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# Digital Pedagogies and Competencies for Quality Education

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## Abstract

Researchers (Chandasiri, 2020; Dubey & Pandey, 2020; El Firdoussi et al., 2020) speculate that the educational systems are more likely not to return to the conventional mode of delivery experienced before the pandemic. Distance education, blended learning, open, flexible and personalized learning are becoming an important part of our daily-life activities, education, and training and in the future are expected to penetrate further into our personal and professional lives. Some of these digital pedagogies, approaches and technologies adopted are here to stay after the pandemic is over (Brammer & Clark, 2020). The experiences gained during the covid-19 era will drive educational systems to become even more hybrid and hyflex learning environments (Yilmazınce et al., 2020). Given the aforementioned, the paper presents and discusses the Digital Pedagogies that the educational systems are expected to employ in relation to the Digital Competences that educators and students (future citizens) are expected to develop. The European Commission, realizing the importance of digital literacy and the development of digital competences for quality education and life-long learning developed two frameworks: 1) Digital Competence Framework for Educators (DigCompEdu) and 2) Digital Competence Framework for Citizens (DigComp). The study concludes by exemplifying the necessity to further examine and define the appropriate steps for the future in order to ensure equal opportunities, quality education, equity among learners as well as enhanced accessibility and usability for all learners through education strategies and the appropriate design of learning environments.

**Keywords:** digital pedagogies, digital competences, quality education

## 1. Introduction & Theoretical Background

Over the last two decades, globalization that “includes the growing mobility of people, the impact of rapid technological change such as internet access and the use of social media,” (Larsen, 2016, p.4) has had an immense impact on education both in terms of technology and intercultural education. The integration of technology is a critical component of educational practices in many countries, and it is a significant topic for a global educational audience.

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One of the basic requirements of 21<sup>st</sup> century teachers is integrating interculturality, global citizenship and cross-cultural experiences into their work. The above is mostly effectively achieved via the integration of technology for communication, collaboration, interaction, sharing and engagement. Technology adoption in schools around the world is continuously growing at an exponential rate in the past decade (UNESCO, 2011). The integration of technology is becoming a critical component of educational practices in many countries, and it is a significant topic for a global educational audience (Selwyn, 2013). The PTSE Standards for Educators, based on feedback from 2200 educators and administrators, were launched in 2017. These standards challenge educators to grow as learners, leaders, citizens, collaborators, designers, facilitators, and analysts. K-20 educators can use a wide range of technology tools to orchestrate synchronous and asynchronous learning experiences that help learners meet these standards.

The technological advancement in information technology and telecommunications resulted in the development of the Web 2.0 and created the appropriate framework for user participation. The traditional one-way communication is transformed to a two-way communication, and process of information. In Web 2.0 users are *contributing, collaborating, creating* - the 3C's (Ala-Mutka et al, 2009). Millions of people around the globe are employing digital tools for personal learning, for workplace learning and for the learning that happens in the educational settings. The Web 2.0 tools can be applied for teaching and learning purposes towards achieving educational objectives, thus transforming social to educational networking. Over the last three decades, synchronous and asynchronous learning opportunities have grown exponentially. Educators can use a growing number of innovative web-based technologies to create learning spaces to connect and facilitate an exchange of information and ideas. A number of Web2.0 technologies are available to support collaboration in online learning settings so it is important for academics and students to be aware of their affordances and limitations during use in Online Learning courses for collaborative knowledge construction (Cole, 2008; Hargadon, 2009; West & West, 2009; Richardson, 2019; Liu, Kalk, Kinney, & Orr, 2012).

Additionally, future educators are expected to develop a more sophisticated and advanced set of competences. Specifically, it is expected that educators will design and implement learning environments enhanced with technology and it is their responsibility through these learning environments to help students become digitally literate and competent. Their own digital competences should be developed in order to achieve the above (European Commission, Joint Research Centre, Redecker, Punie, 2017). In order to be able to achieve the aforementioned, future educators should be provided with those experiences that will promote the development of such skills and competences. Thus, it

is important to practice through their studies the educational use of new and emergent technologies in order to better understand and realize the added value and educational benefits they provide.

