A STEP CLOSER TO UNDERSTANDING RESEARCH TRENDS IN THE FIELD OF DIGITAL INCLUSION OF PERSONS WITH DISABILITIES IN HIGHER EDUCATION: A SYSTEMATIC LITERATURE REVIEW

Ljerka Luic
University North, Croatia
ljerka.luic@unin.hr

Maja Popovic
University of Zagreb, Faculty of Humanities and Social Sciences, Croatia
maja.popovic@protonmail.com

ABSTRACT

Higher education institutions have a strong potential to encourage society to make significant changes, preparing individuals for active and responsible participation in society. As one of the tasks of the higher education system is to take an active role in overcoming the challenges that affect certain parts of society, especially vulnerable groups, it should be able to provide equal opportunities for all students. Digital competences in education are crucial today, so the question arises as to whether sufficient investment is being made into research in this field. The aim of this paper is to offer a systematic literature review that focuses on two types of research currently conducted in the field of digital inclusion in education: (i) use and adaptation of digital educational tools for students with disabilities and (ii) digital competences of teachers. For the purposes of the research, the method of content analysis of recent scientific papers was used. The search analysis was conducted from March to April 2022, while the search of papers in Scopus and Web of Science databases was limited to the period from 2019 to 2022. Terms used in the search were as following: digital competencies, disabilities, higher education. This review includes an analysis of existing concepts of digital inclusion of persons with disabilities in the higher education process as well as proposed methods for assessing digital competencies of teachers in higher education and pursues three objectives: (i) to describe the concepts of digital inclusion, (ii) to provide an overview of trends and (iii) to identify challenges in assessing the digital competences of teachers in higher education related to digital inclusion. Through consideration of these goals, this paper presents an innovative approach to research in this field and emphasizes the need to conduct similar research to promote the development of higher education.
Keywords: *Digital competences, Digital inclusion, Higher education, Students with disabilities, Teachers*

1. INTRODUCTION

Importance of education isn't only reflected in the way it upholds individuals in developing critical thinking and acquiring new sets of problem-solving skills but can also be seen through the impact they have on the environment and the society in which they participate. Higher education institutions, in this instance, have a strong potential to encourage society to make significant changes, preparing individuals to become active and responsible citizens who can contribute to overcoming local and global challenges. One of the tasks of the higher education system is to take *an active* role in overcoming the challenges that affect certain parts of society, especially vulnerable groups by providing equal opportunities for all students, giving everyone an equal chance to thrive in today's social and economic climate. Information and communication technologies (ICT) have irreversibly changed the way we interact with technology and have been in the focus of public policies for years.

In the year 2006, the European Parliament and the Council of the European Union published *Recommendations on key competences for lifelong learning (2006/962/EC)*, recognizing digital competence as a set of skills in ICT an individual needs to "*retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet*" (EUR-Lex, 2006). To identify digital competence and to provide a common understanding of these skills, EU has developed the Digital Competence Framework for Citizens (current version DigComp 2.2) – a document that "*provides more than 250 new examples of knowledge, skills and attitudes that help citizens engage confidently, critically and safely with digital technologies*" (Vuorikari, Kluzer, Punie, 2022). The current version of the document aims to keep DigComp relevant and to serve as a support for different EU policies and objectives, especially those concerning digital transformation. One of the EU policy initiatives aimed to prepare and support education and training system for the digital age is *The Digital Education Action Plan (2021-2027)*. One of the key points of this renewed document adopted by the European Commission in its efforts for digital transition in Europe (the first version having been released in 2018) states that the aim is to „offer a long-term strategic vision for high-quality, inclusive and accessible European digital education". In this regard, digital competence has become especially crucial in the context of the *European Higher Education Area*, promising a more inclusive setting for vulnerable groups, understanding their right to obtain education without barriers. Not only do high education learners and teachers need to be digitally competent to meet the requirements of modern education system, but digital competence can help overcome certain educational barriers students with disabilities face, bringing to the forefront development of a high-quality digital education accessible to all students in the EU. The question arises as to whether sufficient investment is being made into research in this field and the aim of this paper is to offer a *systematic literature review* that focuses on two types of research currently conducted in the field of digital inclusion in education: (i) use and adaptation of digital educational tools for students with disabilities and (ii) digital competences of teachers. This review includes an analysis of existing concepts of digital inclusion of persons with disabilities in the higher education process as well as proposed methods for assessing digital competencies of teachers in higher education and pursues three objectives: (i) to describe the concepts of digital inclusion, (ii) to provide an overview of trends and (iii) to identify challenges in assessing the digital competences of teachers in higher education related to digital inclusion.

