A CASE STUDY OF STUDENTS' VIEWS ON THE DIGITAL SKILLS NEEDED FOR THE LABOUR MARKET

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ABSTRACT

New digital technologies are changing entrepreneurship. Digital entrepreneurship includes new ways how to find customers for business, how to design new products, how to generate revenue, how to collaborate with platforms and partners and so on. Today's labour market requires staff with foundation digital skills, ICT general skills, ICT specialist skills and ICT complementary skills. Improving digital competences is also a major challenge for the European higher education system. The aim of the study is to determine students' views on what digital skills students need to improve in order to enter the future labour market as well as learn and identify opportunities for students to develop their digital skills. Based on the research on digital competences, a questionnaire was developed for students of the Latvia University of Life Sciences and Technologies (LLU). This reassessment was also compared among the faculties of LLU. According to students, the most important digital skills needed for the labour market are as follows: use and manage information (69.84%), evaluation of information (67.19%) and access to information (65.15%). The comparison among the specialties show that students of agricultural engineering and forest science and forestry engineering programmes have the lowest evaluation of their digital skills, but, of course, the specialty “Information technologies for sustainable development” has the highest. Based on the obtained results, the authors suggest that the study course “Informatics” should be regularly reviewed and updated, the development of digital skills should be promoted in all study courses, as well as the study course “Introduction to the specialty” should be used to reduce the gap between ICT skills for the first-year students.

KEYWORDS

Digital Skills and Competences, Digital Entrepreneurship, Self-Assessment

1. INTRODUCTION

With the development of the technological age, the possibilities to solve various everyday needs and situations electronically are constantly increasing - everyday life is unthinkable without communication with peers online. In addition, the number of public services that can be received digitally is also increasing. To take full advantage of these opportunities, well-developed skills in the use of digital technologies are needed. According to the European Commission, more than a third (37%) of Europeans of working age do not have sufficient digital skills, but 13% do not have them at all. If we talk about the situation in Latvia, then the results of the Eurobarometer survey conducted in Latvia show that only a quarter of the public (25%) believe that their e-skills meet every day needs. Meanwhile, 8% of respondents consider their e-skills to be rather insufficient, while 13% admit that their skills are too weak.

Digital competence is not just the ability to surf the Internet, it can be broken down into many smaller components. The European Commission has developed the Digital Competences Framework for Europeans (DigComp), which is divided into five areas: information and data literacy; communication and cooperation; digital content creation; safety; and problem solving. Today, digital competences are no longer just about access to and use of information communication technologies (ICT), they are also about ICT knowledge, skills and attitudes. It should be noted that digital competence, can be seen also as a transversal competence, also helps to develop other essential skills, such as communication, language skills or basic knowledge in mathematics or science.

In the context of developing the skills needed for today's labour market, it should be noted that the digital era is introducing the need for a new business model with new skill requirements, new ways of working, and a more flexible work culture. According to the IBM finding, “The digital era has provided the opportunity and

the need for speed – and that, in turn, has led to new ways of working. Remote working, always-on access, transparency, less hierarchy, pop-up teams operating across functional and organizational boundaries, and organizations operating within an ecosystem of partners all require a cultural agility and, in turn, new skills for the workforce" (IBM, 2019).

2. MATERIALS AND METHODS

To develop the methodology of this study, a study of the scientific literature and documents on digital competence was performed in the light of the above circumstances. Based on the findings, a questionnaire was created to identify students' views on the digital competence necessary for the labour market.

2.1 Theoretical Background of the Study

Students studying at a university should be aware of the need to develop their digital skills for successful integration into the labour market. The first step is to understand what digital entrepreneurship means and what the key factors are. In its Entrepreneurship 2020 Action Plan, the European Commission intends to drive the transformation of the business environment through new digital technologies (Entrepreneurship, 2013). The term Digital Entrepreneurship is used, which is different from traditional entrepreneurship. The European Commission (EC,2015) has defined: "Digital entrepreneurship embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies". Digital enterprises make very intensive use of new digital technologies, especially social, big data, mobile and cloud solutions.

The developed conceptual model of digital entrepreneurship (EC,2013) identifies five "pillars":

1) Digital knowledge base and ICT market - which will contribute to the improvement of the digital innovation, commercialization and ICT sector
2) Digital business environment - which will strengthen the digital infrastructure, the regulatory framework and simplify business
3) Access to finance - which will facilitate access to finance and digital investment
4) Digital skills and e-leadership - which will promote the development of e-leadership skills through education and training
5) Entrepreneurial Culture – which creating a supportive entrepreneurial culture

Digital entrepreneurship is recognized as a new and growing field of research (Zhao & Collier, 2016), and students need to be ready to integrate into digital entrepreneurship today.

