



A3LEARNING COMPETENCE MODEL FOR TEACHERS AND EDUCATORS

Project number: 2022-1-CZ01-KA220-SCH-000089368

Project title: Learning Anywhere, Anytime, from Anyone

Project no: 2022-1-CZ01-KA220-SCH-000089368

Document information

Circulation: Public

Authors (Organizations): INOVA+ - INNOVATION SERVICES, SA

Main author(s):

Daniel Pina (INOVA+)

Francisca Cardoso (INOVA+)

Final version: 23/08/2023

Consortium:

- EPMA, Czech Republic (Coordinator)
- INOVA+ - INNOVATION SERVICES, SA, Portugal (partner)
- Bulgarian Development Agency, Bulgaria (partner)
- Deep Blue, Italy (partner)
- Consorzio Ro.Ma, Italy (partner)

Version No.	Date	Description
1	04/08/2023	Draft version
2	07/08/2023	Draft version
3	23/08/2023	Final version

Contents

SECTION A THEORETICALLY FRAMING	4
Introduction	5
Unveiling the A3Learning Journey	6
Revealing the Project's Achievements	7
The DigCompEdu Odyssey: Embarking on a Digital Competence Journey	9
Embracing Key Concepts	11
Blended Learning Methodology	11
Learning Community	12
Digital Literacy	13
SECTION B ENHANCING DIGITAL COMPETENCES	15
Paradigm shift	16
Digitally empowering schools and teachers	18
Reports of findings	20
Czech Republic (CZ)	20
Portugal (PT)	28
Bulgaria (BG)	30
Italy (IT)	32
Educators' pedagogic areas	37
1) Creating and modifying digital resources	37
2) Differentiation and personalisation	41
3) Teaching	45
4) Self-regulated learning	49
5) Analysing evidence	53
6) Feedback and planning	57
Pedagogic tools and what competencies they support	61
SECTION C FINAL CONSIDERATIONS	63
Conclusions	64
Glossary:	65
References	67

SECTION A

THEORETICALLY FRAMING

Introduction

Welcome to this comprehensive document, developed within the framework of the Erasmus+ A3Learning project, dedicated to enhancing digital competences in education. The project collaborates with educators, policymakers, and stakeholders from various countries, aiming to equip educational institutions with the necessary tools and knowledge to effectively embrace the digital age. The information presented here envisions a future where digital competences play a central role in educational settings. Covering a wide array of topics, from theoretical frameworks to practical applications, the document supports educators and learners in their digital journey. The DigCompEdu framework serves as a reference, responding to the growing recognition among many European member states that educators need a set of profession-specific digital competences to harness the power of digital technology and improve and innovate education.

This document serves as a comprehensive guide for educators seeking to enhance their digital teaching skills, administrators aspiring to seamlessly integrate technology into schools, or researchers interested in investigating the impact of digital competences. The sections can be explored sequentially or accessed directly based on specific interests.

The first section provides a theoretical framework, introducing relevant concepts such as blended learning methodologies, learning communities, and digital literacy. It explores the objectives and background of the Erasmus+ A3Learning project, shedding light on collaborative efforts to promote digital literacy in education, and highlights remarkable outcomes and achievements that reflect the positive impact on educators and learners across participating countries. The DigCompEdu Framework, a pivotal reference, unveils the conceptual outline underpinning the project, unravelling the key pillars driving the enhancement of digital competences in educational institutions.

In the second section, insights into the world of digital competences and their significance at the core of the Erasmus+ A3Learning project are presented. This includes exploration of the transformative potential of digital competences in reshaping educational practices, ushering in a new era of learning, and how the project empowers educators and schools to embrace digital tools effectively, fostering engaging and personalized learning experiences.

The section also includes reports of findings, delving into specific country-level insights, examining the impact of digital competences in Czech Republic (CZ), Portugal (PT), Bulgaria (BG), and Italy (IT). These findings lay the foundation for the subsequent exploration of competence areas in the document, revealing an array of pedagogic tools and the specific digital competences they support, enabling educators to make informed decisions in their teaching practices.

The final section offers concluding remarks that summarize key insights derived from the Erasmus+ A3Learning project, emphasizing the pivotal role of digital competences in shaping modern education. Additionally, a concise glossary of terms related to digital competences facilitates a deeper understanding of the concepts discussed in the document.

This document serves as an invaluable resource for enhancing digital competences in education, contributing to the progress and success of the educational landscape in the digital era.

Unveiling the A3Learning Journey

The A3 Learning project, titled "Learning Anywhere, Anytime, from Anyone," represents a KA2 project within cooperation partnerships in the school education field under the Erasmus+ program. It aims to support teachers, school administrators, and other teaching professions in developing critical competencies for digital transformation through digital readiness, resilience, and capacity development linked with demands within a blended learning strategy.

The project addresses the gap between students' demands, learning attitudes, and traditional methodologies employed in European schools by employing a blended learning methodology applicable to every school discipline. By combining face-to-face and technology moderated learning approaches, it ensures adaptation to all areas of education, promoting an innovative blended approach that covers both technical and digital abilities. The study focuses on developing a highly adaptable learning model and fostering essential abilities such as problem-solving, creative thinking, teamwork, self-managed teams, responsibility, and communication. This approach equips target groups to transfer information effectively and teach using digital tools and online platforms, updating competencies, creating a Learning Community, and adopting appropriate tools and methodologies. Ultimately, the project aims to align national school practices to an EU level while fulfilling the requirements of both students and teachers.

Summarizing, remote learning presents several benefits, including the flexibility to study from anywhere, at any time, and with anyone. Learners can choose when, how, and what to study, fostering a multicultural environment. The blend of remote and face-to-face learning methods helps students stay connected with one another, reducing obstacles and distances.

A3 Learning aims to:

- Develop tools, techniques, and innovative didactical approaches to facilitate blended learning in secondary schools across Europe, with a special emphasis on the incorporation of approaches that aid in the preservation of social skills.
- Develop new skills for students and teachers to promote self-learning, independence, and three-way communication (teacher-student; student-teacher; student-student), encouraging students to choose their own school subjects, activities, and programs based on this philosophy.
- Encourage communication and interdependence among students, instructors, and families by involving target groups. This is designed to promote knowledge of the concept by reaching out to and involving European stakeholders such as school institutions, leading to the establishment of a wider Learning Community.

To achieve these objectives, concrete results will be produced through the A3Learning project:

Competence Model: Participating schools and project stakeholders will receive this Competence Model that assembles all the necessary abilities for teachers and students to meet project criteria and transform aspects of the school environment. Each skill will be carefully chosen and described, with requirements arising from a thorough needs analysis. Focus group activities involving students and teachers will validate and tailor these competencies to the specific school context.

A3Learning Handbook: This comprehensive handbook will document the project's methodology, techniques, tools, and milestones. It will be shared with participating schools as evidence of the work

done, with the hope that the proposed methodology can be adopted and disseminated throughout the school institutes even after the project concludes.

Online Platform: The A3Learning project intends to establish an online platform as a repository of all activities, reports, the Competence Model, and the A3Learning handbook. This platform will serve to disseminate knowledge of the project's objectives and results to various stakeholders. By leveraging technological platforms in the learning process, the project aims to enhance digital preparedness development. Additionally, the project's support for teachers in developing new professional skills aligns with other prioritized areas.

Key findings from the project include the development of a national and European community of learners, **with a focus on designing training courses that are more integrated, innovative, and customized. These courses bridge the gap between face-to-face and remote learning methodologies, promoting resilience and empowerment.** The pandemic situation has also been transformed into an opportunity to highlight the strengths of both approaches. A3Learning not only facilitates school education updates but also equips organizations and staff with new know-how and a platform that can become an asset for their offerings and partnerships.

One of the fundamental themes underlying this project is **the promotion of free and unrestricted communication between students and teachers.** The shared experience of facing similar learning challenges during the pandemic makes the project's purpose clear: to learn from teachers, students, and families and introduce a blended learning methodology. This approach not only offers the advantage of accessibility to those who must travel for lessons but also keeps pupils engaged and interested in their studies.

In conclusion, the proposed strategy in the A3Learning project aims to empower students and teachers with vital competencies, embrace modern digital tools, and align European school practices, ultimately driving the evolution of a blended learning environment that promotes knowledge exchange and fosters a sense of belonging and community among learners.

Revealing the Project's Achievements

The Competence Model is a result, led by INOVA+ and involving all partners, that is dedicated to developing a benchmark for teachers and educators based on the DigCompEdu Digital Competence Framework for Educators. This framework serves as a general reference frame to support the development of digital competencies among educators at all levels of education. Within the framework, three main areas are defined: educators' professional competencies, educators' pedagogical competencies, and learners' competencies. This specific result focuses on educators' pedagogical competencies, encompassing digital resource acquisition, development, and dissemination; controlling and coordinating the use of digital tools in teaching and learning; employing digital tools and strategies for assessment improvement; and empowering learners through the effective use of digital resources.

This Competence Model for Teachers and Educators enables teachers and educators to enhance their ability to employ new learning techniques, particularly for "Blended Learning" approaches, in their everyday classes. **This model will form the foundation for the development of teacher/educator training materials and resources, benefiting subsequent results (the A3Learning Handbook and the online platform).** The key objectives under this outcome are as follows:

- Identify the DigCompEdu pedagogical competencies required for teacher/educator use and adoption of new learning approaches for Blended Learning.
- Involve end-user representatives in co-design sessions to gather valuable insights.
- Develop the A3Learning Competence Model for Teachers and Educators, encompassing the selected knowledge, skills, and attitudes for teachers' pedagogical abilities based on DigCompEdu.

More specifically, this outcome has 3 steps for a good performance:

- 1- Mapping analysis:** the team conducted a survey aimed at assessing teachers' and educators' pedagogical competences in using innovative blended learning teaching methodologies, all based on the DigCompEdu framework. Additionally, an exhaustive review was conducted, focusing on the competences encompassed within the key area of Educators Pedagogical Competencies within the Digital Competence Framework for Educators. A concise report was compiled, presenting the findings of the survey and mapping analysis.
- 2- Co-design sessions:** organised and conducted with teachers and school directors, leading to several notable outcomes. The team established guidelines for the co-design sessions, ensuring their effectiveness and relevance. A total of 8 co-design sessions were held, each involving 10-12 participants, including teachers and school leaders, with two sessions taking place in each country. A short report was prepared at the end, to highlight valuable insights and findings, derived from the collaborative efforts of teachers and school directors.
- 3- Competence model:** the team successfully outlined the A3Learning Competence Model for Teachers and Educators. The model takes the form of a comprehensive matrix that meticulously describes the knowledge, skills, and attitudes considered essential for teachers' and educators' pedagogical skills, all grounded in the DigCompEdu framework. This encompasses various critical areas, such as selecting, creating, using, and managing digital resources for blended learning, as well as effective teaching through digital tools and resources. Moreover, the model addresses assessing learning outcomes and empowering students for effective e-learning through blended learning approaches.

For dissemination purposes, the consortium will effectively utilise the new contacts acquired during the co-design sessions. By employing various communication channels, such as social media, targeted dissemination materials, and events, the project successfully reached key players and target groups in the sector.

The DigCompEdu Odyssey: Embarking on a Digital Competence Journey

The European Framework for the Digital Competence of Educators, known as DigCompEdu, is a comprehensive model developed by the Joint Research Centre (JRC) of the European Commission. Its primary objective is to provide scientific evidence to support the European policy making process.

In response to the constantly evolving demands faced by teachers, there is a need for educators to possess a wider range of advanced competencies. With the widespread use of digital devices, teachers must become digitally competent themselves to effectively assist their pupils in becoming digitally literate. To aid educators in measuring their digital competency, identifying areas of improvement, and providing specialized training, various frameworks, self-assessment tools, and training programs have been developed on national and international levels. Based on an examination and comparison of these instruments, this research proposes a unified European Framework for the Digital Competence of Educators, DigCompEdu.

DigCompEdu offers a solid scientific foundation that supports policymaking and can be easily adapted to support the implementation of tools and training initiatives at local, state, and federal levels. Moreover, it provides a common vocabulary and methodology that fosters cross-border communication and sharing of best practices.

The target audience for the DigCompEdu framework includes educators in diverse educational settings, ranging from early childhood education to higher education, adult education, general and vocational education, special needs education, and non-formal learning situations. The framework aims to a broad reference for creating Digital Competence models by Member States, regional administrations, national and regional organizations, educational institutions, and professional training providers, both public and private.

The framework seeks to advance digital competency among educators in Europe, supporting Member States in their initiatives to promote citizens' digital competency and foster innovation in education. It serves as a shared reference point, offering a common language and logic to support national, regional, and local efforts in developing educators' digital competence.

The DigCompEdu Framework proposes 22 elementary competences categorized into six areas. These areas capture and define digital competences specific to educators. Area 1 focuses on educators' use of digital technology in professional interactions, including colleagues, learners, parents, and other stakeholders, for individual professional development and the collective benefit of the organization. Area 2 addresses the competences required for the effective and responsible use, development, and sharing of digital resources in learning. Area 3 revolves around the management and coordination of digital technology in teaching and learning processes. Area 4 pertains to the use of digital strategies to enhance assessment. Area 5 emphasizes digital technologies' potential in learner-centered teaching and learning practices. Lastly, area 6 encompasses the unique pedagogical skills needed to promote students' digital competency.

The DigCompEdu approach is designed to complement, rather than undermine, national, regional, or local efforts in assessing educators' digital competency. The diversity of approaches in different Member States is appreciated, as it contributes to a valuable and ongoing discourse. The framework aims to create a common ground for this discourse, utilizing a similar language and logic as a starting

point for designing, comparing, and discussing various tools to enhance educators' digital competence at different levels.

Consequently, the DigCompEdu framework adds value by offering a solid foundation for guiding policy decisions, enabling local stakeholders to design tailored instruments based on their needs, facilitating cross-border dialogue, and providing a point of reference for Member States and stakeholders to validate the comprehensiveness and methodology of their present and future tools and frameworks.

The development of the DigCompEdu framework involved consultations with experts and practitioners, starting with a review of existing literature and the synthesis of instruments at local, national, European, and worldwide levels. Through a series of talks and deliberations, a consensus was developed on the primary areas and elements of educators' digital competence, as well as the logic of digital competence growth in each field.

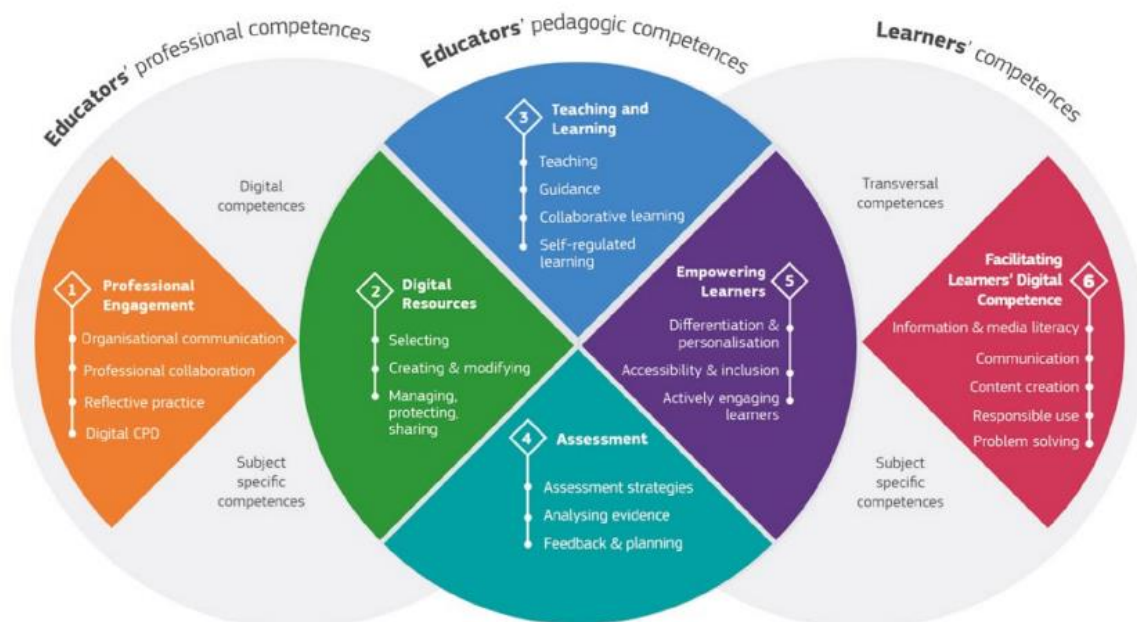


Figure 1 - Synthesis of the DigCompEdu Framework

Embracing Key Concepts

This chapter contains certain theoretical notions that are considered fundamental to the topic that this paper tackles. It begins with a brief introduction of the Blended Learning Methodology concept, which is the foundation of the entire A3Learning project. This is followed by the theoretical notion of Learning Community, which emphasises the importance of forming a community so that inclusion and equity can be achieved more effectively, and learning can be done in a collaborative manner, which is also more successful. Finally, the theoretical notion of Digital Literacy is addressed, as this is the most logical way for implementing the blended learning methodology.

