Digital Competences: Empowerment of Education at Universities

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Abstract: The digital transformation, bringing new challenges for education and jobs, would require learning new skills and to strengthen the ability of people to adapt to challenges in new occupations that emerge in labour markets. Universities are undergoing a digital transformation that affects the teaching, learning, research activities and upskilling of university educators. The paper aims to point out why the educational and digital competencies of university educators need to be developed and operational. The framework of professional activities of university educators would require the strengthening of digital competences. Currently, the integration of digital skills and literacy into study programs is becoming a necessity for higher education. This measure requires innovative approaches and educational mastery of university educators. Therefore, upskilling and professionalization of university teachers employing a competence-based model of further education deserve special attention. The programs of relevant digital and pedagogical competences would promote the empowerment of faculty staff.

1. INTRODUCTION

The world is developing in the trajectory of digital transformation, with digitization affecting economic and social development, called areas of life and work, including education and training. The digital transformation is setting new demands, especially in terms of preparing for new skills and upskilling university educators to use digital technologies in online teaching and encourage students to participate in online learning in virtual environment.

The onset of digital transformation has been rather gradual, but the pandemic COVID 19 has significantly accelerated the process, bringing new challenges and opportunities to universities. The perspectives of higher education will require educators to get prepared for a new approach, which is likely to be a hybrid model of education, teaching and research.

The education at universities was shifted to virtual environment. While the education at universities in 2020 was gradually and partly switched to online education, in 2021 lectures, seminars and consultations took place in virtual conditions in larger measures. In some study programs (e.g. medicine, pharmacy, engineering, etc.), the exercises were postponed to the period when strict anti-pandemic measures were released.

2. OBJECTIVES AND METHODOLOGY

The study is focused on professional competencies of university educators. The professional development and further education of university educators should take into account students’ views and opinions related to the readiness and professional performance of university teachers in online teaching. The paper employs recommendations of the OECD Skills Strategy for the Slovak Republic, international surveys and a survey carried out by the author (Matúšová, 2022).

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They provide feasible arguments why digital skills and competences have to be applied by university educators. Many of them work under the pressure of digital transformation. The upskilling and empowerment of university educators in digital competences should be interlinked with educational skills and innovations.

3. DIGITAL TRANSFORMATION OF EDUCATION AND ITS ECONOMIC IMPACT

The digital transformation has affected the processes of teaching and learning and has put on university educators some new challenges associated with upskilling and the empowerment of digital skills and competences. Experience is being gradually gained and assessed how new requirements imposed on university teachers were coped with in online teaching and learning. The term digital skills applies to the general description of what an individual knows, understands and is able to do when working with digital technologies.

Digital skills include the ability to access, use, filter, evaluate, create, program and share digital content, and to manage and protect information, content, data and digital identities, as well as recognize and work effectively with software, devices, artificial intelligence or robots. Digital literacy is a set of skills for acquiring digital competence, which represents the consistent and critical use of information and communication technologies in work, leisure, learning and communication. Digital literacy focuses on the questions of why, when, who and for whom (Matúšová, 2022). Digital competence is a set of skills, knowledge and attitudes that enable self-confident, critical and responsible use of technologies and systems.

Digital competence in students is understood as the ability that equips an individual to live, learn and work in a digital society, e.g. the student is able to use digital tools to conduct academic research, create student papers and presentations, apply critical thinking, create, share and critically evaluate information.

The digital transformation not only applies to education, but is also linked to Slovakia’s economy, economic growth and competitiveness. The need to innovate higher education while taking advantage of digital technologies is specifically linked to the forecast that by 2025, half of all vacancies in the EU will require tertiary qualifications, with tertiary digital competences being an essential part of the qualifications. The digital transformation of the economy means that almost all jobs would require a certain degree of digital skills. Business models are changing and bringing new job opportunities and paths, but they also require different sets of skills.

The OECD Skills Strategy for the Slovak Republic (2020) also emphasized the need to empower the younger and older generations with relevant skills which would help to adapt to current and emerging professions. The connection between the economic prosperity of Slovakia is thus clearly connected with the issue of education in conditions of digital transformation. In education, it is also necessary to focus on digital innovations, which will soon change the nature and essence of many professions. Related to this, the nature of education will be changed at all levels, including university studies, as well as adult education.