The European Commission's study report (Shaping Europe's digital future, 2021) highlighted issues of digital skills in the workplace, even the impact of ICT on the workplace, as well as the transformation of ICT skills. The study found that most jobs require basic digital skills, including software developers, engineers, doctors, teachers, construction workers, accountants, lawyers, journalists, civil servants, sales staff, agricultural workers and more. Studies have shown that most workplaces require special digital skills such as technicians, professionals - 50% of cases, managers -30%. The lack of digital skills affects more than 38% of jobs and the main negative effects are lost productivity (46%) and declining customer numbers (43%). It was also found that 88% of workplaces have not taken any action to address the digital skills shortage *of* employees.

To reduce the risk of unemployment and growing inequality, a change in ICT skills development policies is necessary. ICT skills development policy should aim to:

- strengthen initial learning,
- increase the use of staff skills,
- stimulate further education.

The Organization for Economic Co-operation and Development (OECD) has highlighted four types of ITC-related skills needed in the workplace (Background report, OECD, 2016). These are: 1) ICT generic skills, 2) ICT specialist skills 3) ICT complementary skills 4) foundation skills (see Figure 1).

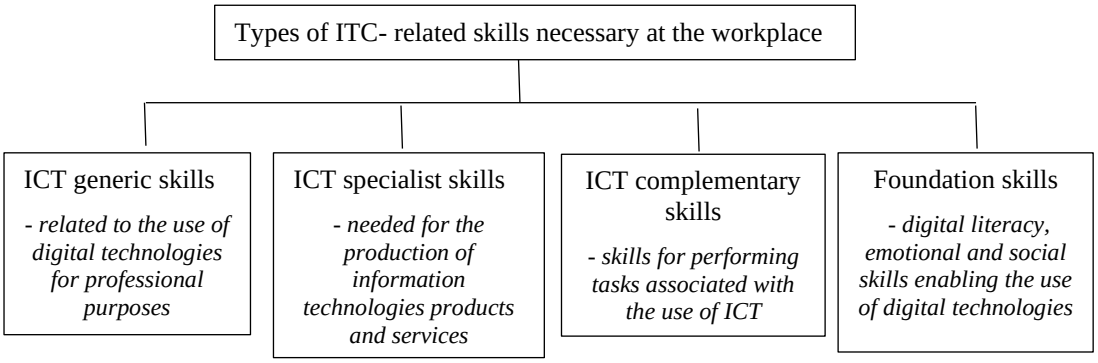

Figure 1. Types of ITC-related skills needed in the workplace (OECD,2016)

Based on the advice of experts and stakeholders, the European Commission (Background report, OECD, 2016) also makes recommendations on how to improve digital skills in the workplace to support labour market transformation. The most important of them are:

- Bridging the digital divide between citizens (especially those lacking ICT skills);
- Raise awareness of the need for digital skills;
- Use loans, grants and other mechanisms to improve and support access to digital technologies, especially for small businesses;
- Expand access to digital skills through the education and training system by renewing programs at all levels and in all sectors of education.
- Promote employers' access to training through sectoral organizations and associations;
- Integrate digital skills into a broader skills strategy that includes other transversal skills relevant to employers.

Based on the above and including social and emotional skills, the higher use of ICT in the labour market is also associated with tasks that require greater interaction with workers and clients.

Correlations between daily use of ICT at work and other tasks include aspects such as (Jobs and skills in the digital economy, 2016):

- Horizontal interaction *(information sharing, training others, giving presentations)*;
- Client interaction *(selling a product or service, advising others)*;
- Self-direction *(planning own activities; organising own time)*;
- Managerial skills *(planning activities of others)*;
- Influence *(persuading people; negotiating with people)*;
- Problem solving *(problem solving in less than 5 minutes, thinking about a solution for at least 30 min)*;
- Physical skills *(working physically)*;
- Manual skills *(using skills or accuracy with hands or fingers)*;
- Information-processing skills *(reading, writing, numeracy)*.

Improving digital competences is also a major challenge for the European higher education system. Universities need to focus on three areas (Torres-Coronas & Vidal-Blasco, 2014): the computer hardware, the operating system, and the specific software. Students must be able to adapt their communication style to the new technological environment and be able to work collaboratively in virtual teams.

In order to develop the digital skills needed in the labour market, the curriculum needs to be reviewed, the ITC infrastructure needs to be adapted to the digital change, and the acquisition of ICT skills in disadvantaged groups needs to be promoted (Kiss M, 2017). The Fast Track for Information Technology programme for long-term unemployed (FIT) in Ireland is a good example. The tasks of FIT are (FIT):

- Upskilling job seekers:
- Increasing access to in-demand technology training:

- Promoting smart people with smart skills:
- Training for employment (commencing careers);
- Putting policy in action.