Blended Learning Methodology

Blended learning is a powerful educational model that combines face-to-face instruction with technology-mediated learning methods. It encompasses a wide range of modalities and pedagogical approaches to achieve an optimal learning outcome. The concept of blended learning has evolved over time, encompassing various instructional technologies, theories, and delivery mediums, making it a versatile and adaptable approach to education. In this paper, we will delve into the key components and significance of blended learning, as well as its potential benefits and challenges (Bersin 2004; Cronje, 2020).

The term "blended learning" was coined in a press release by EPIC Learning in 1999, and since then, its definition has been a subject of ambiguity. However, it is essential to recognize that any learning system or combination of approaches that includes multiple instructional methods and delivery mediums falls under the umbrella of blended learning (Cronje, 2020).

As defined by Marcy Driscoll, blended learning involves blending or mixing web-based technology modalities to achieve educational goals. This includes live virtual classrooms, self-paced teaching, collaborative learning, streaming video, audio, and text. Moreover, it combines different pedagogical methods, such as constructivism, behaviourism, and cognitivism, to foster an ideal learning outcome. The integration of instructional technology with in-person instructor-led training further enriches the learning experience (Cronje, 2020).

Driscoll's emphasis on combining various pedagogical approaches to optimize learning outcomes, regardless of the presence of instructional technology, highlights the need for a broader theoretical framework for understanding blended learning. Thus, a more encompassing definition of blended learning is suggested: "The effective application of a variety of theories, methodologies, and technology to optimize learning in a specific situation" (Cronje, 2020).

The significance of blended learning lies in its potential to bridge the gap between traditional face-to-face instruction and modern e-learning methods. The vast array of tools, technologies, and techniques available in the educational landscape can be overwhelming for training professionals. Blended learning offers a solution by integrating e-learning and instructor-led methodologies into a cohesive and effective learning program. This approach is crucial for training managers, program managers, executives, and developers seeking to design impactful learning experiences (Cronje, 2020; Bersin 2004).

Blended learning's appeal stems from its ability to preserve traditional forms of learning while incorporating the benefits of technology. It acknowledges the importance of retaining millennia-old pedagogical experiences and human connection in education, even as we embrace the technological advancements of the 21st century. The incorporation of technology into the teaching and learning process helps cultivate essential professional competencies, such as ICT skills, critical thinking, and information processing (Nazarenko, 2015).

The positive effects of technology on facilitating and enhancing the learning process have been widely studied, though further research is needed to draw definitive conclusions. It is evident that young learners, being receptive to new technologies, should be encouraged to utilize them for their education. Understanding what attracts youngsters to technology and leveraging those specific characteristics in educational settings can be a potent tool for educators. However, the success of blended learning relies on skilled teachers who can tailor learning activities to cater to individual student characteristics. Their expertise and inventiveness play a crucial role in motivating students and making the learning experience both challenging and enjoyable. An example could be the implementation of a project-based approach designed to align with the cohort of students' preferences and needs (Nazarenko, 2015).

For blended learning to be truly effective, there must be appropriate academic policies and administrative support to integrate technology as a pillar of efficient learning. With the right guidance, blended learning can empower students to develop essential skills for the modern world and create engaging and dynamic learning experiences.

In conclusion, blended learning methodology represents an optimized approach to education that combines the strengths of face-to-face instruction with technology-mediated learning. Its flexibility and adaptability make it a valuable tool for enhancing learning outcomes across various contexts. As technology continues to evolve, blended learning offers a promising path to meeting the needs of students in the digital age while preserving the best practices of traditional education. Embracing blended learning as a framework for education can pave the way for a more engaging and effective learning experience for students worldwide.

Learning Community

The term "learning community" encompasses various theoretical perspectives, drawing inspiration from diverse contexts, including ecology, economics, and ideology. In ecology, a community refers to all living species within a specific geographical area, comprising multiple habitats and the organisms that inhabit them. Translating this ecological viewpoint into the realm of learning communities sheds light on the learning possibilities available to individuals residing in the same neighbourhood or working for the same company – their respective "habitat." However, this perspective raises concerns about inclusion and exclusion, as access to information (the metaphorical "food" for learning) may not be equally available to all. Economists have noted that knowledge can be shared without depleting one's own reserves, but the scarcity of certain knowledge types may enhance their value. This scarcity can influence power dynamics within organizations and society at large, determining who holds authority in the "food chain" of knowledge dissemination (Eraut, 2002).

Another definition of a learning community takes an ideological stance, extending beyond critiques of unequal distribution of learning opportunities. It advocates for the development of "ideal type" learning communities that prioritize inclusive and interdependent human relationships and democratic values. In this view, learning is seen as an integral component of reciprocal human

interaction, shaped by skills, structures, networks, and cultural factors. This perspective encourages mutual learning across professions and between professionals and their clients or even students. While this may have been perceived as utopian in the past, contemporary health and social care industries are increasingly embracing the value of mutual respect between professionals and their clients (Eraut, 2002).

At its core, the concept of a learning community strives to foster inclusive and reciprocal learning environments, where knowledge and opportunities are accessible to all members. These communities seek to break down barriers and ensure that learning is not confined to specific individuals or groups. Inclusive learning communities promote equal access to information and resources, considering the diverse needs and backgrounds of their members. Reciprocal learning emphasizes the value of mutual exchange, where professionals and beneficiaries alike can learn from each other, contributing to a culture of continuous growth and development. Such communities not only benefit individuals but also enhance the collective knowledge and capabilities of the entire group (Eraut, 2002).

Creating and sustaining effective learning communities requires commitment and effort from all stakeholders involved. It involves cultivating a culture of respect, open communication, and collaboration, where diverse perspectives are welcomed and valued. By promoting learning as a shared endeavour, learning communities can transcend traditional hierarchies and power dynamics, fostering an environment of cohesiveness and support.

In conclusion, learning communities represent a paradigm that seeks to redefine how we approach education and professional development. Drawing inspiration from ecological, economic, and ideological perspectives, learning communities strive to create inclusive and reciprocal learning environments. They challenge us to break down barriers, embrace diversity, and recognize the inherent value in every individual's knowledge and experiences. By fostering a culture of continuous learning and collaboration, learning communities pave the way for personal growth, professional advancement, and the collective progress of society as a whole.

Digital Literacy

Digital literacy is a critical aspect of modern education, enabling individuals to effectively navigate and interact with the digital world. In today's technology-driven society, young people are increasingly exposed to digital devices and technologies both inside and outside the classroom. However, there remains a gap between how technology is used in educational settings and how students utilize it in their daily lives. Many schools restrict the use of personal devices like smartphones, limiting their potential for learning, communication, and enjoyment. This disconnects between students' digital experiences outside of school and their limited use within the classroom underscores the importance of fostering digital literacy (Buckingham, 2020).

Digital literacy encompasses a broad range of skills and opportunities for engaging with digital environments. It involves not only reading and writing in digital spaces but also learning and teaching through the use of digital information and communication technologies (ICT). In the context of distance education and virtual learning environments (VLEs), digital literacy is a necessary condition for effective teaching and learning. Teachers need to develop competencies to design and implement engaging lessons within various digital scenarios, blending in-person and remote teaching effectively (Cardoso & Espírito Santo, 2020).

Furthermore, digital literacy should go beyond simply using technology as a tool and should aim to promote meaningful and sophisticated learning experiences. It involves the ability to gather, analyse, interpret, and communicate information from various digital mediums. This extends beyond computers and emails to include all digital gadgets and technologies used for communication and work. Being digitally literate enables individuals to connect with society more efficiently, as they understand how digital devices work and how to utilize them effectively. The goal is to make learning a seamless and integrated part of everyday life, so much so that it is no longer recognized as a separate activity. To achieve this, teacher education plays a crucial role in developing digital literacy. Instructors must not only be trained in technical aspects but also be encouraged to critically reflect on the role of technology in education. By challenging learners to build a critical understanding of their digital presence in the world, teachers can create transformative educational practices (Cardoso & Espírito Santo, 2020; Cunha 2014).

As teachers are introduced to new technologies, they progress through various stages, starting from exposure to the technology, moving on to its adoption and integration into existing practices, and finally reaching a point where they can invent innovative learning settings using technology. This journey requires changes in habits and customs, adjustments to school curricula, and a deeper exploration of the pedagogical implications of using digital technology in the classroom (Cunha, 2014).

In conclusion, digital literacy is a crucial aspect of modern education, enabling individuals to navigate the digital world with skill and understanding. It encompasses a wide range of competencies, from technical proficiency to critical thinking and pedagogical creativity. Emphasizing digital literacy in education prepares learners to engage meaningfully in a technology-driven society and empowers teachers to design innovative and transformative learning experiences. As technology continues to shape our world, digital literacy will remain an essential life skill for all individuals seeking to thrive in the digital age (Figueira & Dorotea, 2022).

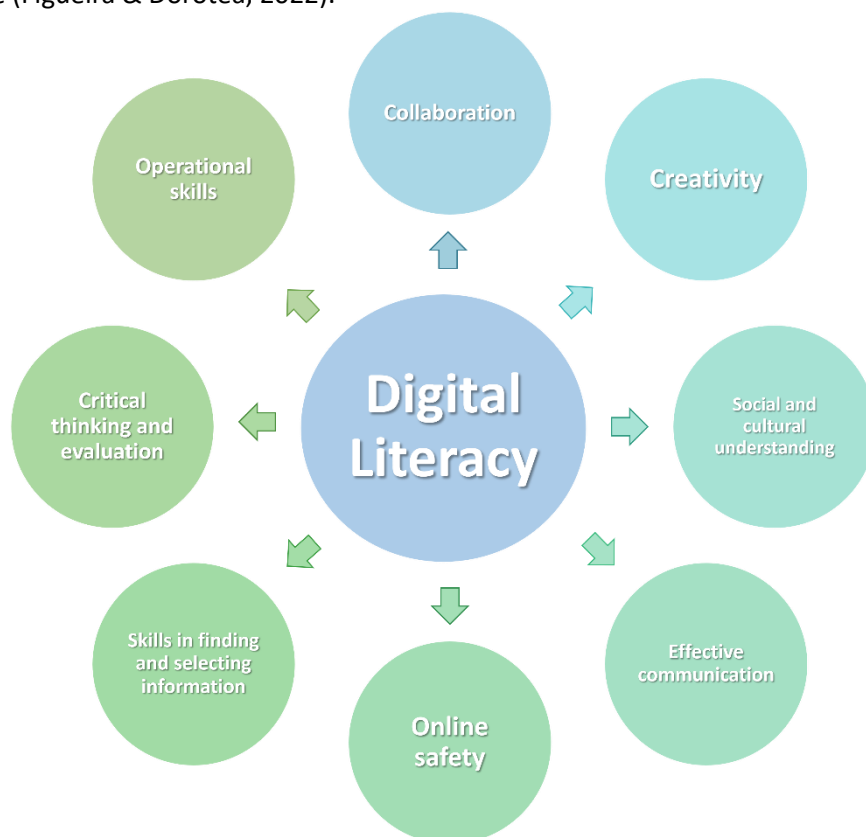


Figure 2 - Skills gained through the incorporation of digital literacy into daily school life.



SECTION B

ENHANCING DIGITAL COMPETENCES

Paradigm shift

The COVID-19 pandemic forced a radical transformation in the field of education, compelling teachers to quickly adapt to blended learning — a combination of traditional face-to-face and online learning. Blended learning offered a hybrid approach that allowed educators to engage their students both in physical classrooms and through virtual platforms. This paradigm shift not only introduced new teaching methodologies but also emphasized the importance of technology integration and personalized learning in the post-pandemic educational landscape.

The Emergence of Virtual Classrooms:

When the pandemic struck, traditional classrooms became inaccessible, pushing teachers to find innovative ways to engage their students remotely. Virtual classrooms, facilitated by video conferencing platforms like Zoom, Google Meet, and Microsoft Teams, emerged as the go-to solution. Blended learning necessitated a comprehensive integration of technology into educational practices. Teachers had to familiarise themselves with these tools, learn to navigate their functionalities, and optimize their use for effective online teaching.

Redefining Pedagogy and Engagement:

With the shift to online learning, traditional teaching methods no longer sufficed. Educators had to rethink their pedagogical approaches to accommodate to the virtual environment. They began creating multimedia presentations, pre-recorded lessons, and interactive quizzes to make lessons engaging and accessible. Furthermore, the digital landscape enabled teachers to incorporate a variety of resources such as educational videos, online simulations, and virtual field trips to enhance their teaching materials.

Personalization and Differentiation:

Blended learning allowed teachers to adopt a more personalized and differentiated approach to instruction. With access to data from online learning platforms, educators could analyze student performance and tailor interventions to address individual learning needs. Personalized learning pathways empowered students to progress at their own pace, ensuring that they mastered the material before moving on to more advanced concepts.

Addressing Equity and Access:

While online learning opened new possibilities, it also highlighted significant equity and connectivity issues. Not all students had access to reliable internet connections or necessary devices, leading to disparities in educational opportunities. Teachers worked to ensure that all students had equitable access to technology and internet connectivity. They employed various strategies, such as providing devices or distributing printed materials, to ensure that no student was left behind. The pandemic underscored the urgency of bridging the digital divide and ensuring equitable access to education.

The paradigm shift to blended learning during the COVID-19 pandemic brought about profound changes in education. Teachers embraced technology, redefined pedagogy, and personalized instruction to suit the hybrid learning environment. Blended learning empowered students to become more independent learners while promoting inclusivity and flexibility. As the world gradually moves beyond the pandemic, the lessons learned from this transformative period will continue to influence and shape the future of education, making blended learning an integral part of the modern educational landscape. The experience of this transformative period will leave a lasting impact on education, influencing future pedagogical approaches and encouraging the integration of technology to enhance the learning experience both in physical and virtual classrooms.

Digitally empowering schools and teachers

"Digitally empowering schools and teachers" refers to the process of integrating technology into education to enhance the learning experience and teaching methodologies. It involves equipping schools with the necessary technological infrastructure, providing teachers with professional development and training in educational technology, and utilizing digital tools and resources to create dynamic and student-centered learning environments.

In digitally empowered schools, technology is used strategically to:

Enhance Classroom Instruction:

Technology is employed to make lessons more interactive, engaging, and visually appealing. Teachers can use multimedia content, interactive whiteboards, educational software, and virtual simulations to illustrate complex concepts and facilitate active learning. For example, a science teacher may use virtual reality simulations to take students on a virtual field trip to explore the solar system, providing a unique and immersive learning experience.

