TEACHERS' DIGITAL COMPETENCIES FOR E-LEARNING APPLICATION IN HIGHER EDUCATION

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Summary

New technologies bring new opportunities for teaching and learning, asking the teacher to keep up with time and technology and to try out new methods and apply them in a proper and high-quality way in the educational process. But with a growing number of tools and technologies, teachers often lose the battle because they cannot keep track with all the news, inform themselves about them and figure out how to integrate them into the educational process. Johannesen and Eide (2000) point out that the application of information and communication technologies in the education process needs to be carefully planned and devised to be set in the pedagogical context. Teachers are expected to have good pedagogical knowledge and to know how to integrate new technology into teaching. But technology brings new levels of complexity and demands new knowledge and skills. It is primarily upon teachers to realize what kind of digital competencies they have and how much training do they need in order to be efficient in e-learning implementation into educational process. In this research it was investigated what is the attitude of the teachers at the University of Zagreb toward e-learning and what digital competencies they need to be able to apply e-learning into their teaching. Results showed that teachers have a positive attitude towards ICT and e-learning application in educational process, yet they need support and training to use new technologies in a more innovative and efficient way.

Background

Johannesen and Eide (2000) state that the improvement in ICT should be incorporated into the pedagogical training of teachers. It is very difficult for teachers to expect to be innovative or teach differently from the *historical model* (the teacher is at the centre of the education process and conveys knowledge to students) unless he/she understands other possible ways of teaching based on theory and research. Besides being well acquainted with technology, teachers have to be as well competent to find a way how to integrate it into teaching, what can be additional burden to them. The teacher can also become tired by constantly looking for and introducing new teaching methods. It should not be forgotten that they are expected to keep track of their expertise in the field, to acquire new knowledge through practice, research and training, but also to be a good scientist and researcher. The teacher is also expected to be a *good teacher*, to be a model for his/hers students, to animate students, and to present them their subject (field) in an interesting way and to motivate them to learn. Due to the amount of daily obligations, the teacher often does not have time, and therefore no will to try something

new. According to the European Commission report (2013), 70% of teachers in the European Union recognize that digital technologies are important for education but only 20-25% of them apply them in teaching. Most teachers use ICT for teaching and less to work with students and students. The reason is that they lack the necessary competences for the pedagogical use of ICT in teaching (European Commission, 2017). It is also stated that 70% of teachers in the European Union want to advance in ICT skills as they need them for their profession. A similar conclusion is also given in the OECD report (OECD, 2016), which brings the results of international research on teaching profession (TALIS), and states that only 37% of teachers often use ICT in teaching. Such a small percentage is attributed to the lack of competencies of teachers to apply ICT in teaching. When a teacher feels competent, he/she will be more inclined to try new teaching methods. Competence and motivation are closely related, so greater competency leads to greater motivation to try out the new things and apply new methods of teaching. In the initial teacher education, particular emphasis should be placed on teaching methods based on digital technologies (digital pedagogy).

Teacher training is often absent because it is presumed that besides they are experts in the subject they teach, they automatically know how to teach. There are still some universities where is presumed that teachers do not need to be trained in teaching. In addition to initial training at the beginning of work in a higher education institution, it is important to provide the teacher with continuous training (professional development) in teaching (Selwyn, 2008). Still, we face today the policies that it is teacher's decision (whether to improve and what), although it should be also the responsibility of the institution he/she is working on. If there are some teacher training programs, they are mostly not compulsory, especially when it comes to training in information and communication technologies. According to a joint study by the European Commission and the OECD (2014), six out of ten teachers did not have any courses on the use of ICT in the classroom. Continuous teacher training enables the acquisition of the competences of digital pedagogy and the ability to monitor technology development. The most recent OECD report (2016) states that continuing training of teachers should be the responsibility of each European country, but in practice it is mostly optional. Also, the latest EDUCAUSE (EDUCAUSE, 2018) report on higher education highlights the advancement of the teaching profession as one of six categories that reflect the most current themes in higher education. The report states that educational institutions often place research beyond teaching and therefore teachers are not always sufficiently motivated to improve their teaching nor rewarded when they are innovative and use new methods and teaching technology. The Report emphasizes that programs that recognize good teaching are essential as well as continuous improvement of teachers in digital skills with the support of their institutions.