The website "CV Market" has compiled six digital skills that are necessary for a modern professional in the labour market in Latvia: e-mail communication, the ability to adapt to the use of new tools, media literacy and information research skills, information presentation skills, social media skills and information technology (IT) and data security fundamentals. The research methodology was developed in accordance with these skills, as the goal of higher education institutions is to increase the qualification of young specialists for successful entry into the labour market.

2.2 Methodology of the Study

Considering the above-mentioned research results on the digital competence, a research methodology which includes a questionnaire for students was developed to identify key areas of Digital Competence (information, communication, content creation, safety and problem solving) and students' self-assessment of their achievements in these relevant areas of competences as well as to identify what digital skills students need to improve in order to enter the future labour market. In this article answers to the questions in the last section are analyzed, namely, the assessment of skills needed for the labour market, to determine the importance of the given skills and do self-assessment of those skills.

The questionnaire included six different digital skills needed for the labour market *(access to information, evaluation of information, use and management of information, information coding and programming, use of ICT for a specific purpose and use of ICT legally and ethically)*, and students had to assess them from three perspectives: the importance of given skills, to what extent they have them and the need to improve these skills. The evaluation was performed in a three-stage Likert scale. The questionnaire contained closed questions.

The survey was conducted at the university of the authors of this article, asking students of different specialties to fill in an electronic questionnaire "Self-assessment of digital abilities", which is available at: https://ej.uz/DigCom. The sample of the study was 216 students from different specialties: civil engineering (14.93%), economics (19.40%), agricultural engineering (14.93%), forest science and forestry engineering (32.84%), information technologies for sustainable development (10.45%) and computer control and computer science (7.46%). Most of them (82.86%) were the first-year students and only 17.14% represented the second-year students.

According to the scientific literature, in order to improve the performance of higher education and promote learning, the study used the self-assessment method, which is recognized as the most powerful tool for identifying strengths and weaknesses (Andrade & Valtcheva, 2009).

3. FINDINGS

The results of the study show that according to the evaluation of students, the most important skill in the labour market is the use and management of information. 69.84% of all respondents consider it to be very important. This is followed by evaluation of information (67.19%) and the ability to access the information (65.15%). Slightly more than a quarter of respondents (26.15%) stated that the least important skill is information coding and programming (Table 1).

Table 1. The importance of digital skills for the labour market, answers in % (n =216)

Digital skills for the labour market	Unimportant	Moderately important	Very important
Access to information	7.58	27.27	65.15
Evaluation of information	7.81	25.00	67.19
Use and management of information	9.52	20.63	69.84
Information coding and programming	26.15	40.00	33.85
Use of ICT for a specific purpose	20.31	48.44	31.25
Use of ICT legally and ethically	21.88	42.19	35.94

Students were asked to rate the extent to which they have digital skills by three statements: *I lack such skills; this skill is average*; *this skill is at a high level.* The results of the survey show that only 37.88% of the surveyed students have the highest level of skills to access information, but 6.06% lack these skills (Table 2). About a third of students have a high level of ability to use and manage the information (32.31%) and to evaluate information (29.69%). Information coding and programming is a skill that is lacking in almost half of the students (46.15%). Although this skill is considered insignificant, it is at a high level of 10.77% (Table 2).

Although educational research has already shown that students have a high level of skills in using mobile phones, smartphones, laptops and other devices, and in using social networking software, they have problems using this technology in their studies (Khoza & Manik 2015). In this study, similar results were obtained: 34.38% of respondents lack the skills to use ICT for a specific purpose, which greatly influenced the distance learning process during the Covid-19 pandemic constraints. Issues of legitimacy of the use of ICT as well as ethical issues are also problematic for 24.19% of interviewed students.

Table 2. Self-assessment of digital skills needed for the labour market, answers in % (n =216)

Digital skills for the labour market	I lack such skills	This skill is average	This skill is at a high level
Access to information	6.06	56.06	37.88
Evaluation of information	7.81	62.50	29.69
Use and management of information	7.69	60.00	32.31
Information coding and programming	46.15	43.08	10.77
Use of ICT for a specific purpose	34.38	50.00	15.63
Use of ICT legally and ethically	24.19	59.68	16.13

Assessing the three most important digital skills needed both in the labour market and in everyday life by specialty, it can be concluded that more than a third of civil engineering students consider that they lack all of these skills; agricultural engineers lack information assessment skills (44.44%) and use and manage information (25%), but as regards forest science and forestry engineering students, 11.11% of respondents consider they lack the skill of use and management of information.

