Chapter #17

POSITIVE DIGITAL LEARNING: CHALLENGES AND PATH FORWARD FOR EDUCATORS

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ABSTRACT
Digital technologies are rapidly changing teaching and learning in the 21st century as both teaching methods and priorities are evolving. Likewise, the skills required of 21st century educators are constantly evolving, and while it is widely recognised that digital literacy is critical, there is no general consensus on what it means for an educator to be digitally literate and what competencies should be included in literacy frameworks for educators. The debate over teachers' digital competencies continues as the rapid pace of technological change makes it difficult to keep up with the latest trends. At the same time, other critical dimensions emerge that also need to be taken into account. In the present research, we examine the impact of two significant challenges that have emerged in recent years on educators' competencies: Emergency Remote Education (ERE) and generative artificial intelligence (generative AI). We examine their practical implications and the resulting emotional challenges of using digital technologies in education. We critically discuss existing competency frameworks that outline the knowledge, skills and attitudes that educators should possess to effectively support student learning and development. Based on the lessons learned, we discuss future directions for their improvement, namely the integration of digital skills with emotional e-competencies, towards the development of a holistic framework for positive digital learning.

Keywords: digital competence framework, technostress, educators, Emergency Remote Education, generative artificial intelligence.

1. INTRODUCTION

Digital technologies are rapidly changing teaching and learning. Teaching in the 21st century is not the same as **both teaching methods and priorities have changed.** In addition to teaching core subjects, teachers must also teach and develop students with skills for the 21st century (P21, 2019). To ensure that students can develop, practice, and apply 21st Century Skills, teachers must have the expertise and competence to teach and train students in 21st Century Skills. Education is increasingly enabled, supported and guided by technology, including artificial intelligence, data management and ubiquitous access technologies, etc. However, just as the mere existence of digital technology does not guarantee its usefulness for quality learning, the mere familiarisation of teachers with digital technology does not suffice either. Against this backdrop, there is a growing consensus that **digital literacy** is essential for teachers in the 21st century. There is a growing movement to support teachers in developing their digital skills. This includes providing professional

development opportunities, creating digital resources for teachers and developing digital literacy standards.

The problem of better preparing teachers to use digital technologies effectively and productively in schools is a complex challenge (Falloon, 2020). Janssen et al. (2013) stressed that digital competency goes beyond knowing how to use devices and applications. They described **digital competence** as a "conglomerate of knowledge, skills, and attitudes connected to various purposes (communication, creative expression, information management, personal development, etc.), domains (daily life, work, privacy & security, legal aspects), and levels" (Janssen et al., 2013, p.479). Equally, the digital competency for teachers should move beyond the often dominant technical and literary conceptualisations and adopt a more holistic understanding that takes into account the increasingly complex knowledge and skills needed to be ethical, safe and productive in diverse, digitally mediated environments (Falloon, 2020). Educators need to learn how digital environments and resources can enhance and impact their teaching practice and learning experience. They must be able to integrate new technologies and use devices appropriately and effectively. This requires distinctly different skills and competencies to function effectively in the classroom and respond to the demands of the 21st century. The technological skills of teachers are therefore increasingly emphasised. There are several **competency frameworks that describe the required digital skills of educators,** i.e. the knowledge, skills and attitudes educators need to effectively integrate technology into their classrooms and support student learning in a digital environment. Each of these frameworks offers a unique perspective on what educators should know and be able to do to effectively support student learning and development in a digital environment.