### **1.1. Digital Natives – The Future Citizens**

The students (the future citizens) that we expect to teach are considered to be digital natives. Digital natives are those that were born and raised during the explosion of the Internet technologies. When the term was first introduced, digital natives, were those that were born after 1980. Since the technology is continuously evolved and developed it seems that each generation is considered to be digital natives in relation to the previous one. Thus, our children, our students, the future citizens, are digital natives in comparison to their parents and educators. Their parents and educators are considered to be digital immigrants, which are the ones that have to prepare the students for the future. Digital immigrants are those born before 1980s and needed to adjust to the use of the new technologies in order to address the needs and demands of the ICT era. Consequently, it seems that there is a gap between students and educators, and students and parents. Our students live in three parallel worlds. At home, at school and the digital world. As digital immigrants, we just do not get it! We do not fully understand how our students/ children use technology (specifically for entertainment purposes). At home, the students/ children use technology mainly for entertainment and gaming purposes. In some cases, with no parental controls and/or restrictions. At school, technology use has several variations. In some cases, it's been employed very traditionally and a subject matter. In other cases, educators integrate technology as a cognitive learning tool. As parents and educators, we are completely outside of the digital world that are students/ children live in. It is important to find ways to close the gap/ to minimize the gap that exists between students (digital natives) and parents/ educators (digital immigrants). It is important to understand their needs and their way of thinking. Finally, it is extremely important and highly necessary to teach them the appropriate, effective and efficient use of technology for personal, educational and professional purposes.

### **1.2. Future professions**

The World Economic Forum (2016) reports that 65% of today's grade school kids will end up at jobs that haven't invented yet. Along the same lines, the Institute of the Future (2018), reports that 85% of jobs that will exist in 2030

haven't been invented yet. Consequently, as parents and teachers/educators we prepare our students/children respectively for the unknown. Some of the future professions, we can find when searching online are the following:

- ▶ Productivity Counselor
- ▶ Personal Digital Curator
- ▶ Microbial Balancer
- ▶ Corporate Disorganizer
- ▶ Curiosity Tutor
- ▶ Alternative Currency Speculator
- ▶ Spacecraft Pilot
- ▶ Block Chain Crypto Specialist
- ▶ Data Detective
- ▶ Digital Detox Therapist
- ▶ Drone Driver
- ▶ Garbage Miner
- ▶ Man-Machine Teaming Manager
- ▶ Hacker/ Ethical Hacker
- ▶ Autonomous vehicle designers/ Flying Car Developer
- ▶ Quantum Programmers
- ▶ Ethical Sourcing Officer
- ▶ Walker/Talker
- ▶ AI Business Development Manager
- ▶ AI-Assisted Healthcare Technician
- ▶ Cyber City Analyst
- ▶ Genomic Portfolio Director
- ▶ Digital Tailor
- ▶ Vertical Farming Consultant

And the list goes on and on. It is impressive, that in some cases it is not easy to define the aforementioned professions.

## **2. Digital Competences**

Given the aforementioned, why do we want to develop students' digital competences? The paper presents and discusses three main reasons.

## 2.1 Reason 1: For Quality Education and Life Long Learning

The United Nations (2015) announced a few years ago 17 Sustainable development goals. These goals are widely known as SDGs. The SDG related to education is the 4<sup>th</sup> one, which is entitled: Quality Education. This goal aims to achieve the following:

- ▶ Ensure inclusive and quality education for all,
- ▶ Promote lifelong learning,
- ▶ Eliminate gender disparities in education,
- ▶ Ensure that all girls and boys have access to quality early childhood development and care,
- ▶ Ensure equal access to all levels of education for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

SDG 4, consists of 10 sub goals. Four of the sub-goals are related to Technology use. Specifically, the following sub-goals are the ones that are related to technology use and integration:

- 4.3 - Equal success to technical/ vocational and higher education),
- 4.4 - Relevant Skills for Decent Work,
- 4.6 - Universal Youth Literacy and
- 4.7- Education for Sustainable Development and Global Citizenship.