Support Personalized Learning:

Technology enables personalized learning pathways for students. Adaptive learning platforms analyse student performance and provide customized content and activities tailored to individual strengths and weaknesses, allowing students to progress at their own pace. This personalized approach ensures that each student receives the support they need to succeed. For instance, an adaptive math program can offer additional practice in areas where a student is struggling while providing advanced challenges for those who excel.

Facilitate blended Learning:

Schools embrace blended learning models that combine in-person instruction with online learning experiences. Virtual classrooms, online learning platforms, and digital resources allow for flexible and asynchronous learning opportunities. This flexibility enables students to access content and participate in learning activities outside traditional classroom hours. For instance, a language arts teacher might assign online reading materials and discussion forums for students to engage with outside of class.

Promote Collaborative Learning:

Digital tools encourage collaboration among students, facilitating group projects, discussions, and peer interactions. Online collaboration platforms enable teamwork even when students are physically apart. Collaborative learning experiences enhance communication, problem-solving, and teamwork skills, which are essential for success in the 21st-century workforce.

Foster Professional Development:

Schools invest in continuous professional development and training for teachers to be able to use the educational technology. This empowers educators to confidently integrate technology into their teaching practices and adapt to the evolving digital landscape. Workshops, webinars, and coaching sessions ensure that teachers stay updated on the latest digital tools and pedagogical approaches.

Cultivate Critical Skills:

Technology integration equips students with essential digital literacy and computational thinking skills, preparing them for the demands of a technology-driven world. Students learn to navigate digital platforms responsibly, evaluate online information critically, and solve problems using computational thinking principles.

Increase Access to Learning Resources:

Digitally empowered schools provide students with access to diverse learning resources beyond traditional textbooks. Virtual libraries, open educational resources (OER), and online databases enrich the learning experience. This expanded access to resources supports differentiated instruction and serves to varied learning preferences.

Bridge the Digital Divide:

Efforts are made to ensure equitable access to technology for all students, regardless of socioeconomic backgrounds, to bridge the digital divide. Schools may provide devices or internet access to students in need, ensuring that every learner can benefit from digital learning opportunities.

Nurture Innovation:

Digitally empowering schools foster a culture of innovation and experimentation, encouraging teachers and students to explore new tools and approaches to education. Teachers may incorporate emerging technologies, such as artificial intelligence or virtual reality, into their lessons to create engaging and forward-thinking learning experiences.

By embracing technology and empowering teachers with digital skills, digitally empowered schools create dynamic and inclusive learning environments that accommodate to individual learning needs, promote creativity, and prepare students for success in the digital age. As technology continues to evolve, digitally empowering schools and teachers remain essential in providing a future-ready education that equips students with the skills they need to thrive in an increasingly digital world.

Reports of findings

This chapter contains all the findings reports from the co-design sessions held in each of the A3Learning project partnership countries (the Czech Republic, Portugal, Bulgaria, and Italy). They can be found listed below.

They all include the key findings based on the participants' answers, divided by areas, namely, creating and modifying digital recourses, differentiation and personalisation, teaching, self-regulated learning, analysing evidence and feedback and planning. Also, some reflections shared by each partner.

Czech Republic (CZ)

Main details of the co-design sessions

ORGANIZER	The European Projects & Management Agency (EPMA)
DATE AND TIME	21.6., 22.6., 28.6., 19.7., 21.7.
VENUE	On-line (MS TEAMS)
NUMBER OF PARTICIPANTS	10
CHARACTERIZATION OF PARTICIPANTS (experience)	Teachers and mostly ICT coordinators in their schools (experience 3- 20 years) teaching children of the age of 11-16 years of age
FACILITATOR	Zuzana Krejčová
ASSISTANT/S TAKING NOTES	None (MS TEAMS recordings)

Key findings of co-design sessions

TOPIC	KEY FINDINGS BASED ON THE PARTICIPANTS ANSWERS
Content more relevant for each area	
1) Creating and modifying digital recourses	<ul style="list-style-type: none"> • Very often, the teachers pointed out that that for the successful implementation of digital tools, they need relevant equipment. <ul style="list-style-type: none"> ○ Stabile and powerful internet connection is needed, wi-fi access also necessary (sometimes it is problem – costly solution) - ○ Some equipment does not convene with the needs of teachers (limited way of use – e.g., interactive board is fine, I can add there something, but I cannot write there

- anything new...) and students have no chance to add there something.
- Some teachers do not use the full potential of the equipment (due to lack of motivation) (e.g., some teachers use data projector just to present some text or pictures), sometimes the students motivate them to use something new, sometimes the school management puts a pressure on improving their skills - Inner motivation is playing the key role for improving the skills of teachers as well.
 - Taking part in project using 3D printers at school (supported by major CZ 3D printer's manufacturer), "AI for kids" project.
 - Some of them start to work with AI for creation of educational material and involve the colleagues.
 - Equipment – sometimes problem when working with students (even in well situated families) – they have no computer (just tablet or mobile phone) – mostly in families where the parents have no need of computer in professional life – sometimes the teachers need to teach the kids to write on the keyboard.
 - Tools used within this area – they change within the time because sometimes the interface changes, there are new features, but the new app does not support a lot of activities from previous level.
 - Digital educational material (DUMY.cz) – a portal with free access to support archiving and sharing of checked and proven educational material – thank to that there is a collection of digital educational materials (the colleagues learned to work with that and use it
 - Some use interactive white boards+ SMART app
 - interactive textbooks – it decreased with the technical development of the SW to support it, but it is still in huge use by language teachers – the textbooks are supported with the exercise books and working sheets.
 - Different educational subject (maths, chemistry) needs different approach while taking into consideration this topic – different level of use, e.g., in maths – no need to use digital resources for teaching, but rather for exercises (if own created materials, than as a supportive material) – TOO MANY SOURCES, it is very much time consuming and rather tiring.
 - If a digital version of the textbook exists – the exercise is picked, and the teacher can add digitally something to it during its teaching.
 - If creating own digital materials – using editor (in google docs when collaborating on it with other teachers, LibreOffice if working alone – for maths libber office is preferred because of better editor of mathematical characters and equations, for geometry – Inkscape – program for creation or editing of objects supported with the vector graphic - <https://inkscape.org/cs/> - the teacher learned with this program through tutorials, but just the

basics – would like to improve her skills later on, otherwise it takes her too much time. When working with pictures, she uses GIMP (equivalent of photoshop; <https://www.gimp.org/>). Chemistry – discussion, finding information, sharing, and presenting them – sometimes creating study materials, more using some tools (shared google presentation and together with students co-creating the final presentation about metals), Jam board (shared white board – used while discussing, students complement the text with their opinions), Padlet (shared work during the classes)

- Sometimes the kids are tired and overwhelmed when using the tools too often.
- School that implements project-based learning at school, incl. teamworking (alternative private basic school) – if particular projects are being developed by students, collaboration digital tools are widely used; during teamwork, students have ca 20 min to create common presentation on the computer; sometimes – students propose the use of particular tool they find interesting (e.g. Kahoot or presentation in standard presentation tools – for creation of presentation for the class)
- In chemistry – a huge number of educational videos of different quality created – time consuming to search among these resources.
- MS Teams – for sharing something with students.
- One teacher creates digital working sheets for further use by students – found on the internet and modified, or just get inspired.
-
- The level of ICT literacy differs among teachers.
 - Work with word, excel, PowerPoint and collaboration tools, typography (similar to those previously mentioned) – there is still lack of the knowledge on the side of teachers – the teachers do not further develop their skills (although they say that they are able to work with MS OFFICE, they are not able to edit it, format it, most common problem is use of the programs
 - In some schools, the teachers must share documents and materials and colleagues send the feedback on that in the collaborative space (the ICT literate teachers push the less skilled to use such tools and learn to use it)
 - Continuous training is necessary – new teachers from school arrive, they are not so skilled as the colleagues that use certain programs, apps, or equipment.
 - Learning apps training – would be also welcome.
 - Motivation from students is also supporting the teachers in acquiring new skills.
 -
- Overload with the resources – existing many different websites with content – used for inspiration/ modification, but creates her own

2) Differentiation and personalisation

study material – too many resources, it would be great to have list of trustworthy resources for each school subject – she finds the current state chaotic, some kind of filtered information would be very much appreciated (it is too complicated and too many things, some older colleagues are discouraged from using it – they will have to start using it, but they will have difficulties with getting into it)

- The teachers use citation, sometimes they also teach how to work with the recourses, why to cite the resources and works with related websites (also through their presentations)

- Licences – schools have bought several licences to certain programs, then it is clear what to use – the licence is paid, but with the third-party outcomes, sometimes the teachers are not sure, what they can do with it (copying from textbooks was widely used, but it is unclear for them, how to handle third party material)
- Creative commons licence – unknown to few teachers
- The teachers use licence free apps and programs and resources that are free to use/ download or for which the school has a licence.
- Resources – downloaded as a whole – e.g., presentation about cyberbullying – there is a name of different author – but as free to download for schools.
- Sharing materials – some share it, using Google Classroom, MS Teams – just for the students
 - Possible to share drafts of presentations of students – makes work with students easier.
- Shared materials – also with colleagues – collaborative space (MS Teams, Google Drive, or others)
- Some of the teachers had undergone specialised training, but it is some time ago, new teachers depart to schools, so it would be useful to refresh this topic.
- The teachers use just resources that are free available or if they have paid access - in one school, the use of digital resources is going through one teacher that is the point to inform how to work with external sources, about the licence rules etc.
- Mostly, the teachers create or modify recourses just for the purposes of their own lessons, if they share it with their colleagues, they never share the materials outside of school (decision of the school)

- Weak point for some teachers
 - although some of the teachers teach a class with only 18 students (the usual number is 30 students per class), they do not implement it.
 - More difficult to implement – some teachers create materials, there are exercises of basic level, if students finish quickly and/or find the level of subject matter easy, they can have bonus exercises, but the teachers need better system.
- Some teachers must adjust the study material for their students – working with students with mental limitation, with autistic students – the preparation is very demanding and time consuming.

3) Teaching

- Some teachers perceive digital collaboration or working with some digital tools at home also as tools enabling differentiation and personalisation.
 - If students co-create presentation on some topic –thank to a digital tool, more motivated students have better prepared slide compared to others – this can enable more personalised approach to students (they can work on their own pace)
 - some teachers lecture within 90 minutes blocks – they work with text and then students write something on Padlet to it, so they have again their own time and space, also questions are gathered like that, then they are displayed them and discussed with the teacher)
- The teachers were not aware of any application (program) for these purposes.
- Some use different levels of testing
- According to the participants, to learn on students' own pace and time was widely tested during Covid-19 isolation.
 - For some students, it was better approach, they were not disturbed by other students and enjoyed it.
 - Some students deteriorated with their knowledge – they were not able to plan, they missed the routine to go to school where they were able to follow the study more efficiently.
- According to some teachers, the study subject workload is the same for everybody ICT – the students are divided in 2 groups (faster and slower), (each student must go through the same amount of study and through the same topics)
- Creation of differentiated education is very demanding – some teachers use it often, but the preparation of 1 hour takes 4 hours (they manage to prepare such hour once per month) - but if they create such material, they sometimes share it the subject committees.
- Some teachers use online systems, and they upload (e.g., to MOODLE) different levels of exercises – what the students find they are capable of they go for
 - E.g., English – they have 6 groups, but each has their own year plan (very demanding administratively) and it is yearly revised (again, it is very time consuming) – a lot of extra work
- Some schools experimented with division of students into classrooms with higher and lower performance, but it was not effective (in some cases, more problematic groups of students formed), then it was decided to come to a more heterogeneous group again.
- Most of questioned teachers are using digital tools (according to the subject matter and the group of students)
 - Also, for teaching of students with specific limitations
 - problems to find new relevant, effective tools/ websites (the place where to find it) – very much time consuming.

4) Self-regulated learning

- if student is not capable of handwriting, it is allowed to write the notes on the computer.
- new didactical formats – just what was recommended from school – we need to align our classes to the curriculum and to the needs of the students (sometimes contradictory)
- some equipment does not cover the needs of teachers.
- Technical equipment – many examples of the it was named - interactive whiteboards, tablets, computers, ICT classrooms, ICT centre, programmable building set, Lego, 3D printers, programmable robots, data projectors, own notebooks, mobile classrooms.
- The teachers need skills to be able to work with the equipment to support the classes – some work with it all the time, some still refuse to use it.
 - Some not so skilled teachers try to work with it but sometimes they get discouraged when the wi-fi of connection fails and they were working hard on preparation.
- Motivation of teachers in progressing in this area - there is no compulsory education of the teachers after finishing the university preparation, it is mostly on the management if they want to motivate the teachers to improve their qualification.
- Motivation and education of teachers - National Pedagogical Institute`s trainings, training provided from the region.
 - Sometimes they have problems to send enough teachers to training, because they do not have enough staff to substitute them at school.
 - E-learning – is also used widely (easier from financial perspective, accessibility), if the teacher is away from the school for a longer period of time, it is a problem for the school.
 - E-learning – also economically preferred
 - Reviews on the e-learning course needed from the users – the teachers do not want to spend a long time on the course that is not beneficial.
- Some schools do not use it, some do, for:
 - Self-evaluation + evaluation of the classes – just in paper in the scale 1-10 – how they felt about it and how they understood the subject matter.
 - Used not for planning, but for monitoring - the students are evaluated verbally, they have edookit.com, where the students can find the evaluation - Mostly the students are not using feedback.
 - Some teachers use it only at the end of the school year – to gather feedback on their lectures, either through google forms (enables anonymous feedback collection) or through the paper forms, sometimes I use Mentimeter – data from the digital forms – well gathered (better then in paper)
 - Sharing of knowledge – the students share it within the google classroom (e.g. sharing of presentation that can become a new study material for other students) – in the

	<p>past, we had to create something, copy it and hand it out too students – the digital technologies enable to share the material within one space and to use it anytime – if the students are also creators of study materials that can be shared, they are much more engaged (they also enjoy the presentation from someone else – their peer) and motivated and they improve many other competences (presentation skills, creativity)</p> <ul style="list-style-type: none"> • Some teachers noted that this approach is in their future vision, they would like to start form next school year, they do not know which of existing systems/ programs/apps would be suitable - there are only paid versions of such tools, and the school does not want to purchase anything in advance. • Covid time revealed two groups of students - one without a problem to self-monitor with the tables and the other deteriorating because this system was not suitable for them (according to teachers, some students are not capable of such approach in their study) • The teachers miss appropriate tools and the knowledge about them. <ul style="list-style-type: none"> ○ Also, the differentiation according to the age of students • One teacher mentioned the system “Bachelors” and its evaluation – this system does not have a very useful function (whisperer). This functionality tells students that they cannot get the lowest grade/and or it will not change the grade they have reached so far - then, they stop learning... • This approach must be seen from perspective of each student, and it is very individual – some students are creative, they can work alone, contrary to some who need constant mentoring and are not capable of any individual work of this kind. • Some schools do not use this approach they perceive that the students are motivated just with the grades – the teachers supposes that the only motivation could be done through quizzes, but not more (especially by students, that are not the study types and have no motivation for studying) • Other school confirms previous opinion – the students have no need to do anything extra, but on the other hand, their 1st grades already start with e-learning (MOODLE) • Self-regulated learning is very individual according to each individual student, but there is growing need with the higher grades to start working with some time frame and present continuously what they have done already (also for the future work on secondary school or for the occupation) – and if they have to present the final project in front of the teachers and other students, they experience how does it feel to be or not be well prepared and it can give them very valuable experience and motivation for preparation at school
<p>5) Analysing evidence</p>	<ul style="list-style-type: none"> • Digital form of analysing of data or evidence is on marginal level. • To analyse digitally, it is seen a bit like the overwhelming part of teachers work. • Teachers usually know what the problems are in particular class and by particular students.