The OECD Skills Strategy for the Slovak Republic (2020) emphasized the following:

a) The acquisition and effective use of skills is a prerequisite for the country to prosper in an increasingly interconnected and ever-changing world. The Slovak Republic is particularly exposed to the effects of digitization, globalization and demographic change. All citizens
will need stronger and more specific sets of skills, including cognitive, social and emotional skills, as well as skills necessary for individual jobs that meet the needs of labour markets.

b) The Slovak Republic already has proved relatively strong indicators in individual skills areas. Apart from that, the participation rate in higher education has increased significantly and the basic skills of adults are at a comparably high level. However, the country still faces many complex skills challenges. Some significant skills in the younger generation lag behind the OECD average, especially in reading and science, and the long-term trend is negative. The shortage of skilled labour force is particularly evident in sectors with a strong demand for science and technology skills. The adult learning culture is underdeveloped, participation rate in adult education is very low and the labourers who would need it most, they participate in adult education to the lowest possible extent. The use of skills in the workplace is currently not reaching its maximum potential.

Four priorities have been identified to improve skills levels in the Slovak Republic, such as strengthening the skills of the youth, reducing skills imbalances, promoting higher participation in adult learning, and strengthening the use of skills in the workplace. The strategy mapped the most important factors of current and future prosperity and economic growth in Slovakia. The issues of the balance of skills in age cohorts (youth, employees in productive age, employees shortly before retirement) were analysed and assessed. The skills strategy emphasized adult education as an important tool for the professional, civic and personal development of the population and considered it necessary to improve the management of government policies and strategies of skills empowerment and upskilling.

Higher education in Slovakia contributes to the partial fulfilment of the above goals. In the period 2005-2015, the number of tertiary education graduates aged 25-34 doubled in Slovakia. In 2018, the share of the population in this age group with a university degree was 37%, but this is still significantly less than the OECD average of 45% (in this age group). One response to the COVID-19 global pandemic is the upskilling of workforce to learn new and additional skills and to strengthen the ability to adapt to new occupations emerging in labour markets. The need to innovate teaching, especially in education at universities with the support of digital technologies, is associated with the forecast that by 2025, half of all vacancies in the EU will require higher education qualifications, usually obtained at tertiary level (OECD, 2020).

4. EMPOWERMENT OF DIGITAL COMPETENCES IN UNIVERSITY TEACHERS

The development of digital competences of teaching staff is currently an increasingly urgent priority. In higher education, the digital transformation requires to set up new demands, especially in terms of new skills that would empower teachers to use digital technologies in online teaching and students to participate in online learning.

University teachers also need to develop their professional teaching competences, including the expertise in the subject matter, and extending to methodological-didactic, pedagogical-psychological, self-reflexive and reflexive competences. These can be considered the basis of teachers’ professionalism. According to Pavlov (2014), “the professionalism of university teachers consists of three dimensions – behavioural, attitude and intellectual ones. They represent a fundamental framework for professional development and analysis of their educational needs” (p.141). Digital skills, digital literacy and digital competences applied by teachers in online teaching are
interlinked to the knowledge of their substance, the attitude toward the use, as well as their skill to demonstrate them in action (behavioural aspect).

Concerning this, Pisoňová et al. (2021) point out that “online learning requires also the fulfilment of different tasks at different stages, be it the planning, implementation and feedback” (p. 220). However, the development of critical thinking, creativity, collaboration and communication in students will be always necessary, regardless of whether the class is taught online or offline. For university educators, continuous professional development and further education is the key for the integration of digital technologies into teaching procedures (p. 226). Kirchmayer (2019) pointed that the digital divide can be observed among teachers which means the difference in digital literacy between the youngest and oldest generations.

The Research Centre for Digital Competences (DigComp) set up by the European Commission specified digital competences that can be reasonably applied in teaching professions:

a) information and data literacy, regarding search, assessment, management of data, information and digital content;

b) communication and cooperation, concerning interaction, sharing, involvement, cooperation through digital technologies; digital identity management;

c) digital content creation, relating to digital content development, programming; understanding of copyright and licenses;

d) security, concerning protection of equipment, personal data and privacy;

e) problem solving, meaning solving technical problems, identification of needs and technological reactions and gaps in digital competences.