Sub-goals 4.3, 4.4 and 4.6, are mainly focusing on the importance of life-long learning and quality education and the need for flexible learning pathways (in different educational settings: formal, non-formal and informal learning). Technology is seen as a mechanism for designing and delivering flexible, hybrid/ blended, hyflex and open lifelong learning environments. ICT plays a vital role in promoting and supporting the diverse needs and requirements of educators and learners (students) by sharing and creating knowledge, ideas and resources. Sub- goal 4.4 refers to the acquisition of digital skills, where it is pointed out that a person's digital literacy will largely determine his/her path in the labour market in the future. Sub-goal 4.7 highlights the need for learners (future citizens) to be armed with the appropriate knowledge and skills with which they will be able to promote a more sustainable and quality lifestyle.

One of the important knowledge and skills is digital literacy. Reference is made to the use of Information and Communication Technologies (ICT) in order to upgrade the study programs at various educational levels. Integrating ICT in our educational practices, curricula will be more effective and help improve the

quality of education. However, in order for the aforementioned to be accomplished, the human factor is considered a fundamental factor. Consequently, the human factor, in this case the educational staff is very much important to be highly qualified and develop its digital literacy. To conclude, a detailed review of the 2030 agenda's framework for action on education shows that ICT is the key strategy for achieving the goals.

## 2.2. Reason 2: Development of 21<sup>st</sup> Century & Transversal Skills

The 21<sup>st</sup> century skills have been outlined and described by various researchers and reports (e.g. Bybee & Fuchs, 2006; Ananiadou & Claro, 2009; Trilling & Fadel, 2009; Mojika, 2010; Rotherham & Willingham, 2010). The workforce needs have changed, the job tasks and type of work are changing and consequently the required skills are changing. Students as the future citizens of the Information Society need to be equipped with various 21<sup>st</sup> century skills. Some of the 21<sup>st</sup> century skills that are given in the literature are the following:

- ▶ Critical thinking
- ▶ Problem-Solving
- ▶ Creativity
- ▶ Collaboration
- ▶ Communication
- ▶ Innovation
- ▶ Knowledge Construction
- ▶ **Digital literacy/ Digital Competencies**
- ▶ Self-directed Learning
- ▶ **Life-Long Learning**
- ▶ Leadership
- ▶ Productivity
- ▶ Social Skills
- ▶ Flexibility
- ▶ Global Citizenship

Additionally, the recent years the concept of transversal skills was revealed in the literature (Carvalho, & Almeida, 2022; Larraz, Vázquez, & Liesa, 2017; Lucas, & Venckute, 2020). Specifically, UNESCO (2014) gives six categories of transversal skills:

1. Critical thinking
2. Innovative thinking
3. Interpersonal skills

4. Intrapersonal skills
5. Global citizenship
6. **Media and information literacy**

At this point it is important to highlight that Digital Literacy/ Media Information Literacy, has *Dual Role*. It is a competency to be achieved as part of 21<sup>st</sup> century and/or transversal skills, as well as the mean to achieve other skills. For example, digital literacy can be employed in order to achieve Global Citizenship. It gives the opportunity to students to collaborate, interact and communicate with other students (in different places) via the use of digital tools such as collaborative documents, digital walls, discussion forums, chats, video and audio platforms.

### 2.3. Reason 3: Important aspect of employability

There are plenty of arguments of why to use technology and various digital tools within the teaching and learning practice, such as: motivation, interest, unique learning and teaching opportunities, innovative instructional approaches & methodologies, appropriate use of technology, fun, gamification and learning, and many many more. Besides the aforementioned, the most significant argument is that ICT/Technologies is an important aspect of employability, thus students (future citizens) are expected to know how to effectively, efficiently and appropriate use technology for various purposes. The need to develop their digital competencies is highly important and necessary. As aforementioned, given the great developments in ICT new forms, of work, communication and economic growth have emerged. It is our duty to provide students with those opportunities and experiences that will adequately prepare them to successfully survive in this competitive, ever-changing Hi-Tech, globalized, and rapid-changing society and become culturally responsible, active, and competent leaders for themselves, and their communities.