6) Feedback and planning

- Also, the teachers find that some children with less contact with their parents appreciate more the personal contact with teachers that can also be used for talking about what to improve at school.
- Sometimes, the data is collected on paper – the teachers are generally not aware of any digital tool that is easy to handle and use.
- During distance learning (during Covid) – we saw and were able to analyse, but now we do not use it.
- If the system used will not evaluate it itself, then it is not beneficial for teachers – time consuming activity.
- It depends on the number of students the teachers work with – if the teacher has less students compared to other teachers, they wonder if the sample (number of students) would give them a good picture of how they should further educate.
- If the work of students is in digital way, that he can be evaluated and analysed digitally (maybe in the case of digital quizzes)
- Schools – using different systems for communication with students and also with parents online (bakalari.cz, school version of MOODLE, etc.)
- Some schools are not grading, but evaluating verbally (sometimes too many information that be overwhelming)
 - The students get verbal evaluation, and it is placed within the edookit – the student can get back to that and see what to do better – it is also accessible for the parents.
 - It is big help for planning further lessons.
 - The children are also setting their future plan in what to improve.
 - The teachers do not use anything special (sometimes google tools for self-assessment) – some prefer the paper version when children are assessing themselves, they think more and deeper about what to improve, and if assessing teachers' classes, some use Google forms, because it enables the students to evaluate anonymously.
 - But it is true, that the technologies enable such things.
- Canva and tinkercad – was also used when working with students for feedback – possible to comment of student's work.
- Electronic student's book for continuous recording of grades
- Teacher from school with more different levels of educability of students find involving of parent (e.g., from socially excluded families) more difficult (e.g.– no interest, no HW equipment)
- Feedback – important – for both sides (for teacher – if the students understand the subject – it should be instant, digital version should be more for the parents)
- There is question how valid is the test or the testing system – sometimes we get accredited tests (from CZ school inspection, from National Pedagogical Institute) – if we test on-line, it is our voluntary, and the following evaluation is very much time consuming – for example if I scan the test, then the scanner should be able to evaluate, otherwise, it is very much time consuming

	If we put some work into MOODLE, then we can digitally evaluate, but I do not see more capacity for that (it would be more burden than support for our work).
Content not identified and to be considered (please identify the area)	AI – it can support the teachers in their way of working, but they would rather avoid it by students – in order the students will be able to develop skills themselves.
Activities not identified and to be considered (please identify the area)	
Integration of the competences in the A3Learning Competence Model	Most of the competencies defined after carrying out the questionnaire, are chosen well for A3Learning competence model, maybe analysing evidence is perceived as less important skill to be developed.

eLearning platform:

- Good orientation
 - Good organisation of content and materials
 - Sharing experience, possibility to comment, write down the notes.
 - No preference
- Moodle, preferably connected to email 😊, also with emphasis to interaction!!!!
 - To be able to get back to the content.
 - Understandable
 - Without using difficult terminology – rather simply and clearly presented information that the users understand what it is good for and how to use it
- Training must be interesting – not boring, please.
 - In the form of audiovisual educational material + discussion + sharing experience
 - Videos with subtitles (because of the lack of deep language knowledge)
- Based on the real needs of teachers (this co-design sessions received very good feedback – finding out the real needs of teachers is more than welcome)

Portugal (PT)

Main details of the co-design sessions

ORGANIZER	INOVA+
DATE AND TIME	27th June 2023 14:00 – 16:00 WEST time
VENUE	Online
NUMBER OF PARTICIPANTS	10
CHARACTERIZATION OF PARTICIPANTS (experience)	The co-design sessions were attended by ten people. They all have more than 10 years of experience in middle school.
FACILITATOR	Daniel Pina

Key findings of co-design sessions

TOPIC	KEY FINDINGS BASED ON THE PARTICIPANTS ANSWERS
Content more relevant for each area	
1) Creating and modifying digital recourses	<ul style="list-style-type: none"> • First and foremost, facilities should provide all necessary conditions for successful digital resource management (for example: a good internet connection, adequate computers for both professors and students, enough chargers and plugs for everyone). • There is a need to develop free digital resources to assist teachers in giving lessons and interacting with students in the classroom and online. • Some of these teachers are already utilising artificial intelligence (AI) to produce digital materials to assist them in their work, as well as utilising it in real time with students in the classroom. This benefits not just themselves in terms of skill development, but also students who are developing and learning new digital abilities.
2) Differentiation and personalisation	<ul style="list-style-type: none"> • Some digital tools allow students to study from knowledge that has already been uploaded to them, and they can learn about the topics at their own pace. • Teacher uses the available tools at their choice, and in many situations, they use digital resources (such as Classroom), where students use it almost as if it were their notebook and develop their personalised digital "portfolio". • Students have more control over their own learning by exploring this method of teaching and learning.
3) Teaching	<ul style="list-style-type: none"> • Almost all teachers state that they began utilising tools during the COVID-19 pandemic and that they continue to use them today, finding them to be highly useful and necessary. • When teaching new subjects, some teachers already employ this digital tools. The clear majority agrees that it facilitates teaching, particularly from a visual standpoint, because students learn faster when they are visualising and when instruction is done in a more engaging manner. Some teachers indicate that digital resources (such as Google Classroom, Kahoot, Milage, and others) are used in approximately 90% of their lessons.
4) Self-regulated learning	<ul style="list-style-type: none"> • Use of some digital tools enables teachers to allow students to engage in their own learning process. This makes it possible for learners to plan, monitor, and reflect on their own learning, as well as offer evidence of progress, exchange insights, and come up with creative solutions. • All of this makes teaching more engaging, while also making students responsible for their own learning and allowing them to engage in their own assessment.
5) Analysing evidence	<ul style="list-style-type: none"> • AI is being used to develop digital resources as well as a resource in and of itself. Teachers are teaching students critical thinking skills by

	<p>requiring them to review the content provided in those apps. These activities also help to improve their research abilities.</p> <ul style="list-style-type: none"> • Also, they use visual tools that helps both them and the students collect and arrange necessary material for teaching and learning, making it easier to deliver subject and prepare lessons.
6) Feedback and planning	<ul style="list-style-type: none"> • Teachers believe that it is critical to employ digital tools that allow users engagement, as this allows them to view all the students' information and remark on it in order to provide relevant feedback. It is also critical that students have access to the content that teachers have uploaded, as well as the ability to comment and receive responses. (These tools exist and are being utilised by most teachers). • Some believe that using visual digital tools for teaching (such as Padlet, Miro, Google Dashboard, Trello, and others) helps both them and the students collect and arrange necessary material for teaching and learning, making it easier to deliver subject and prepare lessons.
Content not identified and to be considered (please identify the area)	<ul style="list-style-type: none"> • With the paradigm shift towards a more digital education, the previous challenge about accessibility and equity persists (area: Empowering learners). • Similarly, teachers are concerned about the use of AI because it can lead to inaccuracies in students learning, requiring the need to educate them with analytical and research abilities (area: collaborative learning). • Also, because they no longer use pen and paper as much, they are experiencing handwriting struggles, and a balancing exercise is required to combat this (area: empowering learners).
Activities not identified and to be considered (please identify the area)	
Integration of the competences in the A3Learning Competence Model	<p>Based on these observations, we can conclude that the competencies that encompass this entire range of considerations are those of Teaching and Learning (collaborative learning), Assessment (assessment strategies, analysing evidence, and feedback and planning), and Empowering Learners (accessibility and inclusion, as well as actively engaging learners).</p>

Bulgaria (BG)

Main details of the co-design sessions

ORGANIZER	Bulgarian Development Agency
DATE AND TIME	4/07/2023 1st session 16:00 – 17:00, 2nd session 17:10 – 18:10
VENUE	BDA's office
NUMBER OF PARTICIPANTS	10

CHARACTERIZATION OF PARTICIPANTS (experience)	Only 2 of the teachers had experience less than 5 years. The rest had experience more than 10 years. Two of the participants were principals of their respective schools. The participants were from 3 different schools. One was a specialized secondary school; one was general secondary school and the third one was a primary school.
FACILITATOR	Simeon Toptchiyski
ASSISTANT/S TAKING NOTES	Denitza Toptchiyska

Key findings of co-design sessions

TOPIC	KEY FINDINGS BASED ON THE PARTICIPANTS ANSWERS
Content more relevant for each area	
1) Creating and modifying digital resources	<ol style="list-style-type: none"> 1. Importance was given in the areas of citation of authors. 2. There is a need for free digital resources, from which the teachers can chose in the context of each lesson how to present to learners. 3. In the case of teachers creating resources, they need authorship protection. 4. There is difference when creating and when using digital resources, which need to be taken care when creating resources. 5. There is need for balance when using digital resources.
2) Differentiation and personalisation	<ol style="list-style-type: none"> 1. Each school based on its needs choses digital resources. 2. It is up to the teacher to decide what and how to interact with the learners. 3. In the primary schools there is no real need for distance learning, while digital lessons in the form of short clips are welcomed.
3) Teaching	<ol style="list-style-type: none"> 1. Digital resources and blended learning need balance and careful planning. 2. Teachers should have vast pool of resources from which to choose according to specific needs. 3. Best results in implementing digital learning approaches are reached through information and right communication with the teachers
4) Self-regulated learning	

	<p>Self-regulated learning in Bulgaria is needed only when teaching kids with special needs. There are plenty of resources online which the teachers can guide the learner in such cases.</p> <p>Self-regulated learning is welcomed for teachers when they learn or improve their own competences.</p>
5) Analysing evidence	<ol style="list-style-type: none"> 1. Testing (online) must always be with limited time for answers. 2. Visualization of evidence is a good idea. 3. Assessment should be accompanied with interaction with the learners.
6) Feedback and planning	<ol style="list-style-type: none"> 1. Digital platforms are good for feedback and planning. 2. Teachers use various “channels” for feedback and information: email, Viber, FB Messenger, WhatsApp, Google Smart Classroom, Microsoft Teams etc.
Content not identified and to be considered (please identify the area)	Artificial Intelligence (AI) can be a good slave, while it can be awful master. Critical thinking and careful planning for teachers. Each teacher has different approach when assigning projects to students on how to avoid AI use by the students.
Activities not identified and to be considered (please identify the area)	
Integration of the competences in the A3Learning Competence Model	The A3Learning competences are needed and are the right one to work on. They can be integrated and used when needed from the teachers. Any help in these competences is welcomed.

Additional voting on platforms use: various, there is no preference.

Italy (IT)

Main details of the co-design sessions

ORGANIZER	Deep Blue and Consorzio Ro.Ma
DATE AND TIME	18/07 and 20/07, 10:00 - 13:00
VENUE	Online, Google Meet
NUMBER OF PARTICIPANTS	12 (6/session)
CHARACTERIZATION OF PARTICIPANTS (experience) (1st session)	Regions represented: north, centre, and south Italy. 4 teachers from high school (from 13 to 18 yo) + 2 teachers from primary school but with past experience in high school

	Subject represented: scientific and humanities
FACILITATOR (1st session)	Angela Donati (DBL)
ASSISTANT/S TAKING NOTES (1st session)	Mara Marzella (DBL)
CHARACTERIZATION OF PARTICIPANTS (experience) (2nd session)	Cities represented: centre and north Italy (Rome, Milan) 6 teachers from High School (from 13 to 18 yo). Subjects represented: scientific, languages, technology, humanities
FACILITATOR (2nd session)	Mara Marzella (DBL)
ASSISTANT/S TAKING NOTES (2nd session)	Davide Diletti (Consorzio Ro.Ma)

Key findings of co-design sessions

TOPIC	KEY FINDINGS BASED ON THE PARTICIPANTS ANSWERS
Content more relevant for each area	
1) Creating and modifying digital recourses	<ol style="list-style-type: none"> Overall, a general interest was founded in gaining/upskilling the ability to create/modify educational contents through digital tools. Participants expressed the need to attend frequent and periodic training courses to update their skills. In addition, it was considered as relevant the need to provide a basic skill level of the most common tools to students as well. With regards to digital educational resources, teachers expressed the need to gain knowledge, methods, and practices to “educationally” engage their students. Specific suggestions were provided, like podcasts, video editing, virtual or augmented reality, and learning how to properly use the digital board. Finally, as a conclusive finding, teachers would need to get to know the existing digital resources available and share these among the community. A consensus was found at a “meta” point, where the digital resources meet the requirements set by the national policies to school education. In other words, teachers would need to gain the ability to modify/adapt digital resources to each specific learning objective or use the digital resources available effectively and coherently.

	<p>As a main and conclusive finding, consensus was found in the need to be introduced to the use of digital resources and tools through concrete application experiences (experiences/best practices of other teachers using resources).</p>
<p>2) Differentiation and personalisation</p>	<p>This competence was considered unanimously one of the most challenging: each student should need a specific education path, as well as tailored educational materials. Unfortunately, this is not possible due to logistics, personnel, and time constraints.</p> <ol style="list-style-type: none"> 1. It was found important to learn how to use digital tools to create/modify digital resources/materials to meet the needs of each student, or at least most of them. 2. Also, teachers consider it important to recognise each different student's learning style, in order to tailor or exploit digital resources as much as possible. 3. A partial but consistent consensus falls within the need to use tools and resources to meet special educational needs (SEN) students. Also, specific feedback dealt with the possibility to integrate students with learning disabilities in teamwork, in order to support their learning through digital tools.
<p>3) Teaching</p>	<ol style="list-style-type: none"> 1. Teaching competence is considered as strictly linked to creating and modifying digital resources: the teachers' ability to tailor/create/modify resources could enhance students' learning, also through group work so that students could be able to design and produce useful resources by their own. 2. A main finding is: teachers need support in information gathering and cooperation in the preparation of innovative teaching units. <p>Overall, a general and pervasive importance was given to the need of designing innovative and up-to-date training courses to upskill teaching competences, so to design lessons integrating digital resources/tools, thus enhancing learning experience.</p> <p>Other feedback refers to: 1) teaching through the use of ChatGPT to enhance the critical analysis of students, and research skills; 2) How to recognise deep fake; 3) Classroom platform; 4) Use of learning resources for STEM subjects.</p>
<p>4) Self-regulated learning</p>	<ol style="list-style-type: none"> 1. According to teachers, to master this competence, it would be necessary to learn how to use mapping/scheming resources to: 1) observe, recording self-learning processes according to the different cognitive students' styles; 2) assess outcomes or provide students a self-reporting assessment test. 2. It is important to stimulate students' willingness and motivation to read, inform and keep updated through materials which are not strictly related to educational programs. 3. Some of the teachers also expressed the interest in using ChatGPT as a tool to stimulate self-learning. So, a specific focus on this would be appreciated.

