INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING AND LEARNING

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INTRODUCTION

This unit deals with **information and communication technologies (ICT) in learning**, also known as digital technologies, educational technologies, eduTech or technology in education and learning. These terms reflect the multifaceted use of technology in different contexts – the use of methods, software and hardware in learning processes. Technology is constantly evolving, and new terms and concepts are emerging to describe these changes and new innovations.

Digital competence is an important civic skill both in itself and as part of multiliteracy. Digital technology is both an object and a tool for learning, and it is used in learning from early childhood education and care to adult education. Teaching must ensure that all learners –including staff– have opportunities to develop their own digital skills. The role of digital technology in teaching is sometimes narrowly focused on individual aspects, such as the quantitative use of digital technology or the use of mobile phones in lessons. A broader examination is needed to address this issue. This unit examines digitality in diversifying the learning event and digital skills that enable flexible learning for learners. Digital competence is increasingly needed in a digitalising world.

Digitalisation promotes the equality of people in need of special support and the accessibility of services offered to them. Digital services can be used to increase the learners' opportunity to participate in and influence the learning event in a more versatile way. The learning challenges of those in need of special support manifest themselves in concentration and control skills, difficulties in directing attention and learning problems. In addition, many people face challenges in interaction situations and various sensory sensitivities. The autism spectrum affects the learner's functional capacity individually.

DIGITAL SERVICES AND TOOLS

Digital services and tools that support learning and functional capacity are used, for example, in the following ways:

- As communication methods that support or replace speech: for example, Symbol Writer, Boardmaker, GoTalkNow , audiobooks, text-to-speech functions.
- Digital tools can be used to improve self-expression and communication: for example, HeyGen AI can be used to make oneself speak, also in different languages, or the OrcamRead device reads texts from near or far, for example from signs.
- Phones, tablets and computers can support writing when producing text independently is difficult: speech-to-text functions.
- Digitalisation also enables more personal study paths, diverse guidance and studying independent of time and place, including distance learning, hybrid or hyflex learning, simultaneous or different learning.

DIGITAL SERVICES AND TOOLS

Digital solutions increase learners' motivation to study and take responsibility for their own studies. They also facilitate or make studying more flexible. Some examples are:

- Visual digital materials
- Use of images, 360-images taken from learning environments, audio, and video
- Virtual Reality (VR) contents, such as realistic learning materials made from learning and work environments
- Augmented Reality (AR) contents
- Participatory survey tools such as Forms, various polls, or whiteboards such as Flinga
- Learning diaries
- Leveraging social media
- Podcasts
- Webinars (online seminars)

GAMIFICATION. WHY GAMIFY LEARNING MATERIALS?

Digital gamification refers to the gamification of entire learning environments and materials while the object is always digital. Learning games have a pedagogical goal and have both entertaining and educational elements. Efficiency is based on immersion and experiences of success. Gamified learning is effective, even though not all learning games are effective or not necessarily motivate learners. The gamification of learning materials has effects that support learning, for example, on observation, motivation and emotions and, of course, learning outcomes. Gamified material for any learning object can be produced with almost any service, such as word-processing programs, or game-based programs, but their use is not necessary. The benefits of gamification can be seen especially in topics that can be less interesting. Although the history of learning games is short, it has already been established that they motivate students to explore the gamified topic more deeply.

TRADITIONAL VS DIGITAL

Digital and traditional teaching methods are sometimes pitted against each other. Instead, they should be used jointly to support each other. Teachers must master more and more different digital services and also be able to utilise them in teaching, taking into account the individual needs of students. When used correctly, digitalisation supports learning in a fun and new way. Integrating digitalisation in teaching requires digital competence alongside special education competence. It is essential that teachers have the courage to try new things, and instead of managing a single digital service, they take a broader look at their own digital competence and support learning. At the same time, it is important to remember that as digital services develop rapidly, teachers must be prepared for incompleteness.