While it is widely recognised that digital literacy is critical for educators in the 21st century, there is a lack of shared agreement on what it means for an educator to be digitally literate and what should be included in digital literacy frameworks for educators. **The debate over teachers' digital skills continues as the rapid pace of technological change makes it difficult to keep up with the latest trends. At the same time, other critical dimensions emerge that also need to be taken into account.** In the present work, we examine the impact of two significant challenges that have emerged in recent years on educators' competencies: **Emergency Remote Education (ERE) or Emergency Remote Teaching (ERT) and generative artificial intelligence (generative AI).**

From the beginning of 2020, the COVID-19 pandemic impacted education provision worldwide as educational institutions had to abruptly switch to **Emergency Remote Education** (Ahmed, 2021; Bond, 2021; Chiu & Lapeyrouse, 2021; Dennis, 2021; Donham et al., 2022). The term Emergency Remote Education describes the sudden transition from traditional in-person instruction to online learning due to unforeseen circumstances. ERE during the COVID-19 pandemic has significantly changed the professional roles of teachers, underscoring a deficit in essential digital skills (Sánchez-Cruzado, Santiago Campión, & Sánchez-Compaña, 2021; Li & Yu, 2022) while highlighting the need to strengthen the resilience of education systems (UNESCO & IIEP, 2020). It has proven to be a challenging experience for both teachers and students (Meinck, Fraillon & Strietholt, 2022; OECD, 2021). Although digital education technologies were crucial in the early stages of the pandemic, their forced adoption posed significant challenges and had both benefits and negative consequences (Dhawan, 2020; König, Jäger-Biela, & Glutsch, 2020; Toquero, 2020).

Last year also saw the **rapid rise of generative AI.** In November 2022, OpenAI announced the release of ChatGPT, a generative, pre-trained transformer model capable of generating texts, translating languages, writing various types of creative content, and answering questions in an informative manner. As generative AI chatbots continue to

develop, they are likely to become more sophisticated and useful. This has the potential to revolutionise the way we interact with computers. In education, generative AI is quickly becoming a transformative innovation with far-reaching impacts on pedagogy and teaching practice. It also raises ethical concerns regarding issues such as bias and privacy, originality and plagiarism, etc., highlighting their importance of critical thinking (Lim, Gunasekara, Pallant, Pallant, & Pechenkina , 2023). Teachers need explicit training to understand and use this technology. Educators need to "model responsible use of ChatGPT, prioritise critical thinking, and be clear about expectations" (Cooper, 2003, p. 444). This requires appropriate professional development opportunities to equip educators with the necessary skills and knowledge about the capabilities and uses of Generative AI in education, as well as best practices for incorporating this technology into their teaching practice (Kasneci et al., 2023; Mogavi et al., 2023).

In Section 2 we examine current trends in the use of digital technologies in education and discuss the rising challenges of Emergency Remote Education (ERE) and generative artificial intelligence (generative AI) use in the field. In Section 3 we investigate the emotional challenges of using technology in education, with particular reference to technostress in online education. Subsequently, in Section 4 we critically examine the principal competency frameworks for educators, and we discuss future directions for their improvement.

2. BACKGROUND: CURRENT TRENDS IN THE USE OF DIGITAL TECHNOLOGIES IN EDUCATION

2.1. Shift to Digital: Emergency Remote Education

During the Covid-19 pandemic, emergency distance learning was used to provide a temporary solution for learning. Facing this unprecedented situation, teachers and schools looked for ways to continue teaching during the pandemic to ensure their students could continue learning at home. The aim of ERE was to provide fast, practical and reliable access in times of crisis so that learning can continue, i.e. to create the most flexible, efficient and effective teaching environment for teachers and students in an emergency situation (Dhawan, 2020; Toquero, 2020). Teachers had to switch to online teaching, using various digital tools and resources and implementing new teaching and learning approaches (König et al., 2020). To this end various solutions have been implemented including online learning management systems, educational apps and websites, etc. This sudden transition from traditional face-to-face instruction to online learning has proven to be a challenging experience for both teachers and students (Kim & Asbury, 2020; Reimers, 2021). There are many factors associated with the challenges of emergency distance learning, such as: technological skills, choice of platforms, internet connections, content knowledge, innovative strategies, pedagogical skills, digital equity etc (Dhawan, 2020; König et al., 2020; Toquero, 2020).