<p>5) Analysing evidence</p>	<ol style="list-style-type: none"> 1. enhancing the skills inherent in interpretation, conscious re-elaboration throughout the learning process, providing the skills to recognise valid from invalid information. 2. Overall, most of the teachers lack this competence: often checklists or assessment grids do not describe qualitatively the progress of students. 3. Analysing evidence is considered as strictly related to “evaluation procedures” through which the teachers assign a point to exams. Indeed, paper based, or digital evaluation does not seem to differ from each other. What teachers need is a specific focus on how to use digital tools to provide students: analysis results, establish catch-up school activities, or empowering learning activities. 4. A major difficulty is recognised as the challenge to get the analyses accepted by students and their families. 5. The ability to analyse evidence could be improved through experience or competence-based learning. <p>Finally, this competence is also linked to feedback and planning. Indeed, this competence can be considered also as the ability to assess not only the school mark, but assessment as a possibility to provide useful feedback.</p>
<p>6) Feedback and planning</p>	<ol style="list-style-type: none"> 1. To provide effective feedback, simple assessment tests (e.g.: True/False, complete the sentence...) are not effective or sufficient. It should be necessary to implement collaborative processes through online open platforms where objectives and criteria assessment are always clear. 2. It is considered as one of the most important competences. During the pandemic, teachers had to use digital tools to provide feedback, and most of them are still using it actually, even though it is time consuming. 3. Teachers are motivated to advance their skills and knowledge on how to use google classroom functionalities and learning paths. The challenge is recognised as the limitation of students and families to accept this innovative way to provide feedback. 4. It is considered as important to pay more attention to the learning process, rather than the performance itself. Also, it is difficult to use digital assessment tools to provide feedback in STEM (e.g.: how to test points on a Cartesian plane using digital resources?) 5. A dimension in this competence is considered as relevant: cooperating with other teachers on how to provide feedback on specific competences to meet the low proficiency level of students when occurring.
<p>Content not identified and to be considered (please identify the area)</p>	
<p>Activities not identified and to be</p>	

<p>considered (please identify the area)</p>	<ol style="list-style-type: none"> 1. Flipped classroom activity to enhance self-regulated learning. 2. Use Google Classroom to assess and provide effective feedback to students. More skills are needed to use Gforms for the assessment.
<p>Integration of the competences in the A3Learning Competence Model</p>	<p>Overall, competences and training materials should be designed to overcome contemporary challenges imposed to school system: 1) Logistic - limit the duration of lessons; sometimes connection could not work or be slowed - not all materials necessary to use digital tools are provided by the school institute; 2) Methodological - a change in paradigm is necessary to bring a concrete innovation in the Italian school system.</p> <p>Generally, competences are recognised as valid and well described by the DigCompEdu framework. Anyway, when developing training contents attention must be paid to concreteness. Training materials should be specific, presenting best practices and providing as much info on how to embed each resource as possible.</p> <p>According to these results, a specific course development path can be drawn:</p> <ol style="list-style-type: none"> 1. Provide best practices about the application of specific tools/strategies/digital practices. <ol style="list-style-type: none"> 1. Create a step-by-step guide on how to implement. 2. Provide concrete results and limitation. 3. Provide specific examples on how to use each digital tool - avoid basic training info. 2. Specific focus on digital tools to implement best practices and integrate digital contents. <p>Finally, in order to enhance teachers' motivation, training materials should be developed by teachers already implementing best practices, as well as the training courses should be led by expert teachers.</p>

Educators' pedagogic areas

The goal of the A3Learning Competence Model is to enable teachers and educators to enhance pedagogical practices through the effective use of digital resources and tools. The Model aims to equip educators with the necessary knowledge, skills, and attitudes to create engaging and student-centred learning experiences using blended learning approaches.

Below, you will find a detailed outline of the competences, categorized into key areas: Creating and modifying digital resources; Differentiation and personalisation; Teaching; Self-regulated learning; Analysing evidence; Feedback and planning.

1) Creating and modifying digital resources

In an increasingly digital world, integrating technology into education has become a necessity rather than an option. The ability to create and modify digital resources empowers teachers and educators to adapt to the unique needs of their students while fostering an engaging and interactive learning environment. As technology continues to evolve, educators must adapt their pedagogical approaches to ensure students are equipped with 21st-century skills and digital literacy. This competence area is critical for educators to stay relevant and meet the diverse demands of modern learners.

The primary goal of this competence area is to equip teachers and educators with the knowledge, skills, and attitudes needed to effectively leverage digital resources in their teaching practices. By mastering this area, educators can enhance their pedagogical practices, embrace innovation, and provide students with a well-rounded education that prepares them for success in an increasingly digital and interconnected world.

a) Modify and Build on Existing Resources:

Objective: Equip educators to adeptly modify openly licensed resources, aligning with learning goals and student diversity for optimized teaching.

Educators must understand the concept of openly licensed resources and the potential they offer. **Openly licensed resources** are digital materials made available under Creative Commons licences or similar frameworks that allow educators to legally modify, adapt, and share them. Teachers should be familiar with different Creative Commons licences, fair use guidelines, and copyright regulations to navigate the legal landscape surrounding resource modification.

Skills such as evaluating the suitability of existing resources for modification and incorporating multimedia elements are essential. By adapting existing resources to align with specific learning objectives and learner characteristics, educators can optimize their effectiveness while saving time and effort in content creation.

Fostering an open sharing and collaboration mindset is crucial for educators. By embracing this culture, teachers can contribute to the collective improvement of educational content, making valuable contributions to the global education community.

Best Practices:

- **Utilize Open Educational Resources (OERs):** OERs are freely available educational materials with open licences that allow educators to modify and customize them for their classroom needs. Platforms like OER Commons and Khan Academy offer a wide range of openly licensed resources that teachers can adapt to suit their specific learning objectives and learner group.
- **Creative Commons Licences:** Familiarize oneself with different Creative Commons licences and understand the permissions associated with each type. For example, Creative Commons Attribution (CC BY) allows modification and redistribution, while Creative Commons Attribution-Non-commercial-NoDerivs (CC BY-NC-ND) only permits sharing without modifications.
- **Adaptation for Diverse Learning Styles:** When modifying existing resources, consider incorporating various media formats, such as videos, interactive quizzes, and infographics, to adapt to different learning styles and enhance engagement.

Example:

An elementary school teacher wants to teach a science lesson on the solar system. Instead of creating all the materials from scratch, the teacher finds an openly licensed interactive simulation of the solar system. He/she modifies the simulation to include additional information about each planet and adjust the difficulty level to match their students' grade level. This way, the teacher saves time while providing an interactive and engaging learning experience.

b) Create or Co-create New Digital Resources:

Objective: Empower educators to collaboratively design interactive digital resources that enhance learning through diverse perspectives and interactive engagement, fostering effective pedagogical practices.

Educators must develop an understanding of pedagogical principles and learning theories to design effective digital resources. By incorporating diverse perspectives through collaboration with peers and subject matter experts, teachers can create innovative and engaging materials that adapt to the needs of their learner groups.

Proficiency in various digital content creation tools and platforms is vital for educators to bring their resource ideas to life effectively. Designing interactive and learner-centred resources promotes active learning and enhances student engagement.

A growth mindset towards digital resource creation encourages educators to continually seek improvement and explore new possibilities. This attitude fosters adaptability and creativity in the design process, leading to better learning outcomes for students.

Best Practices:

- **Student-Centred Resource Creation:** Involve students in the creation process to make the resources more relatable and meaningful for them. Students can contribute ideas, research, and multimedia elements, fostering a sense of ownership and engagement in their learning.
- **Project-Based Collaborative Creation:** Encourage educators to collaborate on resource creation projects with colleagues or subject matter experts. Collaborative efforts bring diverse perspectives and expertise, resulting in more comprehensive and innovative resources.

- **Universal Design for Learning (UDL):** Design resources with UDL principles in mind, ensuring they are accessible to all learners, including those with disabilities. Provide alternative formats, such as text-to-speech functionality or subtitles for videos, to accommodate diverse learning needs.

Example:

A high school history teacher collaborates with the school's technology department to co-create an interactive timeline on a historical event. The technology department assists in creating the digital platform, while the history teacher curates the content and integrates multimedia elements like images, videos, and primary source documents. The interactive timeline becomes a valuable resource for both the history class and other teachers within the school.

c) Consider Specific Learning Objectives, Context, Pedagogy, and Learner Group:

Objective: Equip educators to tailor digital resources effectively by aligning them with learning goals, accommodating diverse needs, and fostering contextual relevance, thereby enhancing equitable and engaging learning experiences.

To maximize the effectiveness of digital resources, educators must be adept at aligning them with learning objectives and instructional design. Analysing the learning context helps identify specific requirements and tailor resources accordingly to ensure relevance and meaningful learning experiences.

Familiarity with various pedagogical approaches enables educators to select the most appropriate resources to complement their teaching methods effectively. Considering the technological infrastructure and constraints of the learning environment ensures that the resources are accessible and feasible for all learners.

Embracing inclusivity and considering diverse learner needs fosters an equitable learning experience for every student. By encouraging peer collaboration and seeking feedback on resource design, educators can continuously improve and refine their digital materials.

Best Practices:

- **Formative Assessment:** Regularly assess students' progress to understand their learning needs and adapt resources accordingly. Formative assessment helps tailor resources to address specific challenges and misconceptions.

- **Contextual Relevance:** Design resources that relate to real-life scenarios or current events relevant to students. Contextualization enhances students' understanding and motivates them to engage with the materials.

- **Differentiated Instruction:** Use digital resources to differentiate instruction and adapt to the diverse learning needs within the classroom. Provide options for students to explore topics at varying levels of complexity or with different media formats.

Example:

A middle school English teacher plans a literature unit on a classic novel. Before selecting digital resources, the teacher considers the students' reading levels and interests. He/she decides to provide multiple versions of the novel, including an audiobook for auditory learners, an interactive e-book with annotations for visual learners, and a simplified text version for struggling readers. This approach ensures that all students can access and engage with the material at their individual levels.

Summary:

The **"Creating and Modifying Digital Resources"** competence area empowers educators to harness the potential of technology for enhancing teaching and learning. This holistic approach considers knowledge, skills, and attitudes necessary for successful digital resource integration, fostering a learning environment that embraces innovation, inclusivity, and continuous improvement. By following best practices and incorporating examples into their instructional strategies, teachers can create dynamic and inclusive learning environments that prepare students for success in a digitally driven world. Ultimately, this will lead to enriched teaching practices and enhanced learning experiences for all students.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Creating and Modifying Digital Resources" competence area, several important themes emerge:

- **Necessary Equipment and Internet Access:** Teachers emphasized the need for relevant equipment, stable internet connections, and Wi-Fi access to successfully implement digital tools. Limited access to equipment and the internet can impede effective use of digital resources.
- **Teachers Motivation and Training:** Inner motivation plays a key role in improving teachers' digital skills. Continuous training and professional development are necessary to empower teachers to use digital tools effectively.
- **Collaboration and Project-Based Learning:** Collaborative digital tools are widely used, especially in schools implementing project-based learning. Students' motivation also supports teachers in acquiring new skills.
- **Wide Range of Digital Resources:** There is an overwhelming number of digital resources available, leading to a need for filtered, trustworthy sources. Some teachers prefer creating their own materials, while others share and modify existing resources.
- **Digital Resource Licencing:** Understanding licences and copyright rules for digital resources is essential. Creative Commons licences are relatively unknown to some teachers.
- **Adapting Digital Resources:** Teachers expressed the need to modify and adapt digital resources to meet specific learning objectives effectively.
- **Usage of Artificial Intelligence (AI):** Some teachers are already using AI to create and interact with digital materials in real-time, benefiting both their own skill development and student learning.

- **Digital Resources in Different Subjects:** Different educational subjects may require different approaches to using digital resources effectively.
- **Facilities and Authorship Protection:** Adequate facilities should be provided for successful digital resource management. Teachers creating resources also expressed the need for authorship protection.
- **Balancing Digital Resource Usage:** Teachers highlighted the importance of balancing the use of digital resources with traditional teaching methods.

Conclusion:

To summarise, the DigCompEdu Framework defines "creating and modifying digital resources" as **“to modify and build on existing openly licensed resources and other resources where this is permitted. To create or co-create new digital educational resources. To consider the specific learning objective, context, pedagogical approach, and learner group, when designing digital resources and planning their use.”**

The "Creating and Modifying Digital Resources" competence area demands a comprehensive approach that includes **providing necessary facilities, continuous training, and support for teacher motivation.** Teachers need **access to trustworthy digital resources and an understanding of licensing and copyright issues.** It is essential **to explore the potential of collaboration and project-based learning to enhance teachers' skills. The effective integration of AI can further enhance digital resource creation and interaction.** By addressing these findings, educators can be better equipped to create student-engaging and effective digital learning experiences.

In conclusion, this competence area equips teachers with the necessary skills to create dynamic and inclusive learning environments, preparing students for success in a digitally driven world. By incorporating technology effectively and continuously seeking improvement, educators can enrich their teaching practices and provide enhanced learning experiences for all students.

2) Differentiation and personalisation

Inclusive education demands that educators recognize and embrace the diverse learning needs and abilities of their students. Digital technologies offer unprecedented opportunities to address these unique requirements through differentiation and personalization. By leveraging technology, teachers can create tailored learning experiences, allowing students to progress at their individual pace and follow personalized learning pathways. Differentiation and personalization foster a supportive and engaging learning environment that empowers each student to reach their full potential.

The goal of this competence area is to equip teachers and educators with the knowledge, skills, and attitudes needed to effectively use digital technologies for differentiation and personalization. By mastering this area, educators can create adaptive learning experiences that adapt to individual learning preferences, abilities, and interests. Personalized learning approaches promote intrinsic motivation, active engagement, and meaningful learning outcomes for all students.

a) Adaptive Learning Strategies:

Objective: To enable educators to implement adaptive learning strategies that adjust to students' individual needs, progress, and learning styles.

Adaptive learning strategies involve tailoring the learning experience to meet the unique needs of each student. Digital technologies offer powerful tools for gathering real-time data on students' progress, understanding, and learning styles. By analysing this data, educators can make informed decisions to adjust their instructional approaches and resources, ensuring that students receive the support they need to succeed.

Best Practices:

- **Formative Assessment:** Utilize digital tools for ongoing formative assessment to understand students' strengths and areas for growth. Frequent assessments inform instructional decisions, ensuring that resources are aligned with students' current level of understanding.

- **Learning Analytics:** Utilise learning analytics and data-driven insights to monitor students' learning progress and adapt instructional strategies accordingly. Analytics help identify struggling students, track their growth, and provide timely interventions.

Example:

A middle school math teacher uses an adaptive learning platform that presents practice questions based on students' performance. The platform identifies areas of difficulty for each student and provides targeted feedback and additional practice on those specific topics. As students progress and demonstrate mastery, the platform automatically adjusts the difficulty level of subsequent questions, ensuring personalized learning experiences.

b) Personalized Learning Pathways:

Objective: To empower educators to create individualized learning pathways that allow students to pursue their unique learning objectives and interests.

Personalized learning pathways recognize that each student has distinct interests, strengths, and goals. With digital technologies, educators can create customized learning experiences that adapt to students' preferences, providing them with a sense of agency in their education. By offering a variety of resources and allowing students to choose topics that interest them, educators foster intrinsic motivation and active engagement, leading to deeper learning and a love for exploration.

Best Practices:

- **Learning Profiles:** Develop learning profiles for each student, considering their strengths, learning preferences, and personal goals. Learning profiles guide the creation of personalized learning pathways.

- **Flexible Learning Resources:** Curate a diverse range of digital resources, such as interactive tutorials, videos, e-books, and simulations, to accommodate varied learning styles and interests.

Example:

In a high school social studies class, students are given the freedom to explore topics related to historical events that resonate with their interests. The teacher curates a list of digital resources covering various aspects of those events, allowing students to choose resources that align with their preferences. Each student then develops a personalized project that reflects their understanding of the chosen historical event, fostering ownership and intrinsic motivation.

c) Scaffolding and Differentiated Instruction

Objective: To equip educators with strategies to scaffold learning experiences and provide differentiated instruction to meet diverse learner needs.

Scaffolding and differentiated instruction are essential to support learners with various abilities and learning styles. Digital technologies allow educators to provide targeted interventions and additional support when needed, ensuring that all students can access the curriculum. By adapting instructional materials, tasks, and assessments to match students' readiness levels and interests, teachers create a learning environment that is both inclusive and challenging. These strategies enable students to develop at their own pace while feeling supported and encouraged to achieve their learning objectives.

Best Practices:

- **Personalized Learning Plans:** Collaborate with students to create personalized learning plans that outline their goals, preferred learning methods, and areas of challenge.
- **Flexible Grouping:** Use digital tools to facilitate flexible grouping, allowing students to collaborate with peers who have similar learning objectives or complementary skills.

Example:

In an elementary school language arts class, the teacher creates leveled reading groups based on students' reading abilities. Using digital resources, each group engages in activities tailored to their reading level, such as interactive e-books with varying difficulty or vocabulary-building games. The teacher provides targeted support and challenges based on each group's needs, fostering a supportive and inclusive learning environment.