Some teachers are still afraid of applying ICT in teaching, fearing that they will be replaced by technology and will no longer be the only knowledge transferor (Klein & Godinet, 2000). Technology will not replace a teacher or make it too redundant, but he can do his role different and improved than before. Today we are more often talking about a teacher as mentor and mediator who leads the student through the educational process, especially in the model in which the student is at the centre of the educational process. Increasing focus on the

learning process is therefore the role of the teacher to encourage this process and to set up a learning environment where, together with the student, he contemplates and comments on the subject and acts as a mentor instead of focusing on the lectures. In this process, students become active participants who are responsible for their learning achievements, and the teacher using innovative teaching methods encourages the student and motivates him to engage, investigate and think, and builds new knowledge based on the information gathered and gains new skills.

Noor-Ul-Amin (2013) states that the application of ICT in the education process can be divided into two broad categories: ICT for education and ICT in education. ICT for education refers to the development of ICT especially for the needs of teaching and learning, while ICT in education includes the use of ICT in the education process. Zhao and Cziko (2001) cite three conditions that are necessary to introduce ICT in teaching: teachers need to believe in the effectiveness of ICT, that application of technology will not cause some disruption in teaching and that they have control over technology.

In their work on the readiness of teachers and teaching materials for e-learning (Lazić et al., 2013) conclude that teachers today need the skills that will enable them the application of ICT in teaching in combination with expert knowledge in a particular area. Therefore, the competences that teachers need for online teaching, for the design and distribution of teaching materials and work with the e-learning system are important for the entire education system. Teacher training and ability of teachers to adapt to time and changes in the environment are directly related to the status of education and educational institutions. Bates emphasizes that digital skills should be an integral part of the course or domain of knowledge (Bates, 2009). Therefore, there are implications for setting up curricula (what to teach), teaching methodology (how it is taught or learned) and evaluation (what is being tested). In cases where any of these areas are not adequately resolved in terms of skills and competences, then teaching is unlikely to be realized in the sense of meeting the 21st century learning goals.

In response to teachers needs what digital competencies do they need, in December 2017, the European Commission adopted a framework for digital competences of educators – DigiCompEdu (Redecker, 2017) with the aim to describe specific digital competences for educators. The framework brings 22 core competencies divided into six areas – professional engagement, digital resources, evaluation, teaching and learning, empowerment of students / students, and support for students in acquiring digital competencies. The framework also proposes a progressive model that will help teachers evaluate and develop digital competencies, and emphasizes six different phases that are typical for the development of digital competence of teachers. Besides this framework, there has been other researches dealing with this topic providing useful information, guidelines and tools for teachers (i.e. Pozos Perez & Torello, 2012; Erasmus+ project MENTEP–Mentoring Technology Enhanced Pedagogy (http:// mentep.eun.org/home); Erasmus+ project Educa-T – Emphasis on developing and upgrading of competences for academic teaching (http://educa-t.hr)).

Research

The aim of the research was to determine attitude of teachers towards e-learning and what digital competence they need to apply e-learning in a quality manner in the educational process. The research also sought to find out how much the lack of or possession of digital competences influences teachers' readiness as well as their motivation to integrate new technologies into the educational process. The research included principally teachers from the University of Zagreb, but also other teachers using the central e-learning system in higher education (Merlin). The online survey was conducted in the November 2017. The survey comprised of 29 questions which were divided in three sets:

- Teachers' attitude towards new technologies in education and technology and tools used by teachers in teaching;
- Support to teachers in working with technologies;
- Teachers' trainings and digital competences for ICT application and e-learning in teaching.