Both teachers and students may experience difficulties with digital educational technologies. Many teachers have not received any training for online teaching (Winter, Costello, O'Brien, & Hickey, 2021). This can make it difficult for them to create and deliver effective lessons. Students may also find it difficult to use technology to learn. This can lead to frustration and reduced engagement. Teachers and students may not have access to the resources they need for online classes, such as laptops, software, or internet access. Students with disabilities may face additional challenges due to the lack of specialised equipment. During distance learning, technical difficulties such as internet disruptions or software

problems may occur, which can disrupt the learning process. As a result, distance learning can lead to increased stress and anxiety among teachers and students.

König et al. (2020) concluded that information and communication technologies (ICT) tools, particularly digital teacher competence and teacher education opportunities to learn digital competence, are instrumental in adapting to online teaching during COVID-19 school closures. Winter et al (2021) stressed that for the successful use of technology by teachers' internal barriers need to be addressed as well, namely attitudes and beliefs, confidence and skills. Overall, the COVID-19 pandemic highlighted the need to **rethink digital skills,** i.e. to develop digital competency frameworks for educators that are more comprehensive, relevant and aligned to the challenges and realities of teaching and learning in a virtual environment. It became clear that the effective integration of digital technologies and innovative pedagogy into education requires a rethinking of the digital competence portfolio of educators. Competences are required for a seamless transition to digital learning scenarios as well as competences and skills to react to psychological effects such as technostress, depression or isolation. In this landscape, **resilience and adaptability** have become pivotal for effective planning and adjustment. A distance learning educator should be equipped to support student learning and growth in a virtual or remote setting. This calls for not only a comprehensive understanding of the technologies and tools required for distance learning but also the pedagogical skills tailored for online and remote learning spaces. These skills include the ability to communicate effectively with students online, manage student behaviour constructively, maintain an organised and effective virtual classroom, and foster a positive and safe learning environment. Above all, educators should possess the ability to create and facilitate engaging, interactive online learning experiences for students.

While scholars like Hodges, Moore, Lockee, Trust, and Bond (2020) draw attention on the differences between ERE during the COVID-19 pandemic and regular online learning, stating that ERE cannot be equated with online learning, since "well-planned online learning experiences are meaningfully different from courses offered online in response to a crisis or disaster", there are valuable lessons to be drawn.

2.2. The Fast Pace of Change: The Advent of Generative AI

As information and communication technologies change rapidly, they disrupt traditional practices, change the scope, methods and tools of teaching and learning in formal education and require people to adapt, considering the potential advantages and disadvantages. The fourth industrial revolution (IR4.0) is characterised by disruptive technologies, processes and practices. The resulting educational paradigm (**Education 4.0**) questions the basic assumptions of traditional education. Education 4.0 is increasingly enabled, supported and guided by technologies such as **artificial intelligence (AI), machine learning (ML), data analytics, mobile technologies, robotics, internet of things, cloud computing, big data analytics,** etc (González-Pérez & Ramírez-Montoya, 2022; Huk, 2021). The fourth industrial revolution is an ongoing process that continues to shape and evolve our world today. Possible future educational paradigms beyond education 4.0 are constantly discussed. Although significant strides have been made in integrating technology into education, there remains a need for comprehensive frameworks that provide guidance and support for educators to adapt their teaching practices to the changing demands of the digital age. Educators are striving to keep up with the rapid pace of change. Therefore, the development and implementation of frameworks to support teachers and schools in preparing for Education 4.0 and Industry 4.0 is an ongoing challenge. New technologies and trends are constantly emerging, making it difficult to create comprehensive and static information.

The recently accelerated pace of technological advances makes it difficult to develop frameworks that can keep up with the evolving landscape. The rise of **generative AI (like ChatGPT)** is fast becoming a transformative innovation with far-reaching implications for pedagogy and classroom practice, also raising ethical concerns around issues such as bias and privacy, originality, and plagiarism, etc and underscoring the importance of critical thinking (Lim et al., 2023). The discussion about how generative AI tools can fit into current research and teaching pedagogy has already started but has not yet found clear answers. As a result, reactions are mixed. Some educators consider it a progressive move that can help increase students' self-efficacy and motivation to learn, while others sound the alarm stressing that it has the potential to encourage superficial learning, limit analytical skills, and encourage misbehaviour (Grassini, 2023; Kasneci et al., 2023; Mogavi et al., 2023). From this perspective, Rahman and Watanobe (2023) note that it is important to keep the limitations of generative AI in mind when using it and not to rely on it blindly. Cooper (2023, p. 444) stresses that educators need to "model responsible use of ChatGPT, prioritise critical thinking, and be clear about expectations". Teachers need explicit training to understand and use this technology. This requires appropriate professional development opportunities to equip educators with the necessary skills and knowledge about the capabilities and uses of Generative AI in education, as well as best practices for incorporating this technology into their teaching practice (Kasneci et al., 2023; Mogavi et al., 2023).