2. METHODOLOGY

The search analysis was performed from March to April 2022 and the search of papers was carried out in the largest interdisciplinary citation databases: Scopus and Web of Science. The search was limited to the period from the year 2019 to 2022. Combination of terms used in the search were the following: *digital competence, disabilities, higher education*. This literature review follows the basic idea of the Cochrane Handbook for Systematic Reviews of Interventions and the following eligibility criteria (Higgins et al., 2019) were determined with the aim of including and excluding papers from the search:

- Research focused on existing digital educational tools for students with disabilities and digital competences of the teaching staff
- Critical overviews on the matter of accessibility in the higher education environment
- The target groups were students with disabilities and teaching staff
- Papers had to be available in the open access publishing model
- Research on emotional impact of accessible technologies were excluded from the results
- Non-English-language papers were also excluded from the results

The initial search generated 903 results (888 results from Scopus and 15 from Web of Science) and the initial screening consisted of reading the titles and abstracts of these papers and the selection of relevant papers was based on the eligibility criteria mention above. After the initial screening, 884 were excluded for either not focusing on *digital inclusion* of persons with disabilities in *higher* education, not being available in the English language or simply having low relevance of papers based on eligibility criteria. The next phase of the screening included reading full texts of the remaining 19 papers. After reading these papers, 8 were excluded because they were focused more on accessibility in the educational environment, rather than the focusing on digital competences. Of the remaining 11 papers, 2 were excluded because they were presenting a systematic literature review, and 1 paper was excluded because it dealt specifically with psychological aspects of loneliness students with disabilities experience in online learning. Based on the search criteria, the literature screening process produced 8 relevant papers aimed at identifying research trends in the field of digital inclusion of persons with disabilities in higher education. The 8 papers generated by this search were then analysed according to the following criteria:

1) Author/s
2) Year published
3) Country
4) Year (data collection)
5) Targeted group (students with disabilities – teaching staff)
6) Sample size (number of faculty members involved)
7) Methodology
8) Assessment method

3. RESULTS

This paper aims to provide an overview of current research trends in the field of digital inclusion of persons with disabilities in higher education. Out of the 8 papers derived from this search the majority was published in the year 2021 with one published in 2020 and one in 2022. In order to get a clear overview of the subject, analysis criteria were developed that included location, year the study was conducted, targeted groups, number of respondents, methodology and assessment method used (Table 1.

Author/s	Year published	Country	Year data collection	Target Group	Sample size	Methodology used	Assessment method
Widyastuti, D.A.R. et al.	2021	Indonesia	-	Students with disabilities	-	qualitative	-
Fernández-Batanero, J.M. et al.	2022	Spain	2020 - 2021	Teaching staff	2072	quantitative	questionnaire
Silletti, F. et al	2021	Italy	2020	Students with disabilities	198	quantitative	questionnaire survey
Medina-García, M et al.	2021	Spain	2020	Teaching staff	142	qualitative	online survey
Arslantas, T.K. Gul, A.	2021	Turkey	-	Students with disabilities	60	mixed	online survey; semi-structured interview
Cabero-Almenara, J. et al.	2021	Spain	2019-2020	Teaching staff	1194	mixed	questionnaire
Boys, J.	2021	UK	-	Students with disabilities	-	critical review	-
Reinholz, D.L. Ridgway, S.V.	2021	USA	-	Students with disabilities	-	-	-

Table 1: Summary descriptions of studies according to the analysis criteria
(Source: Authors)

The research generated papers that were then systematized into 3 main groups: *a) research focusing on digital competence of the teaching staff; b) research focusing on digital competence of students with disabilities and c) critical overviews outlining the importance of accessibility in the higher education environment.*