In order to avoid misunderstanding, definitions of the two most important concepts used in the survey – the concept of e-learning and the concept of digital competence were provided.

The survey included 474 teachers. Of these, 423 teachers (89.2%) were from the University of Zagreb and 52 from other institutions in the higher education system in the Republic of Croatia. The survey was attended by teachers from 33 of 34 members of the University of Zagreb. The total number of participants in the survey was attended by 196 men and 279 women. Women accounted for 58.9% of the survey respondents.

Results

According to the survey results, 90.1% of teachers have a positive attitude towards ICT and e-learning in teaching, 9.1% are reserved and only 0.8% of them has a negative attitude. Most of the teachers (63.7%) believe that e-learning is important while 34.9% think it contributes but not significantly. Also, high number of the teachers (68.1%) believe that the state at their institution is favourable or extremely favourable for the application of e-learning and 61.0% of them think that the conditions (equipment for computers, the Internet) for e-learning and ICT use in education at their institution are good or very good.

When asked about an e-component in their courses 84.8% of teachers answered positively. Teachers who have not the e-learning component in their course named following reasons for that:

- lack of time (30.5%),
- their work in e-learning is not evaluated (neither in teaching nor in their professional advancement (27.6%),
- that e-learning is not relevant to their e-courses (19.0%),
- not being sure that e-learning can improve the quality of teaching (13.3%).

Of these, 38.8% responded that they plan to implement e-learning in the future. Teachers who do not use e-learning in teaching can be encouraged to use it primarily with:

- available and systematic support to teachers in applying new technologies at university level (20.3%),
- recognition of their effort and innovativeness in teaching (using e-learning) in their professional advancement (18.2%),
- availability of professional trainings in the application of new technologies at university level (16.7%),
- examples of good practice (13.5%),
- if the institution decides that e-learning is compulsory (10.4%).

Teachers who use e-learning in their teaching use it mostly as the classroom aids (62.9%), as a blended learning (34.1%) and only 3.0% of have fully online courses.

Teachers who have participated in the survey, use ICT and e-learning to set up content online and to distribute teaching materials (24.6%), which allows students access to content anytime from anywhere. Also online material is easier to maintain and update, so teachers can provide students with the latest information and educational content. It is very easy to use materials from previous years and to adapt to current needs. Teachers also use e-learning for the information about the course and during the course (23.5%), which is very important because they no longer need to put the notice at the bulletin board a few days earlier, which means that a student must come physically to faculty to read it. Teachers see the benefits of ICT and e-learning in better communication with students and students (19.8%). The availability of teachers to students in online environment is much greater than in face-to-face consultations and can enhance communication between teacher and student. Teachers are to determine how much and when they will be available online so that it does not become too heavy burden on them. A smaller number of teachers (12.1%) use e-learning to evaluate and grade student work and for feedback to students on their progress in the course (11.0%). Only 8.9% of teachers use e-learning for the group work. Teachers use mostly e-mail (24.8%), e-learning platform Moodle (23.3%) and web pages (19.2%) in their teaching. All other technologies are presented in percentage less than 9%.

Part of survey was focused on teacher training in ICT and e-learning. Teachers were asked do they need professional training in ICT and e-learning, have they been involved in training and in what way, what motivates them to train and which obstacles they face for professional training?