### 2.4. The next Steps

In order for students to develop the required digital competences, we need to employ digital pedagogies in designing, developing and delivering learning environments. Digital Pedagogy (Pongsakdi, Kortelainen, & Veermans, 2021; Väättäjä, & Ruokamo, 2021) is defined as the study and use of contemporary digital technologies in teaching and learning (. It is applied to online, hybrid/ blended, hyflex, and face-to-face learning environments. In other words, it is the the

study of how to teach using digital technologies. It examines the changing nature of students and the context in which we teach and focuses specifically on the use of technology to break down learning barriers and enhance students' learning experiences. Educators have an important role to play in employing digital pedagogies in their teaching and learning practices.

To develop learning environments enhanced with technology, we need to integrate technology as a learning tool in the teaching and learning practice. Specifically, digital Pedagogy is employed in order to design learning environments enhanced with technology where technology integration as a cognitive-learning tools in the teaching and learning practice can be defined as: The *exploitation of technology by students* as tool that enhances their learning experience, promotes and supports the achievement of *specific learning objectives*. To employ digital pedagogies and design, develop and implement learning environments enhanced with technology (to develop students – future citizens digital competencies), educators need to be equipped with digital competences as well.

### 3. European Frameworks

The European Commission, realizing the importance of digital literacy and the development of digital competences for quality education and life-long learning developed two frameworks: 1) Digital Competence Framework for Educators (DigCompEdu) and 2) Digital Competence Framework for Citizens (DigComp). These very detailed and lengthy European Frameworks provide important guidelines and information on how to develop digital competences for Citizens and Educators. Both of the Frameworks are briefly presented and explained below.

#### 3.1. Digital Competences for Educators

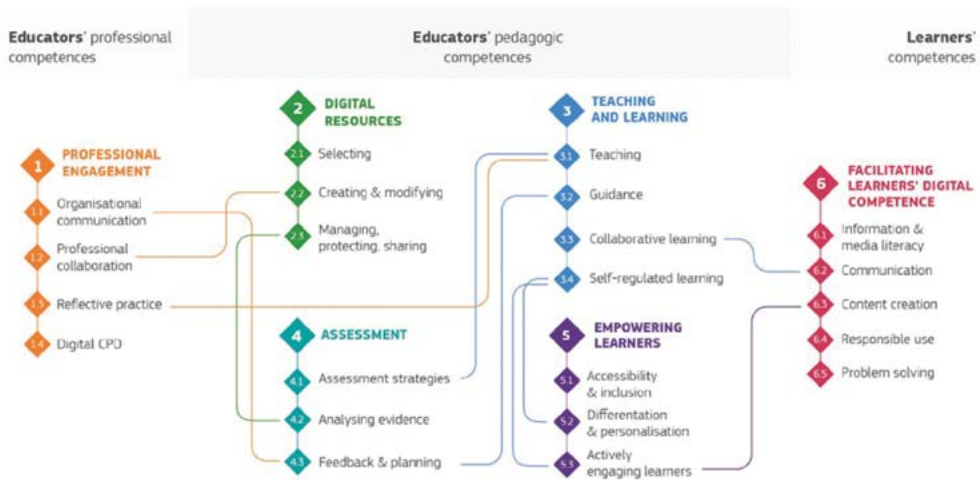
The Digital Competences for Citizens (DigCompEdu) has been developed from the European Commission for the 1st time in 2013 and since then it has been updated and further developed. More information can be found at the following link: [https://joint-research-centre.ec.europa.eu/digcompedu\\_en](https://joint-research-centre.ec.europa.eu/digcompedu_en)

The DigComp consists of six (6) thematic areas, eight (8) proficiency levels, and twenty-two (22) competences. The 6 thematic areas are the following:

1. Professional Development,
2. Digital Resources
3. Teaching and Learning

4. Assessment
5. Empowering Learners,
6. Facilitating Learners' Digital Competence.

At the Diagram 1 below, the 22 competences are also presented. The framework has been used to measure the digital literacy level of the European Educators. It has been employed by several Ministries of Education and national agencies in order to set up and develop related policies for citizens digital skills development. The framework has been also used to design, develop and deliver seminars and professional development trainings for educators (Punie, 2017).