3.1. Research focusing on digital competence of the teaching staff

Entirety of the studies in this section were conducted in Spain and all recognized the importance of use of the ICT and teacher training in higher education, especially amid the COVID-19 pandemic, when both students and teachers had to resort solely to online teaching. This should not come as a surprise because Spain has introduced the imperative of supporting development of digital competence into several of its national policies. Data collection in all 3 studies was carried out either through an online survey or a questionnaire, from 2019/2020 to 2021. Another interesting thing to note here is that all the studies used a series of criteria from the Cabero-Almenara et al. (Cabero-Almenara et al., 2021) *instrument* (a means of measuring the level of digital competence of teachers). Authors of the first study (Medina-García et al., 2021) conducted qualitative research on the knowledge teachers on all educational stages have in ICT and disability and whether that knowledge would increase the use of technology as a teaching resource and the teacher's own motivation. Sample included 142 teachers from all educational stages, 19.7% of which taught at the university level. The results obtained stressed "*the potential of ICT in the education of students with disabilities and the importance of teacher training in order to ensure inclusion*", as stated by the authors. Both the knowledge about ICT and disability the increased use of technology as a teaching resource has a positive impact on the teacher's motivation. The results also show that teachers at lower education levels have a better understanding of disability but lack motivation in using ICT in teaching. The next study (Fernández-Batanero et al., 2022) was conducted with the aim to identify the degree of training and technological knowledge higher education teaching staff in the use of digital resources to support students with disabilities. Authors chose a cross-sectional research design (descriptive and predictive approach) and the sample consisted of 2072 teachers from different higher education institutions. The results obtained by this study showed teachers have a low level of digital competences training when it comes to the use of ICT with students with disabilities. The last study in this section (Cabero-Almenara et al., 2021) was conducted with the similar goal: to understand teacher's knowledge on digital resources as a way of ensuring inclusion for students with disabilities. A non-experimental design was used (qualitative and quantitative analysis) for this research and 1194 teachers from all educational stages from Andalusia participated in the questionnaire, 23.7% of which at the university level. The results obtained showed that the level of digital competence of teachers, though acceptable, need to be higher in order to ensure inclusion for students with disabilities.

3.2. Research focusing on digital competence of students with disabilities

A study in Italy was conducted (Silletti et al., 2021) with the aim of investigating the perspective on distance learning of students with disabilities. The sample consisted of 198 Italian university students with disabilities who had to fill in an online questionnaire and valuate their experience and perception of distance learning during the COVID-19 pandemic. The data collection was carried out in the academic year 2019/2020. The results obtained by this research showed differences of perception depending on the type of disability a student has, but also highlighted the positives in terms of participation in online activities and the negatives such as being socially isolated or experiencing technical issues. A study in Turkey (Arslantas, Gul, 2021) was conducted in order to explore the digital literacy skills of university students with visual impairment. A mixed methods design was used, collecting both quantitative and qualitative data through an online survey and semi-structured interviews. Sample included 60 participants.

The results showed that even though visually impaired students possessed certain digital literacy skills and their vision wasn't considered a barrier, they did *"face problems in digital content creation, critical information evaluation, and in working collaboratively"*, as noted by the authors.

3.3. Research and critical overviews outlining the importance of accessibility in the higher education environment

We cannot have a conversation on inclusive higher educational system without touching on the subject of accessibility and even though the next 3 critical overviews are putting an emphasis on the importance of creating a suitable online setting, they also discuss the importance of creating an accessible physical environment for all students with disabilities. The first paper, a case study conducted in Indonesia (Widyastuti et al., 2021) focused on the efforts of creating a quality environment and education approach in the context of higher education and students with disabilities. It also lists challenges in creating such an environment. This qualitative research was conducted on the Universitas Atma Jaya Yogyakarta (UAJY) and it included the *Inclusive Participatory Action Research.* In order to determine what adjustments need to be done to make the University more inclusive, students with disabilities were actively involved in planning, implementing and evaluating the efforts made to do so. The results of this study highlight that higher education institutions should create a barrier free environment to ensure accessibility (both physical and virtual) for all students, giving them an active role in development and decision making. The next two papers present a unique perspective on disability and accessibility. A critical analysis essay (Reinholz, Ridgway, 2021) focuses on enhancing accessibility in science, technology, engineering, and mathematics (STEM) teaching on all educational levels by understanding the concept of *access needs* as a precursor to equality, stating that without the proper understanding of a person with a disability and without ensuring a completely accessible space in which an individual can fully participate, equality cannot be met. Authors emphasize the importance of normalizing discussions around access needs because they generally tend to focus more on physical access, ASL interpretation, and screen reading while leaving needs of other individuals less visible. To illustrate these ideas, authors discuss different scenarios of access needs in STEM education (disabled and nondisabled persons in laboratory spaces, classrooms and other spaces). Another critical overview focused on the higher education practices in the UK during the Covid-19 pandemic (Boys, 2021). The author observed the quick shift from a physical to an online educational setting and emphasized how it demonstrated a lack of experience in using technologies efficiently for students and teachers. However, in order to achieve good educational practices in higher education, especially for persons with disabilities, old educational norms need to be reviewed *"with diverse learners, teachers, curricula and contexts"* in mind, and the time of the pandemic may just be the right time to start considering these concepts, as stated by the author.