Results in Figure 1 show that majority of teachers need support in use of ICT and in e-learning (84.8% respectively 82.1%) and in preparation and development of e-courses (73.6%). Teachers feel most confident in pedagogical and methodological issues but still 65.0% teachers stated they need such support.
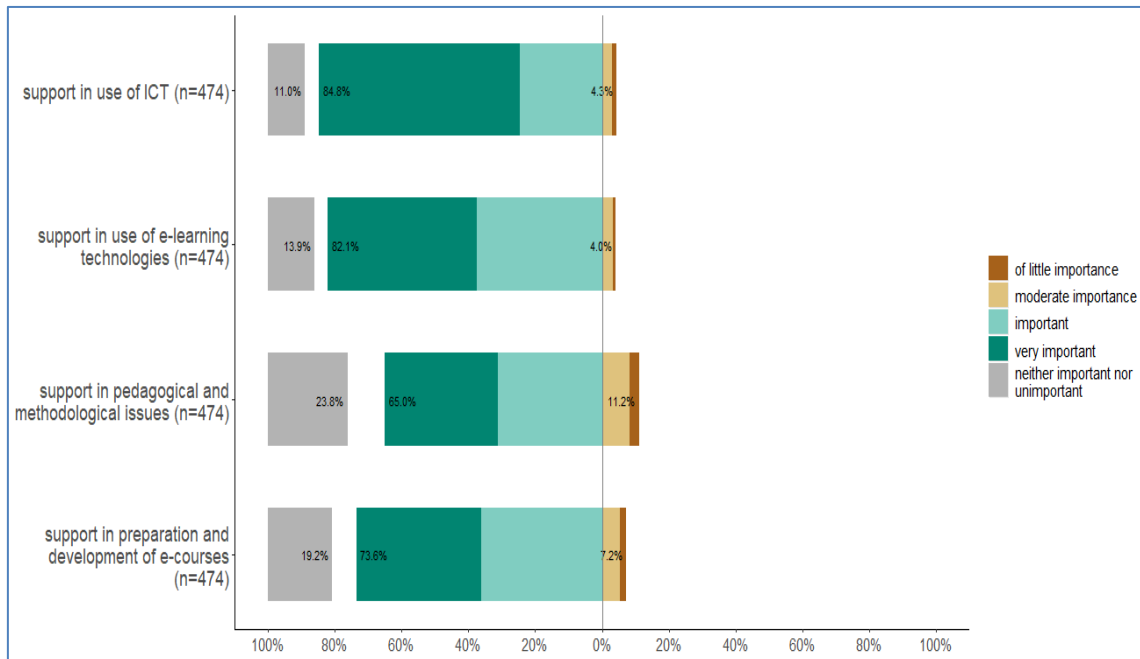
Figure 1. Teachers answer to the question "In e-learning application how important do you find…"

According to the results in Figure 2, most teachers (72.3%) believe that they are digitally competent to apply e-learning in higher education. Nevertheless, more than half of them (59.3%) stated that they need professional training in digital pedagogy, and 48.7% stated that they need training in new technologies.

When talking about education and training programs related to ICT and e-learning that are available to teacher in higher education and meet their needs, majority of teachers (78.0%) responded negatively or did not have opinion. Only small number of them indicated that they are satisfied with available programs. This result indicate that majority of teachers do not know about existing programs, or that they do not meet their needs or that they were not interested in taking some education and training in ICT and e-learning.
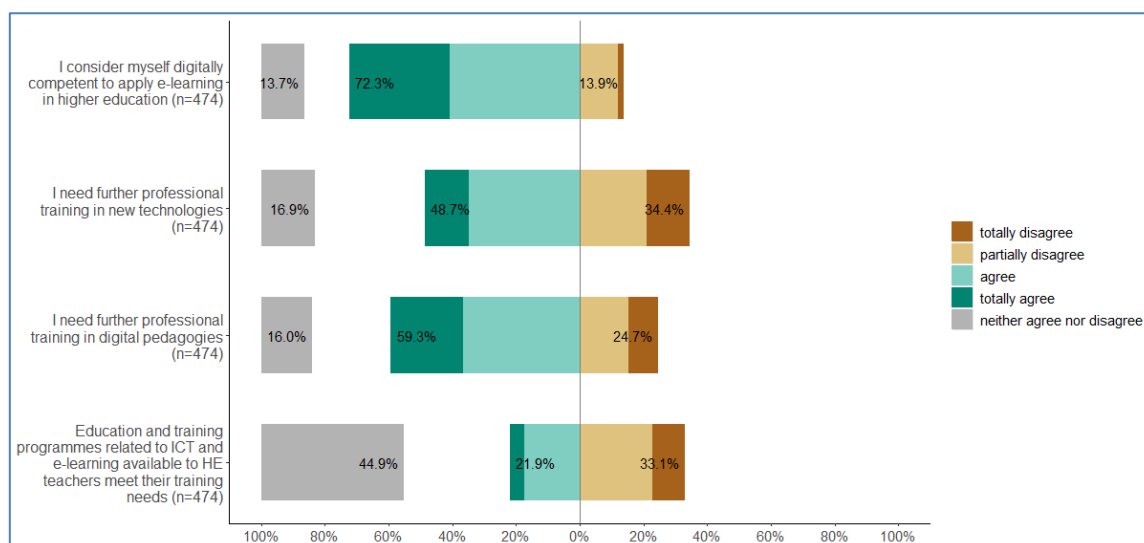