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DIGITAL COMPETENCE

Digital competence is a basic skill for citizens and employees that is valuable capital. Mastering digital skills alongside pedagogical competence is essential in order to utilise digital technology also in the increasingly common distance learning. In today's world, we need a basic knowledge of new and emerging technologies, such as artificial intelligence. Information provides certainty and critical thinking and helps us to use technology safely.

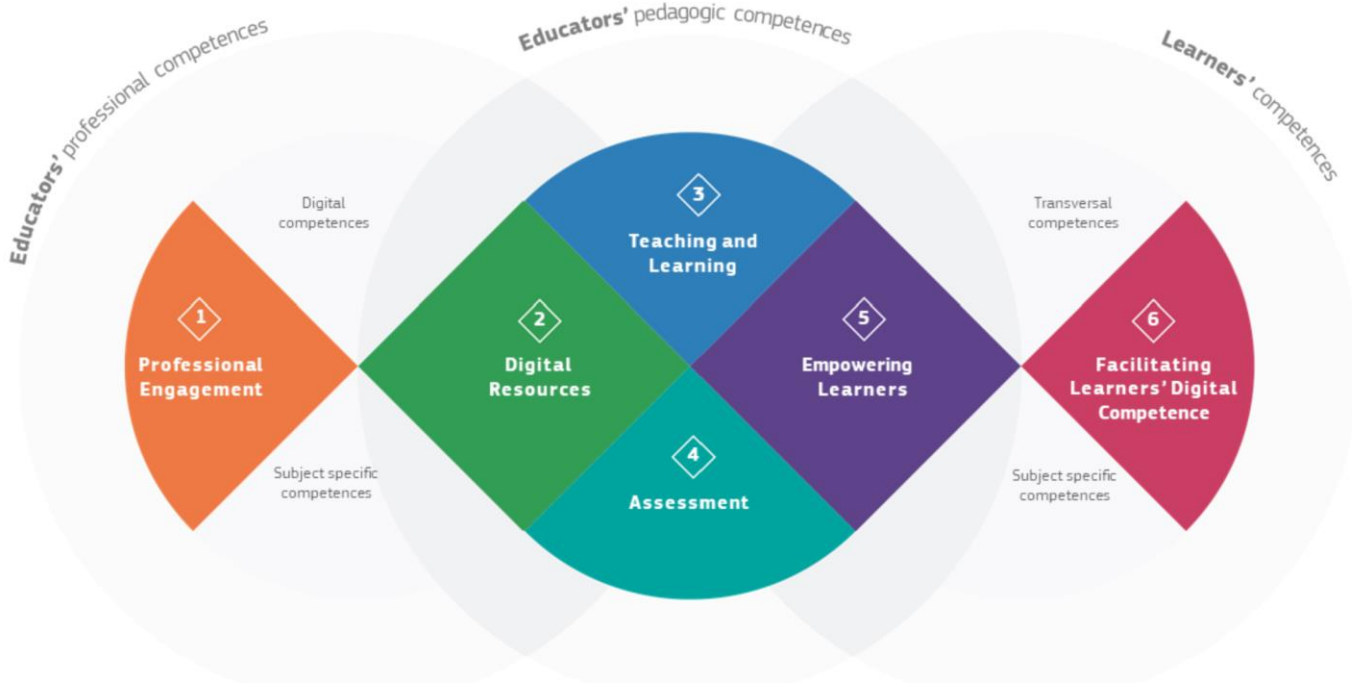
Increased knowledge will also help people identify potential problems related to emerging technologies, for example in relation to ethics, environmental sustainability, data and privacy protection, children's rights or discrimination and biases, including gender bias and discrimination based on disability and ethnicity.

All EU residents, students, jobseekers and workers alike, need digital skills to absorb new and emerging technologies and thrive in a rapidly changing society.

Teaching staff in all fields and levels of education need sufficient skills and self-confidence to make effective use of technologies, including artificial intelligence, in their work.

EUROPEAN FRAMEWORK OF REFERENCE FOR SUPPORT FOR DIGITAL SKILLS IN EDUCATION

The European DigCompEdu (Digital Competence Framework for Educators) is a framework that provides a diverse and comprehensive overview of all the knowledge and skills that a teacher's digital and pedagogical competence involves.