As technologies advance, it is expected that they will continue to transform the learning tools that teachers have used in the past decades. Teachers will need explicit training on how to understand and use these new emerging technologies in their future classrooms. A **continuous rethinking of digital competency frameworks** is needed to help educators effectively adapt their practices to the evolving landscape and its needs. However, it is not enough to simply revise competences from a technical/operational perspective. Rapid technological advances can also be a source of anxiety **and stress** for teachers who feel overwhelmed by the pace of change. Generative technologies in particular are constantly evolving, and it can be difficult for teachers to keep up with the latest trends. This can leave them feeling insecure and less confident in their ability to use these technologies effectively.

The following section explores the emotional challenges of using technology in education, with particular reference to technostress in online education.

3. THE EMOTIONAL CHALLENGES OF USING DIGITAL TECHNOLOGIES IN EDUCATION

The use of digital technologies in education presents teachers with significant emotional challenges. Digital learning technologies can be a double-edged sword for teachers. On the one hand, they can be a powerful tool to improve learning and make it more engaging and personalised. On the other hand, they can also be a source of stress and anxiety.

3.1. Technostress

Originally, Brod defined technostress as 'a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner'' (Brod, 1984, p. 16). Since then, the term has been widely used and studied in various fields, including school education and, more recently, distance learning.

Today, technostress is often understood more broadly as "stress "caused by individuals' attempts and struggles to deal with constantly evolving ICTs and the changing physical, social, and cognitive requirements related to their use" (Tarafdar, Tu, Ragu-Nathan,

& Ragu-Nathan, 2007, p.304). The effects of technostress can be very diverse, depending on the situation and the individual. Mäkikangas et al (2017) noted that stress can be physical or mental for an individual. Technostress can have different causes, strains, inhibitors, and impacts (Nisafani, Kiely, & Mahony, 2020). Salo, Pirkkalainen, and Koskelainen (2019) analysed it in terms of stressors (technostress sources) and strains (technostress results or consequences). Stressors can include factors such as information overload, constant interruptions, difficulty using new technology, and fear of technology obsolescence. Strains can include physical symptoms (such as headaches or eye strain), emotional symptoms (such as anxiety or frustration), and behavioural symptoms (such as decreased job performance or increased absenteeism). Technostress can arise from various sources, such as difficulty adapting to new digital platforms and tools, information overload, technical problems, and feelings of isolation. It can lead to decreased motivation, burnout, and negative impacts on mental and emotional well-being, and can have a negative impact on learning outcomes and performance.

In their study of the "dark side of technologies", Salanova, Llorens, and Cifre (2013) investigated two psychological experiences of technostress associated with the use of information and communication technologies (ICT), i.e., techno-strain (Users report feelings of anxiety, fatigue, scepticism, and beliefs about ineffectiveness associated with technology use) and techno-addiction (users feel bad due to excessive and compulsive use of these technologies).

Technology has become an increasingly important part of teaching at all levels of education. Joo, Lim, and Kim (2016) found that lack of training, inadequate infrastructure, and lack of support from technology specialists can cause anxiety and tension among teachers, which can lead to psychological and physical stress related to technology use. Technostress can influence their intentions to use technology and have a negative impact on the active adoption of new technologies. Over the past few decades, much effort has been devoted to combating the various adverse effects of technology. Positive computing has emerged for building digital environments that can make us happier and healthier, not just more productive. It "comprises concepts, processes and systems which contribute towards the quality of life and well-being of users" (Pawlowski et al, 2015, p. 406). Opposite to problem-focused psychology, positive psychology has been promoted as a scientific approach to studying "what makes life most worth living" focusing on strengths instead of weaknesses, and on building the good in life instead of repairing the worst (Peterson, 2008). Similarly, positive education is pursued as 'education for both traditional skills and happiness'. (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009, p.293). Efforts also include the design and development of technologies to "support well-being and human potential" (Calvo & Peters, 2014).