Figure 2. Teachers reply to the question regarding training

Data in Figure 3 shows that 54.4% teachers, participating in the survey, participated in trainings related to ICT and e-learning technology over the last three years. Of this, majority had less than five training in last three years and only 7.4% took between five to ten trainings. Number of teachers who took more than 10 trainings in ICT and e-learning in last three years in negligible and is 0.8%.
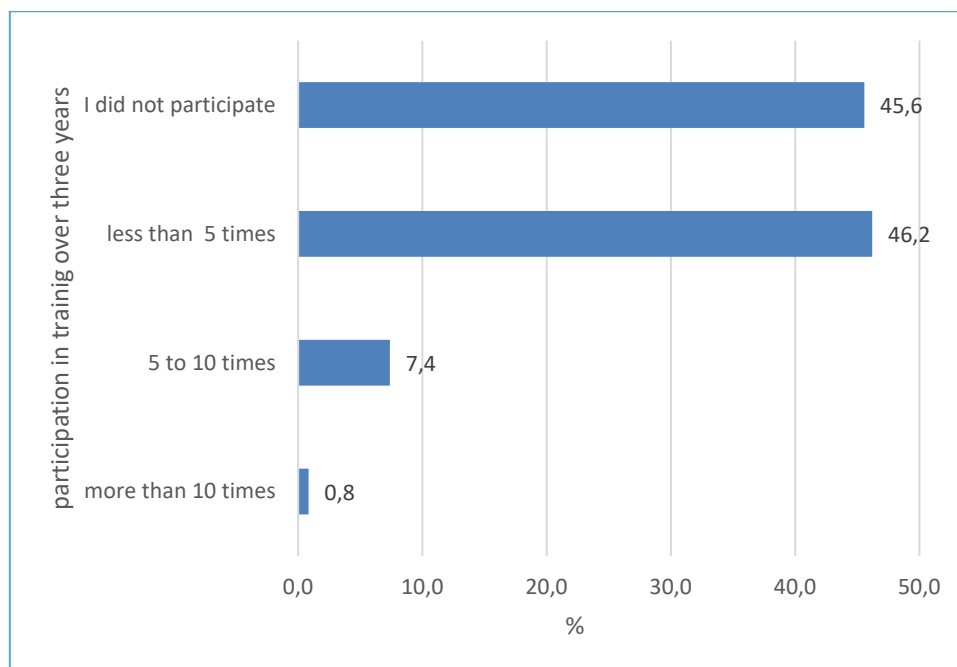

Figure 3. Teachers reply to the question regarding participation in training regarding ICT and e-learning in the last three years

Teachers mostly used training programs in ICT and e-learning available in Croatia (42.8%), 19.7% of them attended training programs in the SRCE, while others were trained in some other educational institutions. Only 6.6% of teachers attended online training programs outside of Croatia.

When asked about the reason for participation in training programs in ICT in e-learning, responses from teachers can summarized into this three reasons:

- personal need for improvement (23.0%),
- improvement of the quality of education (21.9%),
- because of students (21.0%).