With regard to this, the authors Pisoňová et al. (2021) state that university educators should also develop a combination of digital skills and research skills, as research is a part of academic activities and “regardless of the education in academic disciplines, in which the university educators teach, the scientific results need to be observed, selected, analysed and communicated through technological tools” (p. 231).

In relation to this topic, two scientific studies have been carried out. The first study by Guillén & Gámez et al. (2020) analysed how university teachers use different ICT tools for research (from the aspect of gender, and the aspect of different academic disciplines such as engineering-architecture, health sciences, social sciences, arts and humanities). The findings revealed that both male and female respondents showed an average level of ICT use in research. The respondents made more use of digital databases, Google Scholar and tracked the websites of scientific journals highly impacted, but made very little use of software for data analysis, especially in qualitative research. The most use of ICT in research was shown by teachers of engineering and architecture while teachers of arts and humanities used the least ICT in research.

The second study of Mercader & Gairín (2020) highlighted barriers in using ICT for university teachers. The results show that the teachers of arts and humanities perceived the most obstacles to the integration of digital technologies into teaching. Therefore, it is important to develop the procedural and cognitive skills of teaching staff in given areas in order to continue research, self-education and share the results obtained. The focus on research skills in university teachers is extremely important as they also prepare students to apply research tools in practice, after graduation from university as emphasized by Pisoňová et al. (2021, p. 232).
The above studies indicate the urgent need to transfer digital technologies into teaching at universities, including humanities study programs. At the same time, university teachers should be specially prepared (trained) for this task. The nature of the teaching profession, its professionalization, and the professional nature of teacher training and development ought to be inevitably changed with the arrival of digital media and modern trends in education.

According to the findings of Bartošovič and Tamášová (2020), teachers state that their professional development and further (in-service) education through ICT technologies can yield from several advantages of ICT, especially the opportunity to work at one’s own pace, to access to documents at any time, and the opportunity to contact, communicate and discuss new ideas and applications with other participants, even those outside the local area. The authors point out that the study of social learning theories and online learning preferences, as reported by teachers, requires further research on how social learning theories can be translated into technology-driven settings.

5. A SURVEY ON ONLINE TEACHING

The digital transformation of teaching and learning at universities requires the capacity building of teachers’ professional capacities, interlinked to new skills and competences, especially to key competences to work with digital technologies. Competence to work with digital technologies means a certain and critical use of information and communication technologies at work, in leisure time and communication.

We assumed, that educators at universities need to develop educational competencies and subject-matter knowledge, pedagogical skills AND digital competence in personalized online education. In conditions of the pandemic, educators have to deliver courses efficiently, using innovative methods and technologies that are required for effective presentation, processing, skill development, and real-life applications.

In order to successfully set up the development and training of teachers at universities, it is necessary to find out how students perceive the professional performance of teachers in online education. Therefore, we carried out a survey in 2021 focused on the views and opinions of students related to the teaching proficiency of university educators in online education. The sample included 110 respondents which were the students participating in online education.

The purpose of the survey was to identify, among others, following aspects of online education:
- How do students characterize and assess online education?
- How do students view the new requirements of online education imposed on teachers?
- How do students assess the teaching proficiency in online instruction?
- What do students expect from teachers in online instruction?

The opinions and views of students in relation to the teaching proficiency of educators in online education can be considered a reasonable source of information that can be further assessed and utilised in the development of in-service education programmes of university teachers.

One of the reasons why to request feedback information from students is the fact, that students attending universities are members of the virtual generation. They show permanent access and attachment to digital technologies. Their educational needs and expectations differ from those of previous generations (i.e. their parents and teachers).
Therefore, universities and faculties should adjust the methods and practices they use, make them more attractive for students, and be open to innovations in the field of education and digital technologies.

The key results obtained by the survey can be formulated as follows:

(a) Respondents were able to understand and characterize online education as online teaching through a technology platform based on information and communication technologies (WEBEX, teams, zoom, skype, etc.). They viewed online education as a pedagogical innovation in higher education.

(b) Respondents considered the educational content presented to students in online education as clearly and effectively delivered as in full-time education. Some respondents, however, perceived and identified clear differences between online education and full-time education, and expressed their criticism towards online education.