3.2. Technostress in Online Education

Technostress in online education refers to the negative impact of technology use on a teacher's or student's well-being, including physical and mental health, work-life balance, and overall quality of life. This can lead to decreased motivation, burnout, and negative impacts on mental and emotional well-being, and negatively impact learning outcomes and performance. Increased dependence and exposure to the use of technology for distance education can jeopardise the **well-being of individuals** as the boundaries of school and personal life are harder to maintain and negatively associated outcomes and side-effects of technology use may arise, such as **stress from technology use** (Tarafdar et al. 2007). Students often experience difficulty adapting to new digital platforms and tools that can hamper student learning and increase stress levels (Fuchs, 2021; Chiu & Lapeyrouse, 2021; Mu, Florek-Paszkowska, & Pereyra-Rojas, 2022; Yang, Liu, Li, & Li, 2022). The balance between online classes and other tasks and distractions can lead to time management issues

and stress. Students can experience information overload and stress from managing and processing large amounts of digital information. Online education can limit face-to-face interaction and lead to feelings of isolation and stress. Technostress can lead to decreased motivation, burnout, and a negative impact on mental and emotional well-being. Technical problems and disruptions can disrupt learning and cause stress. Similarly, **technostress can affect teachers** in several ways (Mokh et al., 2021; Nang, Maat, & Mahmud, 2022; Siddiqui, Arif., & Hinduja, 2023). Integrating technology into the classroom and using up-to-date digital tools can increase their workload and stress levels. Technical problems can lead to frustration and stress. Additionally, teachers can feel overwhelmed when transitioning to new digital tools and platforms. The balance between technology-enhanced teaching and traditional teaching methods and administrative tasks can lead to time constraints and stress. Technostress can lead to burnout, reduced job satisfaction and reduced motivation (Aktan & Toraman, 2022). Technostress can negatively impact teachers' mental and emotional well-being, leading to anxiety and depression (Estrada-Muñoz, Castillo, Vega-Muñoz, & Boada-Grau, 2020). Technostress influences the intention to use technologies. Gabbiadini, Paganin, and Simbula (2023) examined the role of technostress in the intention to use digital technologies for distance learning and concluded that technostress is a crucial variable in determining the use of distance learning technologies. They also found that organisational support can act as a protective factor against stress caused by the use of technology in organisational environments. Khlaif et al. (2023) model of techno-stressors among academics was found to include: schedule overload, complexity, uncertainty, uselessness, invasion, and compulsion.

Overall, Technostress **can arise from a variety of sources,** such as difficulty adapting to new digital platforms and tools, information overload, technical problems and feelings of isolation. As new digital tools and platforms are introduced, teachers may need to learn new skills and ways of working. This can create stress, especially when the technology is complex or not user-friendly. Furthermore, with so much digital information available, identifying what is important can be difficult. This can leave teachers and students feeling overwhelmed and stressed. Technical issues such as system crashes, slow internet connections or device malfunctions can be frustrating and stressful as well. In addition, the extended use of technology in communication can lead to feelings of isolation and disconnection from others, especially when face-to-face interactions are reduced. The main **technology stressors** (Donham et al., 2022; Aktan & Toraman, 2022) associated with the use of technology in online education include: technical difficulties (e.g. poor internet connection, hardware failure), time management and workload, difficulty in adapting to new digital platforms, lack of human interaction and social support, distractions and lack of concentration, information overload, difficulty in staying organised and motivated, feeling isolated and disconnected from classmates and trainers etc. Overall, technology stressors can be roughly divided into four main categories:

- **Technical challenges**: Difficulties with hardware, software, or internet connectivity.
- **Learning Challenges**: Adapting to new digital platforms, information overload and difficulty staying organised and motivated.
- **Social Challenges:** Lack of human interaction, social support and feelings of isolation.
- **Time Management Challenges**: Heavy workloads, difficulty balancing multiple responsibilities, and distractions.