A slightly smaller number of teachers (17.7%) as a reason for participating in ICT training programs and e-learning stated improvement the teachers' competence. 7.2% of teachers as a reason for participating in the training program lists the recommendation / request of the institution they are working on and 6.9% state as the reason their career advancement.

Discussion

From the results it can be seen that high number of teachers (90.1%) have positive attitude towards ICT and e-learning in teaching and majority of them believe that e-learning is

important (63.7%). High number of them (84.8%) have e-component in their courses. But when asked about the use of ICT and e-learning in their courses they are using it mostly on the basic level – access to learning materials, information about and during the course and communication. The formative assessment and feedback, evaluation and grading and group work are very low on the scale. The e-courses should develop and grow from basic level containing information about the courses and repositories of content to higher level which requires a shift in the educational approach from a model that is geared towards the transfer of knowledge of the teacher to the student-oriented model and to the development and acquisition of their competences. In order to do that teachers need support. They need support in use of ICT and e-learning, support in preparation and development of e-courses and also support in pedagogical and didactical issues. Results show that large number of teachers finds themselves digitally competent for e-learning application in teaching and they can identify sort of professional training they need to improve their skills. Still, small number of them took training more than five times in the last years.

In 2016, the SRCE conducted survey on the teacher training in ICT and e-learning at the University of Zagreb (Kučina Softić et al., 2016). The survey investigated how often teachers use ICT tools and e-learning tools and their need for knowledge in these areas for the next two years. The results of the survey indicated that teachers often use the basic operating systems, e-mail and web, and word processing tools, tabular calculations and presentations, followed by cloud storage tools, e-learning and social networking. The least used are video and animation tools, databases, e-portfolio and webinars and programming. It is therefore logical that in the answers they have just expressed the need for such knowledge or their training.

Teachers expressed the greatest need for knowledge on the use of high technology or technologies from these groups:

- multimedia tools: (video production and processing tools – 56.08%; animation tools – 55.35; tools for making or processing vector or raster graphics 53.72%),
- e-learning (e-learning tools – 56.08%; other e-learning tools: e-portfolio, webinars, lecture-recording tools – 51.72%).

Looking at the survey results in 2016 and those in this research it can be seen that they complement in sort of training teachers identified they need further training. But the problem still stays on the issue who will provide these trainings to them and how to enhance them to start using ICT and e-learning in their courses or how to further develop their e-courses.

This results confirms shows the need for teacher training in ICT and e-learning but as well the training in pedagogical and methodological issues. Tailored and continuous trainings can enhance teachers to implement new methods into their teaching, it will enable to be innovative in course design and work with their students.

Conclusion

The education system in higher education is constantly challenged to offer as much education as possible to as many people as possible, while at the same time developing technology opens up opportunities for new teaching methods.

Application of ICT needs to be carefully planned and put into the pedagogical framework, which requires teachers to have good pedagogical and didactic knowledge in order to apply new teaching methods. It is therefore essential for the teacher to provide continuous training not only in ICT but also in the use of ICT in teaching. Teachers often apply technology in a way that is simply added to classroom teaching and therefore often lacks innovativeness and creativity. Bates and Sangrà (2011) state that this lack of basic knowledge in pedagogy and didactics and continuous improvement in this field leads to the fact that teachers are not innovative in teaching but are in keeping with old traditional models and therefore there is no change in universities. Professional development of teachers at universities should become compulsory if we want to improve the quality of teaching. Also, the use of ICT in teaching will be the beginning as long as teachers perceive new technologies as a threat and as long as their application depends solely on teacher enthusiasm (and accordingly the desire for professional training to know how to implement these technologies in the education process). From ICT we expect a lot, but the impact of ICT on education and training is not at the level that would have been expected so far. The process of changing the process of teaching and learning is still at the beginning. As long as new teaching methods are put in the "old" existing traditional context, there will be no innovative application of ICT in the educational process.

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