(c) The restricted communication between a teacher and students, the lack of classmates’ support, little interaction among classmates, even excessive social isolation and limited opportunity to cooperate with classmates were indicated as the biggest disadvantages of online education. In its current form, online education has certain shortcomings and reservations.

(d) Respondents expect and require from teachers to have developed technical skills and the ability to work with a given technical platform. Teachers should be able to work with technical platforms that are suitable for online teaching. They also require from teachers the linkage and interconnectedness between explanation and exposition of educational content, supplemented with topical information.

(e) Respondents expect that even under the circumstances of online education, teachers should always apply standard pedagogical techniques and instruments, to use motivational incentives, continuously assess students’ answers, etc. They have a clear vision of teachers’ pedagogical skills which should be smoothly interlinked with technical (digital) skills.

(f) Respondents expect a smooth mastery of the teacher in online education. Pedagogical skills are required as a matter of course. Logical explanation synchronised with online presentations must be in place. The teacher’s verbal ability to explain the theory and supplement it with practical examples is “a must”. The same concerns non-verbal keys, including voice, its volume, clear pronunciation and articulation.

(g) Teachers are requested to master technical as well as digital skills. For this purpose, teachers should be specifically trained. Professionalism of educators is considered the most important aspect of online education, both teaching and learning. Teacher’s ability to keep a dialogue with students, to activate students with questions, examples and cases, and to minimize disruptive influences were mostly evaluated.

6. DEVELOPMENT OF DIGITAL COMPETENCES IN UNIVERSITY TEACHERS

Survey results put into the foreground the issue of staff readiness to work with ICT in online teaching. This is in accordance with the World Bank (2020) recommendations, stipulating that staff working online should be trained and supported. The staff need to be supported technically, socially and morally.

The role of a university teacher has changed under the dynamic development of society and the digital transformation of education. Teaching activity requires a number of competences, knowledge and skills with the focus on students who should reach maximum achievement in
education. Under the influence of digitisation of education, mobility of students and teachers in Europe and the world, education models are changing. Many university teachers work with digital technologies with groups of students coming for mobility and study from different cultures, requiring from teachers to understand and consider intercultural differences.

As the teaching staff are the key players in the effective implementation of online education, they should be continuously professionalized, developed and trained. With respect to that, Bartošovič and Tamášová (2020) pointed out that the changing needs of society are also changing the needs of schools, and teachers are required to cope with new tasks, for which they were not prepared in initial teacher training. The authors state that the preconditions for the professional development of teachers lie in the setting of conditions by the school management. The role of the school lies in the support of teaching, planning and implementation of students’ learning, and the utilization of cooperation and collegiality of learners. Positive results of professional development of teachers can be found in workplace learning and intergenerational learning, which represent opportunities for professional development of teachers (p. 21).

Bartošovič and Tamášová (2020, p. 23) further emphasized that teachers state the ability to work at their own pace whenever they have access to materials, use the opportunity to think and discuss ideas with other teachers, the opportunity to make contact as the best reason for their participation in online education, with teachers outside their local area, etc. This alignment between social education theories and teachers with preferences for online learning requires further theorizing and research on how social education theories are transferred to technology-supported settings.

Generally, the concept of competence is clearly preferred over other concepts, as in its scope competence covers knowledge, skills and abilities, as well as attitudes and values. The specific combinations of them in a given context makes competent performance possible (Průcha-Vetěška, 2012, p.149). The university teachers should be trained in accordance with competences.

The interconnection between digital skills and education was supported by an analytical study “56 DELTA skills”, conducted in June 2021 by the McKinsey Global Institute, focusing on 56 foundational skills that can be identified and developed in individuals. DELTA is an acronym for “distinct elements of talents” referring to a clear, distinct and distinctive element in the intellectual equipment (talents) of an individual. Foundational skills can be divided into 4 areas: (1) cognitive skills, (2) interpersonal skills, (3) self-management (and entrepreneurship), (4) digital skills.

The following digital skills are considered foundational:

a) digital fluency and citizenship – includes digital literacy, digital learning, digital collaboration and digital ethics;

b) use and development of software – includes literacy programming, data analysis and statistics, as well as computational and algorithmic thinking;

c) understanding digital systems – includes data literacy, intelligent systems, cyber security literacy, technical translation and its activation.