The POSITIVE LEARN (POSITIVE LEARN, 2023) investigation into technostress situations in distance learning classes identified three core themes and relevant mitigation strategies, namely technostress related to:

- **Technology use and network connections,** such as power cuts, empty batteries, scarcity of devices, hybrid learning situations etc.
- **Access to learning materials/educational content**, such as digital content being either too basic and unmotivating, or very disruptive, teachers' perceived lack of control over the digital content that students watch in classroom etc.
- **Professional development of teachers' mechanisms,** including their lack of technical skills, lack of motivation to use technology, the poor pedagogical support for teaching with technology during teacher education etc.

This implies that **the support teachers need** to better deal with technostress spans several areas, ranging from professional development opportunities to technical, peer and administrative support, and access to mental health resources (Whalen, 2020; Dennis, 2021; Daneshmand, Harris, & Viviani, 2022). Access to training and professional development programs can help teachers develop the competencies they need to effectively integrate technology into their classroom. Availability of technical support staff can help resolve technical issues and provide assistance with digital tools and platforms. Opportunities to collaborate with colleagues will allow teachers to exchange ideas, experiences and strategies for coping with technostress (learn from others' experiences and knowledge, solve problems related to technology use, receive social support). Support from school administration is needed in terms of providing adequate resources, reducing workload and recognizing the importance of managing technostress. To this end, the availability of mental health resources, training and support for teachers struggling with technostress is critical. In addition, teachers need a combination of **technical, pedagogical, and social and emotional competences** to better deal with technostress.

3.3. Generative AI Technology in Education and Technostress

According to Kasneci et al. (2023), the use of large language models such as ChatGPT in education has been identified as a potential area of interest as they offer a diverse range of applications that have the potential to revolutionise teaching and support teaching processes. However, the adoption of Generative AI technology in education can introduce various challenges for users, which can hinder the integration of AI tools into teaching practices. The introduction of generative AI technology in education can pose various challenges for users that can hinder the integration of AI tools into teaching practice. The technology stressors associated with the use of generative AI technology in education for teachers can be divided into four main categories.:

- **Technical challenges**, including issues such as software reliability, compatibility issues, and availability of technical support.
- **Pedagogical and classroom challenges,** relating to concerns about the quality and relevance of AI-generated content, the potential loss of teacher control over materials, student engagement, and the need for teachers to adapt their teaching methods.
- **Privacy and ethical challenges,** including concerns about data protection, ethical content creation, and intellectual property rights as teachers use AI for classroom materials.
- **Professional development challenges,** including access to training and support, limitations, and time management issues, all of which impact teachers' ability to effectively use generative AI technology in education.

4. DIGITAL COMPETENCES FOR EDUCATORS

Table 1.
Digital competence frameworks for educators.