**Graphic image 1.** The DigCompEdu Framework (Punie, 2017).

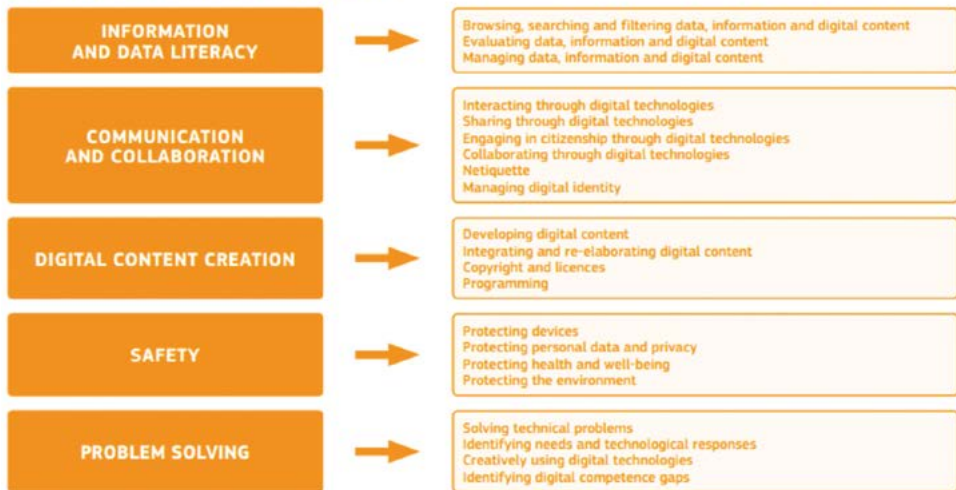
### 3.2. Digital Competences for Citizens

The Digital Competences Framework for Citizens (DigComp) has been developed from the European Commission for the 1<sup>st</sup> time in 2013 and since then it has been updated and further developed. The current version is DigComp 2.2, which has been released in 2022. The DigComp consists of six (5) thematic areas, eight (8) proficiency levels, and twenty-one (21) competences. The 5 thematic areas are the following:

1. Information and data literacy
2. Communication and collaboration
3. Digital content creation
4. Safety
5. Problem solving

The DigComp Framework is mainly employed to guide educators to design learning environments enhanced with technology (Vuorikari, Kluzer, & Punie, 2022). More information about the DigComp framework can be found in the following link: <https://ec.europa.eu/jrc/en/digcomp>

DigComp's five key areas and 21 competences



**Graphic image 2.** The DigComp Framework (Vuorikari, Kluzer, & Punie, 2022).

#### 4. Conclusion

Technology is continuously evolving. Artificial Intelligence (AI) has been around for a long time now, some argue since 1950 (Chen, Chen & Lin, 2020) and specifically research on the use of AI in Education (AIEd) has been conducted for more than 30 years (Zawacki-Richter et al., 2019). However, it wasn't until recently when ChatGPT appeared in November 2022, that its use has been extensively discussed and questioned. The past five years AI was considered to be a great development in the field of educational technology and is expected to grow even more (Educause, 2018, 2019). Specifically, AIEd will have a tremendous raise in various solutions, applications and uses (Zawacki-Richter et al., 2019). Besides AIEd, distance education, blended learning, open, flexible and personalized learning are becoming an important part of our daily-life activities, education, and training and in the future are expected to penetrate further into our personal and professional lives. The pandemic provided an opportunity for some of the technologies and procedures to be tested. It seems that some of these are here to stay (Brammer & Clark, 2020). These technologies

and procedures, and the experiences gained during the covid-19 era will drive educational systems to become even more hybrid and hyflex learning environments (Yilmazınce et al., 2020). Researchers (Chandasiri, 2020; Dubey & Pandey, 2020; El Firdoussi et al., 2020) speculate that the educational systems are more likely not to return to the conventional mode of delivery experienced before the pandemic. In order to keep up with the needs and demands of a globalized, rapidly changing, highly demanding interconnected world, we need to adjust. Consequently, they need to support and guide educators to develop those skills that will allow them to appropriately design and develop learning environments aligned to the requirements of the new trends and technology developments and evolution and finally, for students (future citizens) to develop the required digital competences.

## 5. Literature

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