As shown in Table 3, these skills are at a high level for students majoring in IT or computers. It should be noted that more than a third of economics students (36.36%) have highly developed skill to access the information as well as to use and manage information.

Table 3. Assessment of digital skills "This skill is at a high level" by specialties, answers in % (n =216)

Specialty	Access to information	Evaluation of information	Use and management of information
Economics	36.36	18.18	36.36
Civil engineering	10.00	20.00	30.00
Forest science and forestry engineering	22.22	16.67	22.22
Agricultural engineering	0.00	22.22	12.50
Computer control and computer science	57.14	33.33	33.33
Information technologies for sustainable development	88.89	66.67	55.56

Today, higher education like all other sectors in the world has been influenced by different types of technologies, especially digital technologies (Khoza & Manik, 2015). Therefore, the ability to use digital technologies in higher education is crucial to ensure the development of the competences needed for the labour market. Thus, the questionnaire also included a question on what digital skills students need to improve in order to enter the future labour market.

Results show that 30.77% of respondents really need to improve information coding and programming skill, as this skill was missing most often. Although the evaluation and use and management of information were ranked at a very high level by almost a third of respondents, almost a fifth (18.77%) of them felt a great need to improve this skill (Table 4). 15.78% of those students who answered that this skill is at a high level, still wanted to improve this skill being aware of its importance in the labour market.

The least number of students think that it is necessary to improve the skills of using ICT for a specific purpose (12.50%) and the use of ICT legally and ethically (9.38%), although the data shown in Table 2 show that these skills were missing most often.

Table 4. Self-assessment of the need to improve the digital skills needed for the labour market, answers in % (n =216)

Digital skills for the labour market	I don't need to improve this skill	I should improve this skill	I really need to improve this skill
Access to information	26.15	60.00	13.85
Evaluation of information	23.44	57.81	18.75
Use and management of information	25.00	56.25	18.75
Information coding and programming	24.62	44.62	30.77
Use of ICT for a specific purpose	18.75	68.75	12.50
Use of ICT legally and ethically	23.44	67.19	9.38

The analysis of the results by specialty show that all skills could be improved almost equally for students majoring in economics.

The results show that there is a real need to improve their ability to access information as well as use and manage of information for 50.00% of agricultural engineering students and access to information for 40.00% of forest science and forestry engineering.

Table 5. High need to improve digital skills by specialty, answers in % (n =216)

Specialty	Access to information	Evaluation of information	Use and manage of information
Economics	18.18	27.27	36.36
Civil engineering	20.00	30.00	20.00
Forest science and forestry engineering	40.00	11.11	11.11
Agricultural engineering	50.00	33.33	50.00
Computer control and computer science	14.29	16.67	16.67
Information technologies for sustainable development	11.11	11.11	11.11

Students were asked to name what opportunities they use to develop their digital skills. In the questionnaire a choice of following options was offered: paid courses (formal education in the field), use of free online training, self-study (trial and error of applications, software, technology, etc.), peer help who can demonstrate in person how to use a specific app or asking for advice from older people using the field.

The results show that self-study was the opportunity most often used by students to promote digital skills - 88.6% of cases. It should be noted that self-study skills are also one of the determining factors in the labour market. As students have fairly good communication and collaboration skills (Zeidmane & Vintere, 2021), more than a half of the students (57.1%) used the opportunity “Help from peers who can demonstrate in person how to use a particular application / technology” and one quarter (25.7%) used "Seek advice from older people who use the area".

4. CONCLUSION

According to students’ opinion, the most important digital skills needed for the labour market are as follows: use and manage information (69.84%), evaluation of information (67.19%) and access to information (65.15%).

For the surveyed students, the ability to access information is the most often developed at a high level (37.88%), but the ability of information coding and programming skills (46.15%). There is also a greatest need (30.77%) for skills development in this area.

About a third of civil engineering students lack all of these digital skills.

As regards students majoring in economics, all the mentioned skills are developed at either an intermediate or high level, however, about one third of respondents really need to improve these skills.

The greatest need to improve the ability to access information is for agricultural engineering and forest science and forestry engineering students, respectively: 50.00% and 40.00%.

This was a case study and used a self-assessment method, therefore the results are based on the respondents' opinion and can’t be generalized. The study can be used to identify problems / directions for in-depth research.

The authors’ recommendations are based on findings:

- the study course “Informatics” should be regularly reviewed and updated,
- the development of digital skills should be promoted in all study courses;
- the study course “Introduction to the specialty” should be used to reduce the gap between ICT skills for first-year students.

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