Name	Author	Focus Areas	Scope
Digital Competence Framework for Citizens (DigComp)	Vuorikari Rina, Kluzer & Punie (2022)	The DigComp framework identifies the key components of digital competence in 5 areas: Information and data literacy, Communication and collaboration, Digital content creation, Safety, Problem solving.	DigComp aims to be an enabling, descriptive, and non-prescriptive reference framework for digital competence.
European Framework for the Digital Competence of Educators (DigCompEdu)	Punie (editor), Redecker (2017)	The "DigCompEdu" framework provides a reference framework for the digital competence of educators, focusing on twenty-two competences organised into six areas: Professional engagement, Digital resources, Teaching and learning, Assessment, Empowering learners, and Facilitating learners' digital competence.	DigCompEdu is aimed at educators at all levels of education, from early childhood to higher and adult education, including education and training, special education, and non-formal learning contexts.
UNESCO ICT Competency Framework for Teachers (ICT-CFT)	UNESCO (2018)	The UNESCO ICT-CFT addresses all aspects of a teacher's work: Understanding ICT in education, Curriculum and assessment, Pedagogy, ICT, Organisation and administration, and Teacher professional learning. The Framework identifies three successive stages of a teacher's development: Technology Literacy, Knowledge Deepening, and Knowledge Creation.	The aim of the UNESCO ICT-CFT is to inform education policy makers, teacher trainers, professional learning providers and working teachers about the role of ICT in education reform.
Technological Pedagogical Content Knowledge (TPACK)	Schmidt et al. (2009)	The TPACK framework identifies three primary forms of knowledge that need to be integrated to effectively teach specific content using technology: Content Knowledge (CK), Pedagogical Knowledge (PK) and Technological Knowledge (TK).	TRACK describes the knowledge and skills required for effective technology integration in teaching. Other important relationships between knowledge forms include: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK).
The Norvegian Professional Digital Competence Framework for Teachers	Kelentrić et al. (2017)	The Norwegian Professional Digital Competence Framework for teachers describes seven key competence areas of: subjects and basic skills, school in society, ethics, pedagogy and subject didactics, leadership of learning processes, interaction and communication as well as change and development.	Each of the seven competence areas describes the knowledge, skills and competence to meet the requirements of each competence area and/or to action plan how to reach the described requirements.
The International Society for Technology in Education (ISTE) Standards for educators	Crompton (2017)	The ISTE framework for educators includes seven competencies – profiles of the teacher as Learner, as Leader, as Citizen, as Collaborator, as Designer, as Facilitator and as Analyst.	The educator section of the ISTE Standards provides a road map to helping students become empowered learners. Digital skills are implicit in every profile/role.
Educators' digital competence framework (EDC)	Siina, C. (2022)	The EDC framework identifies twenty competencies organised into four sections: Knowledge development, Knowledge application, Knowledge sharing, Knowledge communication.	The EDC framework focuses on 'mobilising digital technology for improving inclusive and quality education for all children, with an explicit focus on the most vulnerable'.

The European Parliament and Council (2018) identified digital competence as one of the key competences that every person needs for "**personal fulfilment and development, employability, social inclusion, sustainable lifestyle, successful life in peaceful societies, health-conscious life management and active citizenship**". Digital competence involves "the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society". It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking".

In recent decades numerous **competence frameworks** have been proposed, outlining teachers' required digital competences. The underlying common goal of all digital competency frameworks is to improve the quality of teaching of teachers in the digital age, i.e. to meet the demands of the digital age. Table 1 provides an overview of the most pronounced frameworks.

These frameworks provide an understanding of what it means to be **digitally competent** as an educator from different perspectives. It is widely recognised that digital literacy requires more than just technical knowledge and encompasses a wide range of interrelated skills and attitudes. Digital competence frameworks consider **multiple dimensions of digital competences**, including technical skills, pedagogical knowledge, critical thinking, information literacy, digital citizenship and collaboration. In addition, they typically organise competencies into different areas, such as e.g. digital literacy, digital communication, digital content creation, digital collaboration, digital assessment, etc. The variety of facets examined illustrates the complexity of the task. As technology plays an increasingly important role in education, educators must not only be able to leverage technology, but also effectively integrate new tools and applications into the classroom to teach 21st century skills. The **pedagogical autonomy of educators in the use of technology** is essential. Teachers must understand and master the pedagogical use of digital technologies as well as their potential and limitations.

To support the effective adoption of ever-changing digital technologies and innovative pedagogies in education, a rethinking of educators' digital skills portfolio is required. The COVID-19 pandemic demonstrated that ensuring learning continuity goes beyond the mere adoption of distance learning modalities. Teachers should be able to use new technologies effectively, adapt to changing conditions and address potential learning challenges. The lack of awareness, capacity and professional skills in teachers for the design and implementation of positive distance learning interventions represents a significant barrier, yet a comprehensive approach to training for **eLearning positivity** is lacking. To increase the preparedness and capabilities to avert such negative aspects of learning, new capabilities must be created. Against this background, the aspects of positive psychology/positive computing as a means for teachers to create positive views, emotions and atmospheres in times of crisis prove to be a necessary skill to address psychological/emotional aspects of distance learning. Nevertheless, the "positification" of distance learning in school education is often overlooked (POSITIVE LEARN, 2023). Educators' lack of awareness, capacity and professional skills to design and implement positive e-learning interventions represents a significant barrier, but a comprehensive approach to teaching e-learning positivity is lacking.