4. DISCUSSION

As stated in the Rome Ministerial Communiqué (EHEA, 2020) document, the pandemic brought with it a time of crisis that has greatly challenged higher education institutions in providing socially inclusive learning in terms of ensuring equal access to digital technologies for learning and teaching. During this time, digital competence gained even greater significance not just in digital transformation of our societies, but also in understanding the use of ICT as a medium for learning and teaching in educational environment. All three papers focusing on digital competence of the teaching staff in the higher education environment conducted qualitative research (including a cross-sectional research) on the existing knowledge teachers on all educational stages have in the use of ICT and their understanding of disability and whether, as seen in the first study, that knowledge would increase a teacher's own motivation

in using ICT as a teaching resource. The results of these studies mainly show that, even though the academic teaching staff has the highest level of knowledge in using ICT in teaching, they lack a better understanding of disability and how a good quality ICT teaching materials can contribute to an entirely inclusive education. It is interesting to see how these two concepts are interrelated. On one hand, digital competence, viewed as an ability to use basic digital tools and online platforms (Skov, 2016), can be easily achieved by additional education of the teaching staff. But, on the other, having a better understanding on how students with different disabilities use these tools presents a bigger problem, especially in the higher education environment. This brings us to the next two studies focusing on digital competence of students with disabilities and how they experience and perceive digital educational tools in their academic endeavours. What both studies have shown is that students will experience different ICT tools in teaching depending on the disability they have. This is a clear indication that in order to ensure inclusiveness in higher educational institutions, students with disabilities should actively participate in creation and/or adjustment of these tools. Another very important issue can be observed here is the fact that, certain tools, in this case distance learning, can heighten social isolation which is also one aspect of ICT that must be taken into account when developing these tools. The last research and the additional two critical overviews are focusing on the importance of accessibility in the higher education environment. The first study brings to the front *Inclusive Participatory Action Research,* emphasizing the importance of including students with disabilities in decision making around the concept of inclusion in the higher education environment. An interesting matter the first critical overview touches on is the fact that researchers tend to focus on only one type of a disability, according to which an assumption could be made that disabilities in general could also be viewed through trends. Whichever disability resonates most in the public space will be the disability covered by the future studies. The last overview in a way sums up this literature review. The author in this lengthy essay explains how the education system during the covid-19 pandemic was caught unprepared in delivering accessible content to students with disabilities, and how it demonstrated exactly where the weaknesses are and how to continue forward after the pandemic, with the emphasis on "how to improve curricula, resources, *modes of delivery and student experiences",* as stated by the author.

5. CONCLUSION

This literature review has been conducted on a smaller sample in order to attain a general overview of current research trends in the use and adaptation of digital educational tools for higher education students with disabilities and digital competences of educational professionals. The papers obtained by this review were all conducted and published in the years: 2020, 2021 and 2022, during the Covid-19 pandemic. What is evident from this literature review is that there needs to be a better understanding on how teacher motivation is connected not only to ICT, but also how it correlates to the matter of inclusion of students with disabilities, what the limiting factors are not just in higher education, but on all levels of learning. What the latest research showed is that teachers in general have an acceptable to a low-medium level of technological training and focus needs to be redirected in this area. On the other hand, in order to understand what impact digital competence has and how it can contribute to a more inclusive environment for vulnerable groups, we first need to understand how these groups or in this case, persons with disabilities, perceive and use technologies. Only when a clear understanding of the advantages and disadvantages of what is considered good quality education material is established and how students with different disabilities interact with the technological infrastructure will the development of higher education be able to rise to the challenge of ensuring inclusive education to all.

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