Summary:

The "Differentiation and Personalization" competence area equips educators with the knowledge, skills, and attitudes needed to address learners' diverse needs effectively. Adaptive learning strategies enable educators to adjust instructional approaches based on real-time data, ensuring personalized support for each student. Creating personalized learning pathways empowers students to pursue their interests and goals, fostering intrinsic motivation and active engagement. Scaffolding and differentiated instruction adapt to the diverse abilities and learning styles of students, creating an inclusive and supportive learning environment. By implementing these strategies through digital technologies, educators can provide meaningful and transformative learning experiences, preparing students for success in a rapidly evolving world.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Differentiation and Personalization" competence area, the following themes and insights emerged:

- **Digital Resources for Individualized Learning:** Each school chooses digital resources based on its specific needs. Teachers have the autonomy to decide how to interact with learners using these resources to personalize their teaching.
- **Challenges in Implementing Differentiation:** Some teachers find it challenging to implement differentiation and personalization. They create materials with varying levels of difficulty to adapt to different student abilities, but it can be time-consuming and demanding.
- **Addressing Diverse Learning Needs:** Teachers must adjust study materials for students with different needs, such as working with students with mental limitations or autism. Digital tools are seen as tools enabling differentiation and personalization.
- **Using Digital Collaboration for Personalization:** Teachers use digital tools like Padlet to enable students to work at their own pace and personalize their approach to learning. Students co-create presentations, and this allows for more individualized learning experiences.
- **Testing and Learning at Students' Own Pace:** Some teachers implement different levels of testing and allow students to learn at their own pace and time. During the Covid-19 isolation period, learning at their own pace was widely tested, with varying impacts on student performance.
- **Challenges in Creating Differentiated Education:** Creating differentiated education is demanding, and teachers use digital tools to upload different levels of exercises on platforms like Moodle. Some schools experiment with dividing students into classrooms based on performance, but it may not always be effective.
- **Importance of Learning Styles:** Teachers recognize the importance of recognizing different students' learning styles to tailor or exploit digital resources effectively.
- **Supporting Students with Special Educational Needs:** The need to use tools and resources to meet the needs of students with special educational needs was emphasized. Digital tools can support the inclusion of students with learning disabilities in teamwork.
- **Self-Paced Learning and Student Autonomy:** Some digital tools allow students to study at their own pace and take control of their learning by exploring personalized digital portfolios.

Conclusion:

To summarise, the DigCompEdu Framework defines "Differentiation and Personalization" as **"To use digital technologies to address learners' diverse learning needs, by allowing learners to advance at different levels and speeds, and to follow individual learning pathways and objectives."**

The "Differentiation and Personalization" competence is considered one of the most challenging by teachers. While the ideal goal is to have a specific education path and tailored materials for each student, logistical, personnel, and time constraints make it difficult to achieve. However, teachers acknowledge the importance of using digital tools to create and modify resources to meet diverse student needs as much as possible. Differentiation and personalization strategies can be facilitated

through the thoughtful integration of digital resources, enabling students to learn at their own pace, supporting special educational needs, and fostering student autonomy in the learning process.

In conclusion, mastering this competence area equips educators to create transformative learning experiences that cater to the unique needs and abilities of students. By leveraging technology for differentiation and personalization, teachers prepare students for success in a rapidly evolving world while fostering a sense of autonomy and ownership in their learning journey.

3) Teaching

Incorporating digital devices and resources into the teaching process is essential for educators to meet the demands of modern learners and create effective and engaging learning experiences.

Digital technologies offer diverse tools and resources that can enhance instruction, cater to individual learning needs, and promote active student participation. By mastering this area, educators can leverage digital tools to effectively orchestrate teaching strategies, experiment with new pedagogical methods, and ensure a dynamic and effective learning environment.

a) Planning and Implementing Digital Devices and Resources

Objective: To plan for and integrate digital devices and resources into the teaching process effectively to enhance instruction.

To effectively plan and implement digital devices and resources, educators need to be aware of the wide range of digital tools available and their potential impact on the learning experience. Teachers should assess the suitability of these tools for different teaching contexts, ensuring that they align with learning objectives and support the specific needs of their students. By strategically incorporating digital resources, teachers can enrich classroom interactions, facilitate multimedia learning experiences, and encourage collaboration among students.

Best Practices:

- **Alignment with Learning Objectives:** Ensure that the chosen digital devices and resources align with the intended learning objectives. Integrate technology seamlessly into the curriculum to enhance student understanding and engagement in the subject matter.
- **Accessibility and Inclusivity:** Select digital resources that are accessible to all students, including those with disabilities. Ensure that content is presented in various formats, providing options for diverse learning preferences.
- **Student-Centered Approach:** Involve students in the selection of digital resources to adapt to their interests and learning preferences. Empower students to take ownership of their learning journey by encouraging them to explore resources that resonate with them.

Example:

A high school science teacher plans a lesson on the human respiratory system. He/she integrates digital resources, such as interactive 3D models and virtual simulations, to provide students with an

immersive and hands-on exploration of the respiratory system's functioning. The teacher ensures that digital devices, such as tablets or laptops, are readily available for each student to actively engage with the resources during the lesson.

b) Managing and Orchestrating Digital Teaching Strategies

Objective: To appropriately manage and orchestrate digital teaching strategies in the classroom.

Effectively managing digital teaching strategies requires setting clear expectations and guidelines for responsible technology use in the classroom. Teachers should foster digital citizenship among students, promoting safe and ethical practices when using digital devices and online resources. It is essential to address potential challenges, such as distractions from non-academic content, and develop strategies to maintain a focused and conducive learning environment.

Best Practices:

- **Establishing Technology Guidelines:** Collaboratively establish technology guidelines with students to outline expectations for appropriate technology use during class time and the responsible handling of digital devices. These guidelines can help students develop self-regulation and ensure that technology is used to enhance learning rather than distract from it.
- **Digital Citizenship Education:** Dedicate time to teach digital citizenship skills, including online etiquette, critical evaluation of online content, and responsible digital communication. Empower students with these skills to foster a respectful and safe online learning environment.
- **Balancing Digital and Non-Digital Activities:** Maintain a balance between digital and non-digital activities to ensure a well-rounded learning experience. Incorporate a variety of activities, including group discussions, hands-on experiments, and creative projects, to provide students with diverse learning opportunities.

Example:

A primary school teacher establishes clear expectations for technology use in the classroom. He/she creates a digital citizenship agreement with his/her students, outlining responsible behaviours while using digital devices. The teacher incorporates collaborative online platforms and interactive presentations to enhance student engagement and participation, while maintaining a balance between digital and non-digital learning activities.

c) Experimenting with New Formats and Pedagogical Methods

Objective: To experiment with and develop new formats and pedagogical methods for instruction using digital technologies.

Embracing digital technologies allows educators to experiment with innovative teaching formats and pedagogical approaches. Teachers should be open to exploring new tools and methodologies, seeking feedback from students, and continuously improving their digital teaching practices. Experimentation and innovation are essential for staying relevant and meeting the evolving needs of learners.

Best Practices:

- **Professional Development:** Participate in professional development workshops and conferences to stay updated on emerging digital tools and best practices. Engage with professional learning communities to share ideas and collaborate on innovative teaching methods.
- **Student Feedback and Reflection:** Regularly seek feedback from students on the effectiveness of digital teaching strategies. Encourage students to share their experiences and preferences regarding digital tools and activities. Use this feedback to refine and improve instructional approaches.
- **Pilot Projects:** Conduct pilot projects to test new formats and technologies in a controlled environment before full implementation. This allows educators to evaluate the feasibility and impact of new approaches and make necessary adjustments.

Example:

A middle school language arts teacher explores the use of digital storytelling as a way to enhance students' writing skills and creativity. The teacher introduces students to digital storytelling platforms, where they can create multimedia narratives using images, audio, and video elements. The teacher encourages students to experiment with different storytelling techniques and genres, providing opportunities for self-expression and peer feedback.

Summary:

The "Teaching" competence area equips educators with the knowledge, skills, and attitudes needed to effectively integrate digital devices and resources into their teaching process. By planning and implementing digital tools, managing digital teaching strategies, and experimenting with new formats and pedagogical methods, teachers can enhance the effectiveness of their instruction and create dynamic and engaging learning experiences. Embracing digital technologies allows educators to adapt to the evolving needs of learners, promote active learning, and foster a culture of innovation in the classroom. By following best practices, educators can maximize the benefits of digital tools and resources, creating a positive and impactful learning environment for all students.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Teaching" competence area, the following themes and insights emerged:

- **Increased Use of Digital Tools:** Teachers started utilizing digital tools during the COVID-19 pandemic and continue to use them due to their usefulness and effectiveness. Many teachers find that digital resources enhance teaching, especially from a visual standpoint, making instruction more engaging and promoting faster learning.
- **Link to Creating and Modifying Digital Resources:** The teaching competence is closely linked to the ability to tailor, create, and modify digital resources. Teachers recognize that their ability to design innovative teaching units and integrate digital resources can enhance students' learning experiences.
- **Need for Support and Training:** Teachers expressed the need for support in gathering information and collaboration in preparing innovative teaching units. There is a desire for innovative and up-to-

date training courses to upskill teaching competences, specifically in designing lessons that integrate digital resources.

- **Utilization of Digital Tools for Inclusive Teaching:** Digital tools are used not only for mainstream students but also for teaching students with specific limitations or learning needs. For instance, some students who are unable to handwrite are allowed to use computers for notetaking.
- **Challenges in Finding Relevant Tools:** Teachers face challenges in finding new and effective tools/websites, which can be time-consuming. Access to a vast pool of resources from which to choose according to specific needs is desired.
- **Need for Technical Skills and Equipment:** Teachers need the skills to effectively use the technical equipment available in schools, such as interactive whiteboards, tablets, computers, 3D printers, and data projectors. Some teachers may require additional training and motivation to embrace digital tools.
- **E-learning and Blended Learning:** E-learning is widely used and preferred, especially in situations where teachers are away from school for extended periods. However, careful planning and balance are needed in implementing digital learning approaches.
- **Importance of User Reviews and Feedback:** Teachers value user reviews and feedback on e-learning courses to ensure their effectiveness and relevance.

Conclusion:

To summarise, the DigCompEdu Framework defines “Teaching” as “To plan for and implement digital devices and resources in the teaching process, so as to enhance the effectiveness of teaching interventions. To appropriately manage and orchestrate digital teaching interventions. To experiment with and develop new formats and pedagogical methods for instruction.”

The "Teaching" competence area requires a balance between digital and traditional teaching methods. Teachers need support and training to effectively integrate digital tools into their teaching practices. Access to a diverse range of digital resources and tools is essential to cater to diverse student needs. Motivating teachers and providing opportunities for professional development can lead to more innovative and effective teaching practices. Through careful planning and thoughtful use of digital tools, educators can create engaging and inclusive learning environments that promote student success and improve learning outcomes.

In conclusion, mastering this competence area empowers teachers to leverage digital technologies effectively, fostering a culture of innovation and enhancing the learning experience for all students. Feedback from co-design sessions highlights the increased use of digital tools, the link between this competence and creating/modifying digital resources, the need for support and training, the importance of inclusive teaching, and the challenges of finding relevant tools and utilizing technical equipment. Teachers value user reviews and feedback to ensure the effectiveness and relevance of e-learning courses.

4) Self-regulated learning

Self-regulated learning is a crucial skill for learners to develop, empowering them to take ownership of their learning process, set goals, monitor progress, and reflect on their achievements. Digital technologies offer valuable tools to support learners in becoming more self-regulated. By fostering self-regulated learning, educators can nurture students' autonomy, motivation, and metacognitive skills, which are essential for success in their academic journey and beyond.

The goal of this competence area is to equip teachers and educators with the knowledge, skills, and attitudes to leverage digital technologies effectively in supporting learners' self-regulated learning. By mastering this area, educators can create a learning environment that empowers students to plan, monitor, and reflect on their learning, fostering independence and lifelong learning skills.

a) Planning for Self-regulated Learning

Objective: To use digital technologies to help learners plan their own learning process effectively.

Digital technologies provide learners with tools for setting goals, developing study plans, and organizing resources. By facilitating learners' ability to plan their learning journey, educators can encourage a proactive approach to learning and enhance students' sense of control over their academic progress.

Best Practices:

- **Choice and Autonomy:** Offer students a variety of digital tools and platforms for goal setting and planning. Allow learners to select tools that align with their preferences and learning styles, fostering a sense of autonomy in their learning process.
- **Time Management Skills:** Guide students in developing time management skills through digital tools, such as calendar apps, task organizers, and study planners. Encourage learners to set realistic timelines and prioritize tasks to avoid procrastination.
- **Personalized Learning Plans:** Collaborate with individual students to co-create personalized learning plans. Use digital tools to tailor learning experiences based on students' strengths, interests, and goals.

Example:

In a high school biology class, the teacher introduces digital planning tools to help students manage their learning process for a semester-long project on ecosystems. Students are given a choice of using digital study planners, such as Google Calendar or Trello, to set milestones, deadlines, and tasks related to their project. By using these tools, students can break down the project into manageable steps, allocate time for research and data collection, and plan for peer feedback sessions. This approach empowers students to take ownership of their learning journey and develop effective time management skills.

b) Monitoring and Reflecting on Learning

Objective: To enable learners to monitor their progress and reflect on their learning using digital tools.

Digital technologies offer learners opportunities to track their progress, gather data on their performance, and reflect on their strengths and areas for improvement. By engaging in regular self-assessment and reflection, students can adjust their learning strategies, set new goals, and gain **insights into their learning process.**

Best Practices:

- **Digital Portfolios:** Encourage students to create digital portfolios that showcase their work, achievements, and reflections. Digital portfolios allow learners to monitor their progress over time and identify patterns of growth.
- **Formative Assessment Tools:** Integrate digital formative assessment tools that provide instant feedback to students on their performance. These tools help learners identify areas that require further practice and allow educators to tailor instructional support.
- **Metacognitive Prompts:** Incorporate metacognitive prompts into digital learning activities, encouraging students to reflect on their thought processes, decision-making, and problem-solving approaches.

Example:

A middle school English teacher incorporates digital self-assessment tools in weekly writing assignments. Students use a writing assessment app, where they receive automated feedback on grammar, vocabulary, and writing structure. The app also provides suggestions for improvement and areas for students to focus on in their next assignment. After receiving feedback, students engage in a digital reflection journal, where they write about their writing process, what they learned from the feedback, and how they plan to improve their writing skills in the future. This practice encourages metacognition and helps students develop a growth mindset.

c) Providing Evidence of Progress and Sharing Insights

Objective: To use digital technologies for learners to provide evidence of their learning progress and share insights with peers and educators.

Digital tools allow students to document and showcase their learning achievements through various media, such as digital portfolios, blog posts, multimedia presentations, and online discussions. By sharing their insights and reflections, learners actively contribute to a collaborative and enriching learning community.

Best Practices:

- **Digital Showcases:** Organize digital showcases or exhibitions where students can present their work and insights to a wider audience, including peers, parents, and the community.
- **Collaborative Online Platforms:** Utilize collaborative online platforms to encourage peer-to-peer sharing of insights and ideas. Foster a supportive online learning community where students can provide feedback and learn from one another.
- **Digital Reflection Journals:** Encourage students to maintain digital reflection journals, where they regularly record their learning experiences, challenges, and breakthroughs.

Example:

In a history class, students are assigned to create digital portfolios to document their historical research projects. They use platforms like Google Sites or e-portfolios to showcase their research findings, multimedia presentations, and written analyses. As part of the project, students participate in an online discussion forum, where they share insights from their research and engage in peer-to-peer feedback. This collaborative platform allows students to learn from each other, gain new perspectives, and develop a deeper understanding of historical events and their significance.

d) Promoting Creative Solutions

Objective: To encourage learners to use digital technologies creatively to find innovative solutions to learning challenges.

Digital technologies offer a wide range of creative tools, such as video editing software, graphic design applications, and collaborative platforms. By exploring these tools, learners can express their ideas, solve problems, and present their understanding of concepts in novel and imaginative ways.