Against this background, **social and emotional competencies,** which have already been studied in other contexts, are increasingly seen as crucial in helping teachers and students cope with technostress in digital learning environments. Socioemotional competencies encompass a range of skills and abilities related to understanding, managing, and effectively interacting with one's own emotions and the emotions of others in social contexts.

Mindfulness-based approaches have long since found their way into the medical and psychotherapeutic fields. Introducing **mindfulness** into education aims to improve well-being, mental health, social and emotional skills, resilience, prosocial behaviour, and academic performance (Sheinman & Russo-Netzer, 2021).

Emotional intelligence (EI) has been shown to be crucial in organisational contexts and beyond (Capgemini, 2019). Emotional intelligence is described as "the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Salovey & Mayer, 1990). There are five key elements to EI: self-awareness, self-regulation, motivation, empathy, and social skills.

In the area of digital wellbeing, **emotional e-competencies** refer to an individual's ability to effectively manage and control their emotions in the digital or online environment (Salinas, De Escoriaza, & Hernández, 2022). Emotional e-competencies encompass a set of skills and qualities that enable individuals to navigate digital spaces in an emotionally intelligent and healthy manner. Salinas et al. (2022) developed a renewed model of socioemotional competencies comprising five main components: emotional e-awareness, emotional e-regulation, e-self-control of impulsiveness, emotional e-independence and social e-competency.

Audrin & Audrin (2023) studied the integration of digital competence and emotional intelligence in a digital environment. They developed a conceptual model for **digital emotional intelligence** (dEI), which builds on both trait emotional intelligence (TEI) and ability emotional intelligence (AEI) and associates them with the knowledge, skills, and attitudes of digital competence.

Against this background, emotional e-competences can be seen as essential for digital learning as they form the basis for effective engagement, collaboration and well-being in the virtual classroom. These competencies enable learners to meet the challenges of online education with resilience, adaptability and positive social interactions. Emotional e-competencies are just as important for teachers in digital learning. As educators navigate the challenges and opportunities of online teaching, these skills will enable them to create a supportive and engaging virtual classroom environment. Teachers with strong emotional e-competencies can better understand and connect with their students, respond to their emotional needs, and build trust and relationships, which is especially critical in remote environments. Additionally, these competencies empower educators to effectively manage their own emotions, reduce burnout, and improve their ability to adapt to the evolving digital landscape. They can also enable productive communication with students, resolve conflicts and provide constructive feedback, ultimately leading to a more enriching and successful digital learning experience for everyone involved.

5. CONCLUSION

Digital competence frameworks should help educators develop the necessary skills, knowledge, and confidence in effectively utilising technologies in their teaching practices. Overall, teachers need a combination of **technical, pedagogical and social and emotional competencies** to harness the capabilities and better deal with the challenges of educational technologies. The way forward is to **integrate digital competences with emotional e-competencies, towards the development of a holistic framework for positive digital learning**. Existing digital competence frameworks for educators should be expanded to include critical emotional e-competences required to enable teachers to manage digital

learning spaces in emotionally intelligent and healthy ways, while also responding to the emotional needs of their students.

Furthermore, teacher competency frameworks need to be viewed as dynamic to ensure that educators are well prepared to meet the changing needs of students, adapt to evolving educational practices, and remain consistent with the broader goals and priorities of education systems. Therefore, regular review and revision of these frameworks is essential. In line with the constant revision of competency frameworks, a culture of continuous learning for teachers needs to be created. This means giving them regular opportunities to find out about new technologies and their use in lessons.

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