DigCompEdu describes the digital skills that teachers need to effectively integrate technology into their pedagogical practices. DigCompEdu is directed towards all levels of education, from early childhood to higher and adult education, including general and vocational education, special needs education and non-formal learning contexts.

EUROPEAN FRAMEWORK OF REFERENCE FOR SUPPORT FOR DIGITAL SKILLS IN EDUCATION

DigCompEdu describes the **teacher's professional and pedagogical competence**. Professional competence describes the areas in which teachers can use digital tools, for example, when communicating in an organisation and with learners. Pedagogical competence describes, for example, the ability to experiment with new digital teaching methods and that the teacher ensures the accessibility of materials, also taking into account the need for special support, learners' digital abilities and ways of using technology, as well as contextual, physical or cognitive limitations in the use of digital tools.

The model also describes the **learner's competence** when, for example, the teacher prepares assignments that require effective and responsible use of digital tools for communication, collaboration and participation.

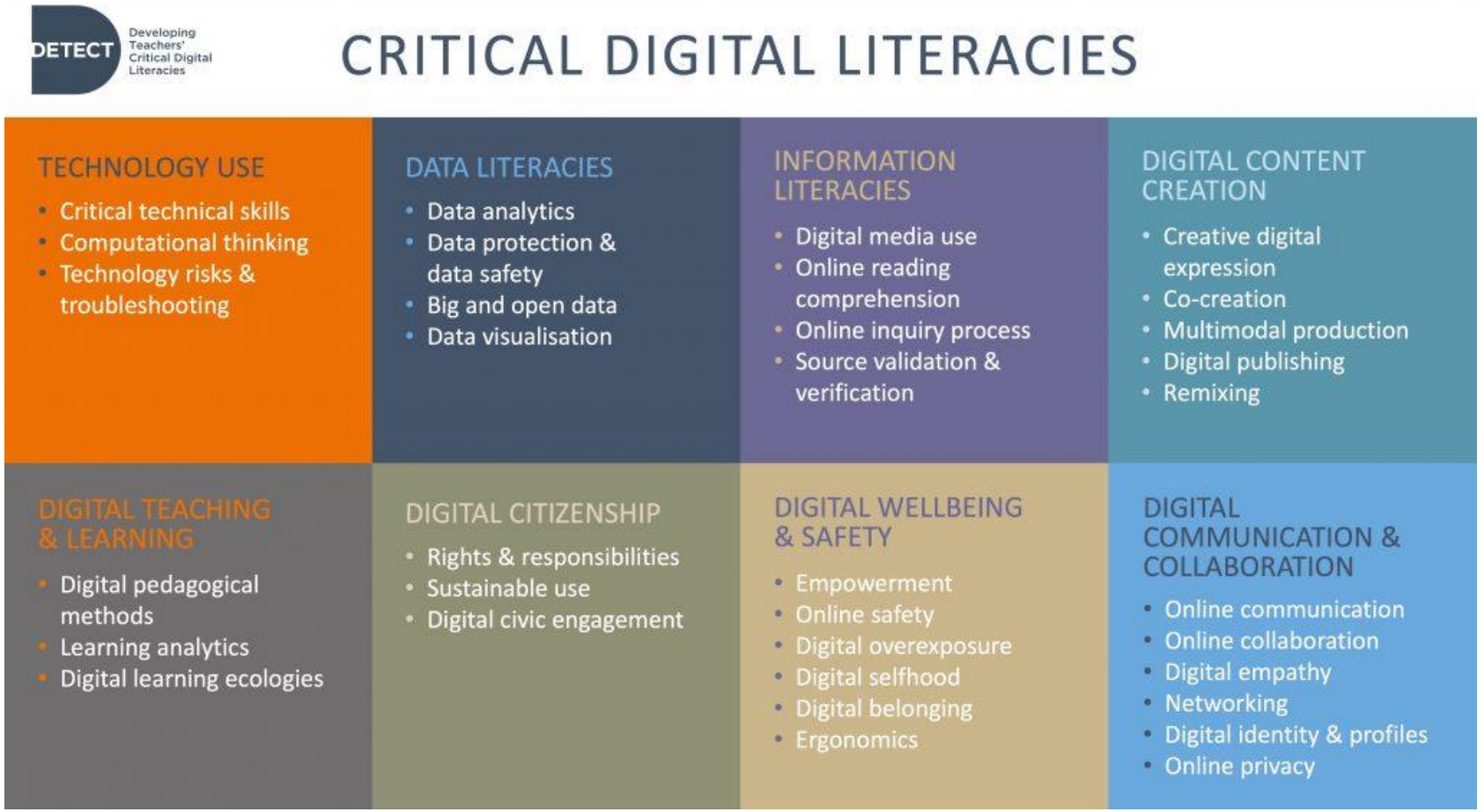
Based on the teacher's digital competence framework, the Selfie for Teachers assessment tool has been created by the EC, which allows primary and secondary teachers to assess their own professional digital competence. To use the tool, you need an EU Login account. Any teacher in Europe or anywhere else in the world can use the tool for free.