Best Practices:

- **Project-Based Learning:** Design project-based learning experiences that incorporate digital tools for students to demonstrate their understanding through creative projects.
- **Choice of Digital Tools:** Offer learners the freedom to choose digital tools that align with their creative vision. Encourage experimentation and playfulness in their use of technology.
- **Celebrate Creativity:** Recognize and celebrate creative solutions in the classroom. Encourage students to share their creative works with the class and provide positive reinforcement for innovative efforts.

Example:

In a high school physics class, students are tasked with designing a digital creative project to explain complex scientific concepts. They have the freedom to choose from various creative tools, such as Adobe Spark, Powtoon, or Prezi, to create interactive presentations, animations, or videos. This project-based learning approach encourages students to think creatively and present their understanding in innovative ways. Students showcase their projects during a digital exhibition, where they demonstrate their mastery of physics concepts using engaging and imaginative multimedia.

Summary:

The "Self-regulated Learning" competence area empowers educators to use digital technologies effectively to support learners' autonomy and metacognitive skills. By helping students plan, monitor, and reflect on their learning, educators foster independence and lifelong learning habits. Digital tools enable learners to share insights and evidence of progress, creating a collaborative and enriching learning environment. By encouraging creative problem-solving and self-expression, educators can nurture students' confidence and adaptability in an increasingly digital world.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Self-regulated Learning" competence area, the following themes and insights emerged:

- **Limited Use in Mainstream Education:** Self-regulated learning is mainly perceived as necessary for teaching kids with special needs. Some schools do not utilize it extensively, while others see potential benefits in using digital tools for self-regulated learning.
- **Teacher's Learning and Competence Improvement:** Teachers welcome self-regulated learning when it comes to their own professional development. They find it useful for improving their own competences and skills.
- **Evaluation and Feedback:** Some teachers use self-regulated learning tools for self-evaluation and evaluation of classes. Feedback collection is done through paper forms, Google Forms, or apps like Mentimeter. Sharing knowledge and resources within digital platforms like Google Classroom enhances student engagement and motivation.
- **Individual Approach and Differentiation:** Self-regulated learning must be seen from the perspective of each individual student as it is highly individualized. Some students are creative and capable of working alone, while others need constant mentoring and support.
- **Challenges and Future Vision:** Some teachers are interested in implementing self-regulated learning but lack appropriate tools and knowledge about them. The effectiveness of self-regulated learning may vary according to the age and learning style of students.
- **Digital Tools for Self-regulated Learning:** Teachers find that some digital tools allow students to engage in their own learning process, plan, monitor, and reflect on their learning progress. This empowers students to take responsibility for their learning and be actively involved in their assessment.
- **Mapping and Scheming Resources:** Teachers express the need to learn how to use mapping/scheming resources to observe and record students' self-learning processes according to different cognitive styles. These resources can help assess outcomes and provide self-reporting assessment tests for students.
- **Stimulating Willingness to Learn:** Stimulating students' willingness and motivation to read, learn, and stay updated through materials not strictly related to educational programs is considered essential for self-regulated learning.
- **ChatGPT for Self-Learning:** Some teachers expressed interest in using ChatGPT as a tool to stimulate self-learning and enhance critical analysis and research skills.

Conclusion:

To summarise, the DigCompEdu Framework defines "Self-regulated Learning" as **"To use digital technologies to support self-regulated learning processes, i.e., to enable learners to plan, monitor and reflect on their own learning, provide evidence of progress, share insights and come up with creative solutions."**

The "Self-regulated Learning" competence area **equips educators to use digital technologies effectively in supporting learners' autonomy, metacognitive skills, and ownership of their learning process.** By planning for self-regulated learning, educators enable students to set goals and manage their learning journey. Through monitoring and reflecting on learning, students can assess progress and adjust their strategies. Sharing insights and evidence of progress through digital tools contributes to a collaborative learning environment. Promoting creative solutions allows students to express understanding in innovative ways. Co-design sessions highlighted the importance of individualized approaches and the potential of digital tools like ChatGPT for stimulating self-learning. As educators master this competence, they foster independence and lifelong learning skills, preparing students for success in an interconnected world.

5) Analysing evidence

Analysing evidence of learner activity, performance, and progress is a fundamental aspect of data-informed teaching and learning. Digital technologies provide educators with vast amounts of data and evidence that can be utilized to gain insights into individual and group learning patterns, identify areas of improvement, and tailor instructional strategies to meet learners' needs effectively. By mastering this area, educators can make informed decisions to optimize their teaching approaches and enhance student learning outcomes.

The goal of this competence area is to equip teachers and educators with the knowledge, skills, and attitudes to effectively generate, select, critically analyse, and interpret digital evidence on learner activity, performance, and progress. By mastering this area, educators can leverage data-driven insights to inform their teaching practices and foster continuous improvement in both instruction and student learning.

a) Generating and Selecting Digital Evidence

Objective: To generate and select relevant digital evidence on learner activity, performance, and progress.

Educators must be familiar with various digital tools and platforms that generate data on learner activity and performance. Additionally, they should be able to identify and select appropriate evidence that aligns with specific learning objectives and provides valuable insights into students' progress.

Best Practices:

- **Formative Assessment Tools:** Integrate digital formative assessment tools into instruction to gather real-time data on students' understanding and progress.
- **Learning Management Systems (LMS):** Utilize LMS platforms to track student engagement, completion rates, and performance on assessments.
- **Learning Analytics:** Leverage learning analytics tools to gain insights into students' online learning behaviours, engagement, and progress.

Example:

In an online math course, the educator integrates digital formative assessment tools, such as Kahoot or Quizizz, to assess students' understanding of mathematical concepts after each lesson. The assessment data generated by these tools provides real-time insights into students' comprehension and identifies areas where additional support is needed. The teacher selects specific assessment questions and performance data to create a comprehensive view of each student's progress and mastery of the subject.

b) Critically Analysing Digital Evidence

Objective: To critically analyse digital evidence to derive meaningful insights.

Analysing data requires educators to apply critical thinking skills, identifying patterns, trends, and areas for improvement in student learning. By interpreting the evidence thoughtfully, educators can make informed decisions to support individual learners and enhance overall teaching strategies.

Best Practices:

- **Data Cross-Referencing:** Cross-reference data from different sources and assessment methods to gain a comprehensive understanding of students' learning progress.
- **Identifying Learning Gaps:** Analyse evidence to identify learning gaps and areas where students may require additional support or enrichment.
- **Contextual Analysis:** Consider the context and individual characteristics of students when interpreting data, recognizing that each learner is unique and may have distinct learning needs.

Example:

A high school science teacher gathers data from various digital sources, including online quizzes, virtual lab simulations, and interactive learning activities. The teacher cross-references this data to identify patterns and trends in student performance. By critically analysing the evidence, the teacher recognizes that certain students struggle with a specific scientific concept. Upon further investigation, the teacher identifies common misconceptions and decides to design targeted instructional interventions to address these gaps in understanding.

c) Interpreting Evidence to Guide Teaching and Learning

Objective: To interpret digital evidence to inform instructional decision-making.

Interpreting evidence involves connecting data insights to teaching practices. Educators should use evidence to identify areas of strength and weaknesses in their instruction, personalize learning experiences, and implement targeted interventions to meet learners' diverse needs effectively.

Best Practices:

- **Data-Driven Instruction:** Utilize evidence to inform instructional decisions, such as modifying teaching strategies, adjusting the pace of instruction, and offering personalized support to students.

- **Individual Learning Plans:** Develop individual learning plans based on data insights to address the specific needs and learning goals of each student.
- **Continuous Improvement:** Embrace a culture of continuous improvement, using evidence to reflect on teaching practices and implement changes based on data findings.

Example:

In a middle school language arts class, the teacher uses learning analytics from the learning management system (LMS) to analyse student engagement and progress in reading assignments. The teacher discovers that some students are consistently reading above grade level, while others are struggling to meet grade-level benchmarks. Based on this evidence, the teacher creates individual learning plans for each student. High-achieving readers receive additional challenging reading materials, while struggling readers are provided with extra support and resources to improve their reading skills. The teacher continuously monitors student progress using the LMS data to adjust the instructional approach and ensure personalized learning experiences for all students.

d) Fostering Critical Thinking Through Data Analysis

Objective: Develop educators' critical thinking in data analysis to enhance insights, identify gaps, and optimize teaching for improved student outcomes

Develop educators' ability to foster critical thinking through the analysis of digital evidence, enabling them to derive meaningful insights from data. By examining patterns and trends, educators can identify learning gaps, adapt instruction, and implement targeted interventions to enhance student learning outcomes.

Best Practices:

- **Contextual Data Exploration:** Encourage educators to immerse themselves in the context of data by considering the broader learning environment, individual student characteristics, and instructional objectives. This holistic approach nurtures critical thinking and helps educators extract nuanced insights.
- **Comparative Analysis:** Guide educators in comparing data from diverse sources or different time periods to unveil trends, anomalies, and correlations. This practice cultivates the ability to think critically about data relationships and potential causes behind observed changes.
- **Question Formulation:** Instruct educators to formulate probing questions about the data, prompting them to delve deeper into its implications. By seeking answers to questions like "Why did this trend emerge?" or "What factors might be influencing this pattern?", educators enhance their analytical thinking.

Example:

In a high school history class, an educator examines digital evidence from an online discussion forum where students discussed the causes of a historical event. By analyzing students' responses and engagement patterns, the educator identifies varying levels of understanding and misconceptions.

Observing that certain students consistently mention a specific factor as the primary cause, the educator engages in comparative analysis across multiple discussion threads. This reveals a trend where students who emphasize this factor also tend to omit other contributing factors. Through critical analysis, the educator deduces the need for a targeted classroom discussion addressing this misconception. The resulting intervention guides students toward a more comprehensive understanding of the historical event's causes.

Summary:

The "Analysing Evidence" competence area equips educators with the knowledge, skills, and attitudes to effectively generate, select, critically analyse, and interpret digital evidence on learner activity, performance, and progress. By mastering this area, educators can leverage data-driven insights to inform their teaching practices and foster continuous improvement in both instruction and student learning. Embracing data-informed decision-making enables educators to optimize their teaching strategies, promote personalized learning experiences, and enhance student achievement and success.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Analysing Evidence" competence area, the following themes and insights emerged:

- **AI and Digital Resources:** AI is being utilized to develop digital resources, and teachers are using these resources to teach critical thinking and research skills. Visual tools are also employed to collect and arrange material for teaching, making it easier to deliver subject matter and prepare lessons.
- **Interpretation and Conscious Re-elaboration:** The competence involves enhancing skills in interpretation, conscious re-elaboration throughout the learning process, and the ability to distinguish valid from invalid information.
- **Challenges and Lack of Competence:** Many teachers lack this competence, and often checklists or assessment grids do not adequately describe students' progress. The challenge lies in getting analyses accepted by students and their families.
- **Feedback and Planning:** Analysing evidence is closely linked to providing useful feedback, not just assigning grades. Teachers need to know how to use digital tools to provide analysis results, catch-up school activities, and empower learning activities.
- **Digital Analysing of Data:** The use of digital tools for analysing evidence is on a marginal level. Teachers may find it overwhelming and time-consuming. The preference for personal contact with students also affects the use of digital analysis tools.
- **Testing and Visualization:** Online testing often has limited time for answers, and visualization of evidence is considered beneficial. Assessment should be accompanied by interaction with learners to ensure a comprehensive understanding of their progress.

Conclusion:

To summarise, the DigCompEdu Framework defines “Analysing Evidence” as to generate, select, critically analyse, and interpret digital evidence on learner activity, performance and progress, in order to inform teaching and learning.

The "Analysing Evidence" competence area equips educators with the knowledge, skills, and attitudes to effectively analyse digital evidence of learner activity, performance, and progress. By generating and selecting relevant data, educators gain valuable insights into individual and group learning patterns. Through critical analysis, they identify areas of improvement and learning gaps. By interpreting the evidence thoughtfully, educators can make informed decisions to optimize their teaching approaches and enhance student learning outcomes. Key findings from co-design sessions emphasize the importance of AI and digital resources, the need for interpretation and conscious re-elaboration, challenges in competence, feedback and planning, digital analysis of data, and the value of testing and visualization. Embracing data-informed teaching and learning empowers educators to foster continuous improvement, personalized learning experiences, and enhanced student achievement.

6) Feedback and planning

Feedback is a powerful tool in the teaching and learning process, helping students understand their strengths, identify areas for improvement, and make progress toward their learning goals. Digital technologies offer diverse opportunities for educators to provide targeted and timely feedback to students, adapt their teaching strategies based on data insights, and empower learners and parents to be active participants in the learning process. By mastering this area, educators can enhance the impact of feedback on student learning and promote a data-informed approach to instructional planning.

The goal of this competence area is to equip teachers and educators with the knowledge, skills, and attitudes to effectively use digital technologies for providing targeted and timely feedback to learners, adapting teaching strategies, and enabling learners and parents to use evidence for decision-making. By mastering this area, educators can create a feedback-rich learning environment that supports students' growth, motivates learning, and fosters meaningful collaboration with learners and their families.

a) Providing Targeted and Timely Feedback

Objective: To use digital technologies to provide targeted and timely feedback to learners.

Educators must employ a variety of digital tools and platforms to deliver feedback to students that is specific, actionable, and personalized. Timely feedback enables learners to make immediate adjustments to their learning strategies and encourages continuous improvement.

Best Practices:

- **Audio and Video Feedback:** Use digital tools to provide audio or video feedback, which can be more expressive and convey nuances that text-based feedback might not capture.

- **Rubrics and Feedback Forms:** Implement digital rubrics and feedback forms to standardize feedback and ensure consistent and comprehensive guidance.
- **Automated Feedback:** Leverage digital technologies, such as automated assessment tools, for immediate feedback on quizzes and practice activities.

Example:

In an online language course, the educator uses a digital tool that allows them to record audio feedback for each student's written assignments. Instead of providing written comments, the teacher records personalized audio feedback, offering praise for strong points and providing suggestions for improvement. This audio feedback gives students a more human touch and allows them to hear the tone and enthusiasm in the teacher's voice, which can be motivating and encouraging.

b) Adapting Teaching Strategies Based on Digital Evidence

Objective: To adapt teaching strategies and provide targeted support, based on the evidence generated by the digital technologies used.

Utilizing evidence from digital technologies, educators can analyse learners' performance, identify learning gaps, and tailor their instructional approaches to better meet students' needs. Adapting teaching strategies based on data insights promotes differentiated instruction and improved learning outcomes.

Best Practices:

- **Data-Informed Differentiation:** Use digital evidence to differentiate instruction and provide targeted interventions to support learners who may require additional assistance or enrichment.
- **Flexible Grouping:** Use digital data to form flexible groups based on learners' performance levels and learning preferences, allowing for personalized learning experiences.
- **Progress Monitoring:** Continuously monitor students' progress using digital tools to identify trends and make data-informed decisions about instructional adjustments.

Example:

A primary school teacher uses digital assessment data from math quizzes to identify students who are struggling with specific mathematical concepts. The teacher then adapts their teaching approach by creating small groups during class time. In these groups, the teacher provides targeted instruction and additional practice activities to address the identified learning gaps. The teacher also uses interactive digital learning tools to engage and challenge high-achieving students with more advanced math problems.

c) Enabling Learners and Parents to Use Digital Evidence for Decision-Making

Objective: To enable learners and parents to understand the evidence provided by digital technologies and use it for decision-making.

Educators should communicate with learners and parents about the significance of digital evidence, helping them understand their progress and areas for growth. Empowering learners and parents to interpret and use evidence supports a collaborative learning environment and strengthens the home-school partnership.

