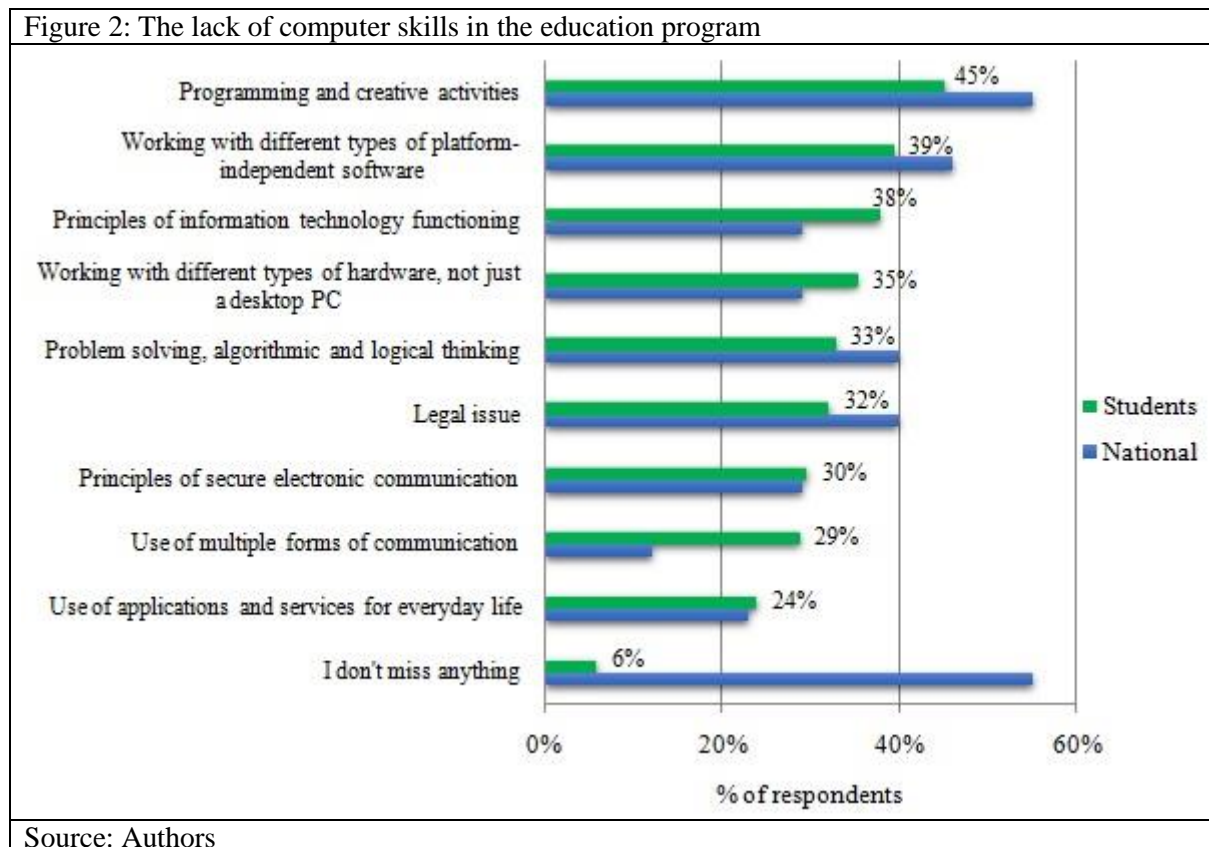
system to fulfil the ambition that schooling should be a place where young people acquire a sufficient level of digital literacy for everyday life and the labor market, this indicator has a significant role. In second place is self-education, where a high proportion is online learning. The existence of different courses and webinars is especially popular among young people with the growing access to broadband connection. The last of the most common ways to acquire digital skills is learning from friends and acquaintances. The study at the national level reported a similar occurrence. The most common ways of acquiring digital skills were 59% from self-study, 56% from the university environment, and 42% from friends. On the one hand, the situation in the Slovak Republic can be interpreted as a significant shift in people developing their individual self and internal motivation. On the other hand, it can indicate gaps in the education program. An important deviation (more than 20%) in the digital skills acquired at the university could be attributed to the additional skill acquisition within a school.



In addition to identifying the most common ways of the digital skills acquisition, the research also identified some gaps between students' requirements and the education program (Figure 2). The attitude of young people to adapt to new technologies is natural, i.e., they are not afraid to experiment and try new opportunities without prejudices. Respondents most frequently identified the lack of programming and creative skills (45%), which included website creation, multimedia, application programming, and design. These suggestions were based on the ability to be employed in the labor market, as the demand for this in IT staff is high, regardless of the business activities of those seeking suitable employees. Moreover, apart from gaining knowledge of programming languages, programming itself develops a students' thinking and ability to analyze, synthesize, generalize, and search for new appropriate solutions, which 33% of respondents stated were skills not covered in the education. These two areas of digital competence are strongly supported in the European Digital Competence Framework for Citizens, which offers partial solutions to improve these deficiencies.

Moreover, another identified shortcoming was a multiplatform feature in information literacy, as reported by almost 40% of respondents. This finding arises as a shortfall because a variety of software and digital platforms are used in practice. Pointing to the existence of other less-widespread but open-sourced software that could provide a competitive advantage for graduates and a high degree of flexibility in the labor market may make a study more attractive to potential candidates. Furthermore, 38% of respondents reported an information gap in the area of ICT operating principles.

Figure 2: The lack of computer skills in the education program



Source: Authors

Comprehensiveness and consistency are necessary for this sector because many processes are interconnected and a deep knowledge of the ICT operating principles can accelerate solving any problem that arose.

Conclusion

The infiltration of information technology into the economy has caused changes in staff qualification requirements in recent decades. A vision for the future predicts that the majority of jobs will require at least a minimum level of digital skills. Current government projects and initiatives are already taking the first measures and actions to retrain a large proportion of economically active citizens to new challenges caused by massive digitalization and automation. Many of current job positions will be automated and will require creative and logical thinking. Among other things, the survey results show that more than the 50% of students of the University of Žilina have evaluated their own digital skills as advanced, opening possibilities for further development. Moreover, they identified a degree of non-conformity between the education and their requirements that respond largely to the current offer of jobs.

In addition to the obtained results, it is important to raise society’s awareness by explaining its need to support digital skills. Responding to the present situation requires a variety of changes and activities so that current students and graduates can confidently meet employers’ demands. This phenomenon concerns society as a whole. Informatization takes place not only in the commercial and private sector but also in the public sector where it is being discussed in relation to the individuals’ quality of life. The number of electronic public services that assumes at least a minimum level of digital skills for a large population is increasing.

Nevertheless, modernizing education requires an open dialogue between employers and the educational institutions. This may mean that education institutions regularly consult employers about their requirements and re-evaluate the content of their education program accordingly. The most significant obstacle to this might be the assumption that an individual can self-acquire digital skills from the modern technology surrounding them. The ultimate aim of the consultation and re-evaluation would be to understand digital skill requirements, support digital technology in education, reflect students’ requirements through implementing an education curriculum that educates all target groups,

and promote interest in the use of modern technologies and the possibility of future innovation to respond to society's everyday needs.

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