CRITICAL DIGITAL LITERACY MODEL TO SUPPORT TEACHING

There is a need to support teachers and learners in continuously updating their digital skills and in examining the broader societal impacts of digital technology, for which a research-based model for critical digital literacy was developed in the EU-funded DETECT project. The idea of the model is to describe the key and critical competence areas and uses of digital technology, rather than individual technical skills.

- The **use of technology** involves a new way of supporting programming thinking in teaching.
- **Data literacy** is an emerging phenomenon that helps us understand what the data collected about us is used for. Artificial intelligence has developed rapidly, and both teachers and young people need to understand its principles.
- **Information literacy** includes skills for effective inquiries, application and critical evaluation of all forms of digital information, including information generated by artificial intelligence. Learners are often more familiar with producing digital content in their free time, and schools could diversify it with creative and communal tasks.
- **Digital interaction and collaboration skills** are related to, for example, empathetic communication or awareness of one's own digital identity.
- **Digital well-being and security** are often brought up negatively in discussions (security, dependence), even though digitalisation can positively support cohesion or empowerment. Digital ergonomics should be better taken care of in schools.
- **Digital citizenship** involves, for example, respecting copyright, taking sustainable development into account and participating in digital citizenship.
- Mastering **digital teaching and learning** practices is important in the role of both teacher and learner. Learning analytics can develop into a tool for reflecting on one's own learning.