Best Practices:

- **Student-Led Conferences:** Facilitate student-led conferences where learners showcase their progress using digital evidence and discuss their learning journey with parents.
- **Data Interpretation Workshops:** Organize workshops or webinars for parents and students to understand how to interpret digital evidence and use it to set learning goals.
- **Learning Analytics Reports:** Provide user-friendly learning analytics reports to parents that highlight their child's progress and offer suggestions for supporting learning at home.

Example:

In a high school science class, the teacher regularly shares learning analytics reports with both students and parents. These reports provide a visual representation of each student's progress, including areas of strength and areas for improvement. During parent-teacher conferences, the teacher explains the data to both the students and their parents, helping them understand how to interpret the evidence and set specific learning goals. The teacher encourages students and parents to collaboratively discuss strategies for improvement based on the digital evidence presented in the reports.

Summary:

The "Feedback and Planning" competence area equips educators with the knowledge, skills, and attitudes to effectively use digital technologies to provide targeted and timely feedback to learners, adapt teaching strategies based on digital evidence, and enable learners and parents to use evidence for decision-making. By mastering this area, educators can create a feedback-rich learning environment that supports students' growth, motivates learning, and fosters meaningful collaboration with learners and their families. Embracing data-informed decision-making enables educators to optimize their teaching strategies, promote personalized learning experiences, and enhance student achievement and success.

Key findings of the co-design sessions with teachers/educators:

Based on the key findings from the co-design sessions regarding the "Feedback and Planning" competence area, the following themes and insights emerged:

- **Digital Platforms for Feedback:** Digital platforms, such as Google Smart Classroom, Microsoft Teams, and others, are widely used for providing feedback and communication with students and parents. Electronic student's books are used for continuous recording of grades.
- **Importance of Feedback:** Teachers consider feedback as crucial for both students and themselves. It helps teachers understand if students understand the subject matter and enables students to improve their performance and set future goals.

- **Challenges and Time Constraints:** Providing effective feedback through digital assessment tests can be time-consuming. Some teachers find it challenging to handle the workload of evaluating digital tests and prefer using other methods like paper-based assessments.
- **Collaborative Feedback Processes:** Teachers emphasize the importance of collaborative processes and online open platforms where assessment objectives and criteria are clear. Cooperative feedback from other teachers can help meet the low proficiency level of students.
- **Motivation to Improve Skills:** Teachers are motivated to advance their skills in using digital tools like Google Classroom functionalities and learning paths for providing feedback. However, there may be limitations in students and families accepting this innovative feedback approach.
- **Focus on Learning Process:** Teachers recognize the significance of focusing on the learning process rather than just performance. The use of visual digital tools for teaching and providing feedback (e.g., Padlet, Miro, Google Dashboard, Trello) is valued by teachers as they help organize necessary material and enhance lesson delivery.
- **Engagement and Collaboration:** Digital tools that promote user engagement and allow students to access and comment on uploaded content are considered critical. Teachers believe these tools facilitate relevant feedback and foster communication between teachers and students.

Conclusion:

To summarise, the DigCompEdu Framework defines “Feedback and Planning” as “To use digital technologies to provide targeted and timely feedback to learners. To adapt teaching strategies and to provide targeted support, based on the evidence generated by the digital technologies used. To enable learners and parents to understand the evidence provided by digital technologies and use it for decision-making.”

The "Feedback and Planning" competence area equips educators with the knowledge, skills, and attitudes to effectively utilize digital technologies for providing targeted and timely feedback to learners, adapt teaching strategies based on data insights, and enable learners and parents to use evidence for decision-making. By mastering this area, educators create a feedback-rich learning environment that supports students' growth, motivates learning, and fosters meaningful collaboration with learners and their families. The key findings from co-design sessions highlight the importance of digital platforms for feedback, the significance of feedback for both students and teachers, challenges and time constraints, collaborative feedback processes, motivation to improve digital skills, a focus on the learning process, and the value of engagement and collaboration. Embracing data-informed teaching and learning empowers educators to optimize their instructional strategies, promote personalized learning experiences, and enhance student achievement and success.

Pedagogic tools and what competencies they support

Open pedagogic tools are digital resources and platforms that are openly accessible, allowing educators to modify, customize, and co-create content based on specific learning objectives and learner needs. These tools adapt to various competence areas, aligning with the ever-growing demands of modern education.

Below we can explore some open pedagogic tools corresponding to the 6 key competence areas presented previously:

Competence Area	Open Pedagogic Tool	Features
Creating and Modifying Digital Resources	Khan Academy	Offers a vast library of video lessons, interactive exercises, and assessments that can be modified and personalized to align with specific learning objectives.
Creating and Modifying Digital Resources	PhET Interactive Simulations	Provides interactive science and math simulations that can be integrated into lessons to enhance understanding of complex concepts.
Differentiation and Personalization	Edpuzzle	Enables educators to customize video lessons with embedded questions and quizzes, allowing for personalized learning pathways.
Differentiation and Personalization	Gooru	Uses AI-driven algorithms to personalize content recommendations based on students' learning preferences and performance.
Teaching	Moodle	A versatile learning management system that offers tools for organizing, managing, and delivering online courses, including discussions, assignments, and quizzes.
Teaching	Nearpod	An interactive presentation platform that allows teachers to create multimedia-rich lessons with real-time assessments, promoting active participation.
Self-regulated Learning	Seesaw	A digital portfolio tool that supports self-regulated learning by allowing students to document and reflect on their learning journey.
Self-regulated Learning	Trello	A project management tool that helps students plan, organize, and track their learning tasks and progress.
Analysing Evidence	Quizlet	Offers digital flashcards and quizzes that provide data on student performance and progress, enabling teachers to assess learning outcomes.
Analysing Evidence	Google Forms	Enables teachers to create surveys, quizzes, and assessments with automated data collection and analysis, facilitating evidence-based decision-making.

Feedback and Planning	Feedback Fruits	Provides interactive tools like peer feedback and group discussions, fostering collaboration and targeted feedback
Feedback and Planning	Mentimeter	An interactive presentation tool that allows teachers to gather real-time feedback from students, supporting data-informed planning.

Additional Tools:

[Evernote](#): A note-taking app that supports students in organizing and managing their learning materials and reflections.

[Socrative](#): A real-time assessment tool that enables teachers to create quizzes and polls, providing instant feedback on student responses.

[Microsoft Teams](#): A collaboration platform that offers virtual classrooms, file sharing, video conferencing, and messaging capabilities. It facilitates seamless communication and collaboration within a digital learning environment.

[Blackboard](#): A learning management system (LMS) with tools for course management, content delivery, assessments, and communication. It allows teachers to organize course materials, engage students through discussion forums, and track progress.

[Google Classroom](#): Offers an easy-to-use platform for distributing assignments, providing feedback, and managing student progress. It simplifies document sharing and collaboration.

[Cisco Webex](#): A collaboration platform that offers video conferencing, screen sharing, and interactive whiteboarding features. It supports virtual classes and real-time collaboration.

[Kahoot](#): A game-based learning platform that allows educators to create interactive quizzes and surveys. It encourages student participation and gamifies the learning experience.

[Kaltura](#): A video platform that enables educators to upload, manage, and share video content. It supports flipped classroom approaches and enhances multimedia learning experiences.

[Padlet](#): A visual board for organising and sharing the content.

By leveraging these open pedagogic tools strategically, educators can create dynamic, personalized, and engaging learning experiences that adapt to students' individual needs and foster the development of essential competences in the digital age.

SECTION C

FINAL CONSIDERATIONS

Conclusions

The paradigm shift brought about by the COVID-19 pandemic forced educators to adapt swiftly to blended learning, combining face-to-face and online interactions. This transformation emphasized the integration of technology and personalized learning, becoming an essential aspect of the post-pandemic educational landscape. Virtual classrooms emerged as an innovative solution, offering teachers the ability to engage students both in physical classrooms and through virtual platforms.

The emergence of virtual classrooms demanded a comprehensive integration of technology into educational practices. Teachers embraced video conferencing platforms and explored various digital tools to optimize online teaching. Pedagogy was redefined to cater to the virtual environment, with educators creating engaging multimedia presentations, interactive quizzes, and diverse learning resources to enhance student learning experiences.

The A3Learning project has set a transformative course within cooperation partnerships in the school education field under the Erasmus+ program. **Its primary goal is to equip teachers, school administrators, and other teaching professionals with critical competencies for digital transformation, fostering digital readiness, resilience, and capacity development.** By embracing a blended learning strategy, the project bridges the gap between students' demands, learning attitudes, and traditional methodologies employed in European schools.

Amidst the technological advancements and benefits of blended learning, educators also faced equity and access challenges. The digital divide became more evident, highlighting disparities in students' access to reliable internet connections and devices. Addressing these issues became a priority for teachers, who worked tirelessly to ensure equitable access to education for all students, regardless of their circumstances.

The A3Learning Competence Model was conducted to become a guiding light for educators, empowering them to enhance pedagogical practices through effective use of digital resources and tools. Equipping educators with these competencies will enable them to create student-centred and engaging learning experiences, further enhancing the benefits of blended learning.

As we move forward, digital literacy remains a critical aspect of teaching. Emphasizing the development of digital skills, critical thinking, problem-solving, teamwork, and communication is essential to navigate the ever-evolving digital landscape successfully. The A3Learning project's vision aligns national school practices to an EU level, fostering the growth of a skilled and digitally empowered generation of learners and educators.

In conclusion, the A3Learning project serves as a beacon of innovation and adaptation in the face of evolving educational challenges. And this Competence Model is an example of that, by promoting blended learning, integrating technology, and fostering digital literacy. As educators continue to embrace new methodologies and pedagogical approaches, they will pave the way for a more inclusive, equitable, and engaging learning environment that meets the diverse needs of students and prepares them for the demands of the future. The journey of A3Learning is one of progress, empowerment, and collaborative growth, accompanying in a new era of education in the 21st century.

Glossary:

CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD)

CPD is the process through which members of professions maintain, improve, and widen their knowledge and skills, as well as develop the personal traits essential in their professional lives. It is often accomplished through a variety of short and long training programmes, some of which give accreditation. All structured, systematic education and training activities in which people participate in order to receive knowledge and/or learn new skills for a current or future employment are referred to as job-related continuing education and training.

DIGITAL COMMUNICATION

Using digital technologies for communication. There are various ways of communication, such as synchronous communication (real-time communication, such as using Skype or video chat or Bluetooth) and asynchronous communication (not concurrent communication, such as email or SMS) using one-to-one, one-to-many, or many-to-many modes.

DIGITAL COMPETENCE

Digital competence is broadly characterised as the confident, critical, and creative use of information and communication technology (ICT) to fulfil goals relating to job, employment, learning, leisure, inclusion, and/or participation in society.

DIGITAL CONTENT

Any sort of information that exists as digital data encoded in a machine-readable format that can be created, accessed, distributed, updated, and stored using digital technology. Web pages and websites, social media, data and databases, digital music, such as mp3s and e-books, digital photography, digital video, video games, computer programmes and software are all examples of digital content. Digital content is split into digital resources and data for the DigCompEdu architecture.

DIGITAL RESOURCES

The word typically refers to any content that has been released in a computer-readable format. A distinction is drawn between digital resources and data for the purposes of DigCompEdu. In this context, digital resources include any type of digital content that is immediately understandable to a human user, whereas data must be processed, treated, and/or interpreted before it can be used by educators.

DIGITAL TOOLS

Digital technology employed for a specific purpose or function, such as information processing, communication, content creation, safety, or problem solving.

FORMATIVE ASSESSMENT

Formative assessment refers to a wide range of approaches used by teachers to assess students' comprehension, learning requirements, and academic achievement during a lesson, unit, or course. The overarching purpose of formative assessment is to collect precise information that may be used to improve instruction and student learning as it occurs.

LEARNING ANALYTICS

The measurement, collecting, analysis, and reporting of data on learners and their contexts for the goals of understanding and optimising learning and the environments in which it occurs is referred to as learning analytics.

LEARNING OUTCOMES

Learning outcomes are described as the information, abilities, and competences that people have gained as a result of learning and that may be shown in a recognition process if necessary. Learning outcomes, according to the European Qualifications Framework (EQF), are declarations of what a learner knows, understands, and is able to accomplish after completing a learning process.

OPEN EDUCATIONAL RESOURCES

Teaching, learning, and research materials in any medium, digital, or otherwise, that are in the public domain or have been released under an open licence that allows others free access, use, adaptation, and redistribution.

PEER-ASSESSMENT

Peer assessment is the procedure through which students grade each other's assignments or tests using benchmarks established by the teacher. The practise is used to save professors time while also improving students' grasp of course materials and metacognitive skills. Peer assessment can empower students to take responsibility for and manage their own learning; enable students to learn to assess and develop life-long assessment skills; improve students' learning through knowledge diffusion and exchange of ideas; and motivate students to engage more deeply with course material.

VLE (VIRTUAL LEARNING ENVIRONMENT)

A virtual learning environment (VLE) is a web-based platform that facilitates the digital parts of courses of study, typically within educational institutions. VLEs often allow participants to be organised into cohorts, groups, and roles; display resources, activities, and interactions within a course structure; support multiple levels of assessment; report on participation; and integrate with other institutional systems.

References

- Bersin, J. (2004). *The Blended Learning Book*. Pfeiffer. Retrieved July 31, 2023, from https://books.google.pt/books?hl=pt-PT&lr=&id=chhoH9BIORgC&oi=fnd&pg=PR1&dq=what+is+the+Blended+learning+methodology&ots=TzDivtLWDL&sig=RIYYVPMECmR8j5CBgdXn_SxZiAM&redir_esc=y#v=onepage&q&f=false
- Buckingham, D. (2020, June). Rethinking digital literacy: Media education in the age of digital capitalism. *Digital Education Review*, 37, 230 - 239. Retrieved July 2023, from <http://greav.ub.edu/der/>
- Cardoso, A. d., & Espírito Santo, E. (2020). Literacia digital: um mosaico de experiências no contexto da formação docente. In J. A. Coord. Sara Dias-Trindade, *Pedagogias Digitais no Ensino Superior* (Vol. 8, pp. 83 - 104). Coimbra. Retrieved July 2023, from <https://shorturl.at/mpsMU>
- Cronje, J. C. (2020). Towards a New Definition of Blended Learning. *The Electronic Journal of e-Learning*, 18(2), 114 - 121. doi:DOI: 10.34190/EJEL.20.18.2.001
- Cunha, S. S. (2014). O SABER PEDAGÓGICO E LITERACIA DIGITAL: CONSTRUINDO PRÁTICAS NO COTIDIANO ESCOLAR. In C. P. Souza, *IV Colóquio Interdisciplinar de Cognição e Linguagem: educação, trabalho e identidade* (pp. 316 - 330). Retrieved July 2023, from <https://shorturl.at/BRWZ8>
- Eraut, M. (2002, April). Conceptual Analysis and Research Questions: Do the Concepts of "Learning Community" and "Community of Practice" Provide Added Value? *Annual Meeting of the American Educational Research Association*, pp. 1 - 14. Retrieved July 31, 2023, from <https://files.eric.ed.gov/fulltext/ED466030.pdf>
- Figueira, L. F., & Dorotea, N. (2022). Competência digital: DigCompEdu Check-In como ferramenta diagnóstica de literacia digital para subsidiar formação de professores. *REDUFOR : Revista EDUCAÇÃO & FORMAÇÃO*. doi:<https://doi.org/10.25053/redufor.v7.e8332>
- Nazarenko, A. L. (2015, October 27-30). Blended Learning vs Traditional Learning: What Works? *Procedia - Social and Behavioral Sciences*, pp. 77 - 82. Retrieved July 31, 2023, from https://www.sciencedirect.com/science/article/pii/S1877042815046662?ref=cra_js_challenge&fr=RR-1
- Redecker, C. (2017). *DigCompEdu - European Framework for the Digital Competence of Educators*. European Commission. Yves Punie. Retrieved 2023, from https://joint-research-centre.ec.europa.eu/digcompedu_en