The statistical analysis in the DELTA study referring to the correlation between the level of performance (proficiency) of selected skills and education showed that the highest correlation was confirmed in digital literacy. It is digital literacy that is acquired and developed in formal education, non-formal education and informal learning. The integration of digital literacy into
university study programs is therefore becoming a necessity. The professionalization of university teachers in digital competences is therefore a current challenge (Matúšová, 2021).

Our brief survey highlighted the students’ expectations and requirements imposed on teachers in pandemic. With regard to the respondents’ opinions, teachers primarily should master the content of education and be able to mediate and explain it, know to apply relevant teaching methods and forms, be able to apply digital technologies, encourage students to think and learn, respond to educational needs of students, integrate formative and summative assessment of students in online education (Tamášová – Matúšová, 2021). It can be assumed that students formulate their requirements towards teachers in terms of their own educational needs and goals, and under the influence of social environ.

In terms of digital transformation of education at universities, individual educational needs of university teachers must be taken into account. Primarily, the training and development refer to professional competencies, including digital competences, closely linked to curriculum presentation, testing of knowledge, knowledge assessment and quality of education.

7. FUTURE RESEARCH DIRECTIONS

There are numerous issues open to further research, including the development of training programs for university teachers. They should aim to empower their competences, including digital competences should be thoughtful and responsive to the framework of teachers’ professional activities. Currently, teaching is perceived much more as a professional activity, so teachers at universities are required to professionalize teaching activities. A university teacher is also expected to work as a researcher and take greater responsibility for his own development.

These multiple aspects of the teacher’s activity were reflected in professional standards of faculty staff. The professional standard is a framework containing the category of a teacher, qualification prerequisites, a career level and a career position, as well as a competence profile, including indicators and tools serving for the assessment and measurement of competencies. Competences are identified at subject-matter and didactic-methodological competence, which can be observed (identified) in specific professional activities of teachers.

A competence-based model of professional development can be applied in this context. The model is principally based on the analysis of educational needs. It also includes professional standards that apply to the professional efficiency of a teacher. Thus, from the competence-based model covering a set of competences, a model for further education of university teachers can be derived. Of course, there can be a large number of competence models. The development of competence-based models should take into account the levels of university education where teachers work (ISCED 5 – ISCED 8), the professional focus and the goals of education.

The training needs should be assessed due to the requirements of the teaching profession and from the aspect of maintenance, deepening and extension of competences in university teachers as well as the goals set by university management. If university management promotes teaching in a multicultural group of students, or professional mastery with digital technologies and online learning of students, it must create the appropriate prerequisites, including material, technical and human resources. Teacher should be specifically trained, retrained or undergo qualification programs.
Accordingly, it is necessary to identify the relevant educational needs of individual teachers. Educational needs can be hypothetically defined as a lack of knowledge or skills that are important for teaching profession and an individual teacher, preserving and promoting teacher’s mental, physical and social function. They can also be characterized as a gap between the actual performance and a predefined performance standard.

Thus, the development of competence-based models of further education and development of university teachers should clearly follow the identification and analysis of educational needs. The needs can be either current and reactive when there is a decline in professional performance due to the lack of training or a gap, or they can also be proactive, tied to the future, when they are closely related to organizational strategy and plans of human resource development, especially to technical development, personnel policy, etc. (Babiaková et al., 2014, p. 78-79).

The analysis of educational needs should take into consideration individuals, university goals, future trends and opportunities. It can be supported by Delphi method (expert opinion) used in forecasting and prognosis. Teaching activities in university teachers cover direct teaching in a study program, further education according to an accredited program, consultations, research and publication of research results.

8. CONCLUSION

Individuals’ digital skills are to be gradually integrated into digital literacy and comprehensive digital competences, usable in employment, private and social life and practice. Digital competence includes a well-established, confident and critical use of ICT technologies, relying on basic information and communication skills such as the use of computers for recovery, acquisition, storage, generation, presentation and exchange of information, communication and participation in social networks on the Internet.

Digital literacy has the highest correlation with education. The integration of digital literacy into university study programs must therefore become a necessity. The development of digital competence in university teachers deserves special attention. Education itself ceases to be the key to a prosperous future, attractive jobs and standards of living. As part of the competitive struggle among university graduates, additional knowledge, skills and competences will present an added value. The digital skills of university teachers and the combination with pedagogical competencies must become an added value in university educators.

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