CRITICAL DIGITAL LITERACY MODEL TO SUPPORT TEACHING

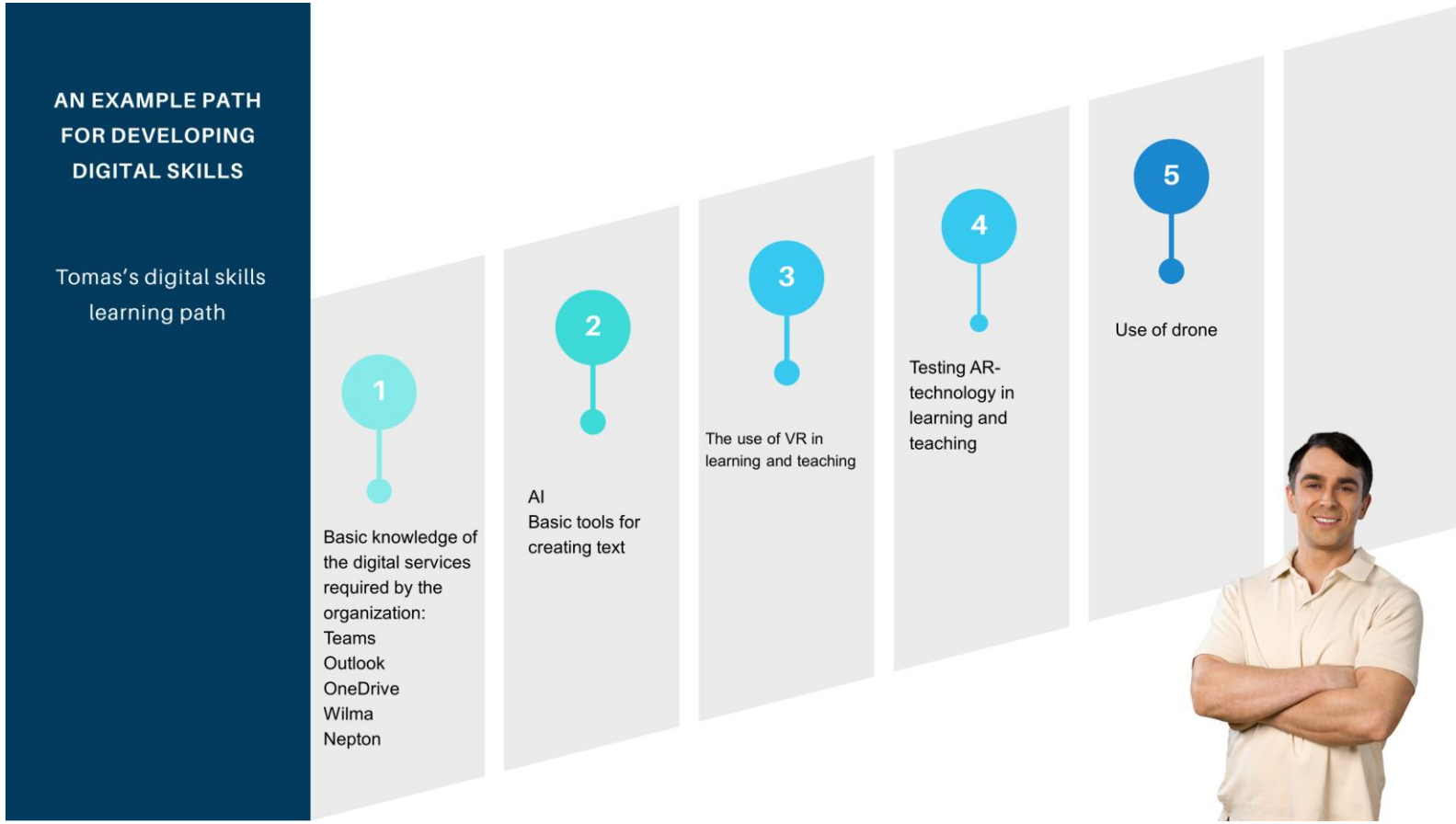


In practice, digital literacy can be seen, for example, when learners make book trailers of books read as multimedia outputs, and learners become familiar with the copyright of images. Another example is when learners critically evaluate public social media posts or search for information on a topic being studied and compare it with AI-generated responses.

SIMILAR AND DIFFERENT NEEDS IN DIGITAL COMPETENCE

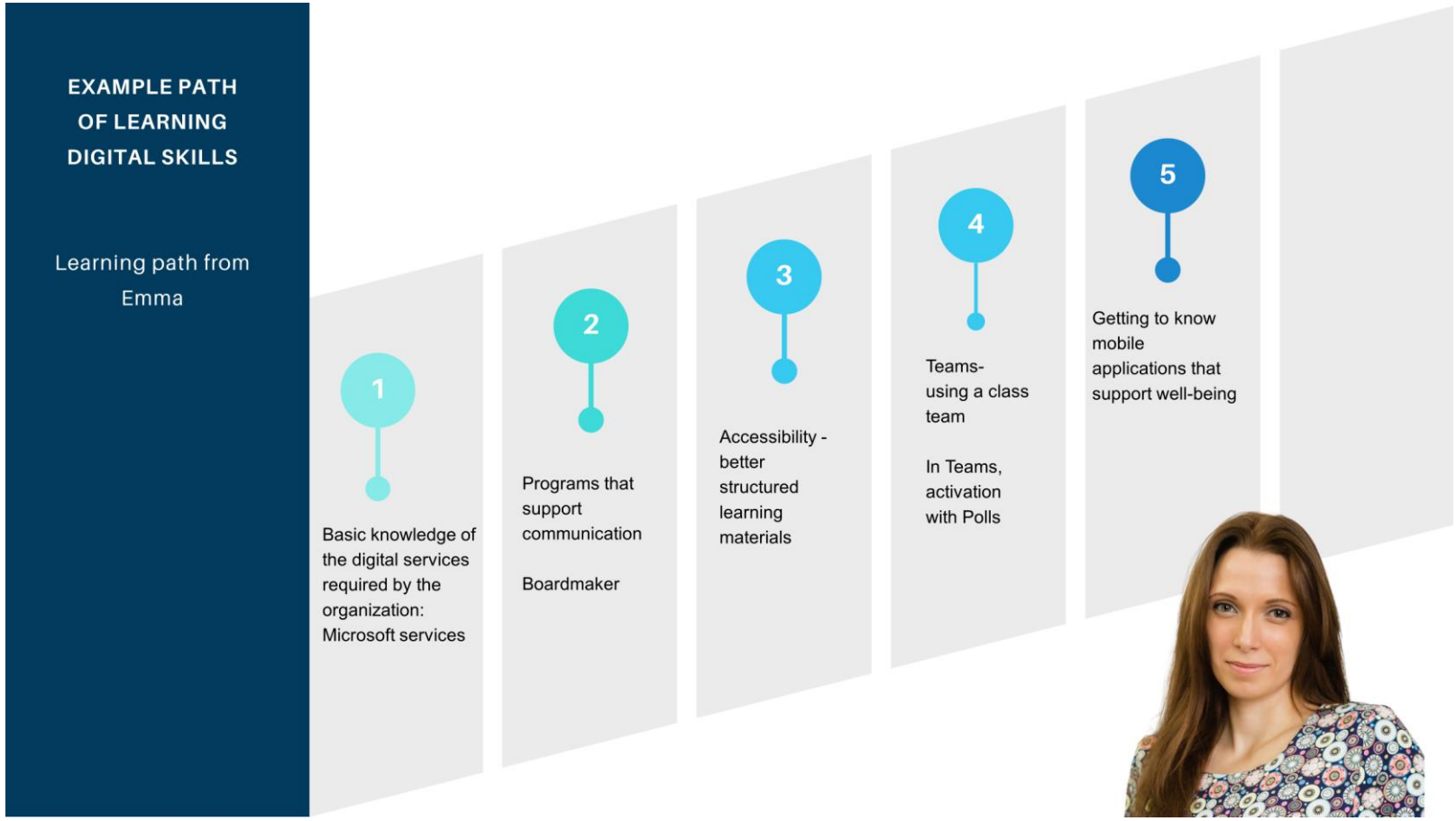
The goal of learning, teaching or work determines which digital skills are needed and used in tasks. Digital competence is also defined by the use of digital services required by the organisation. In order to learn digital skills, a teacher or other employee can create a learning path for digital competence in a self-directed manner. For example, a path containing 1-5 digital skills that the person wants to learn as the year progresses.

In the example on the right, Tomas acquires digital skills for the digital services required by the organization, such as Microsoft tools, AI, VR, AR or drones.



SIMILAR AND DIFFERENT NEEDS IN DIGITAL COMPETENCE

In this second example, Emma acquires digital skills in the use of digital services required by the organisation, such as Microsoft tools and the communication program Boardmaker, the production of accessible learning materials and the use of Classroom-Teams as well as familiarising herself with well-being applications in learning.



HOW CAN YOU ACQUIRE DIGITAL SKILLS?

Safely test digital services

Learn from or with a colleague

Learn from learners

IT services and IT support in organizations

Artificial intelligence. For example, Edge's Copilot

Plan your own digital competence learning path

Trainings, both public and free or paid. Can be done remotely

Digital competence can be acquired in many ways in and out of work, and in education

Set up a learning circle in your organisation to practice using the digital services together

Events, for example: Bett UK, EduTech Europe or, the ITK Conference in Finland

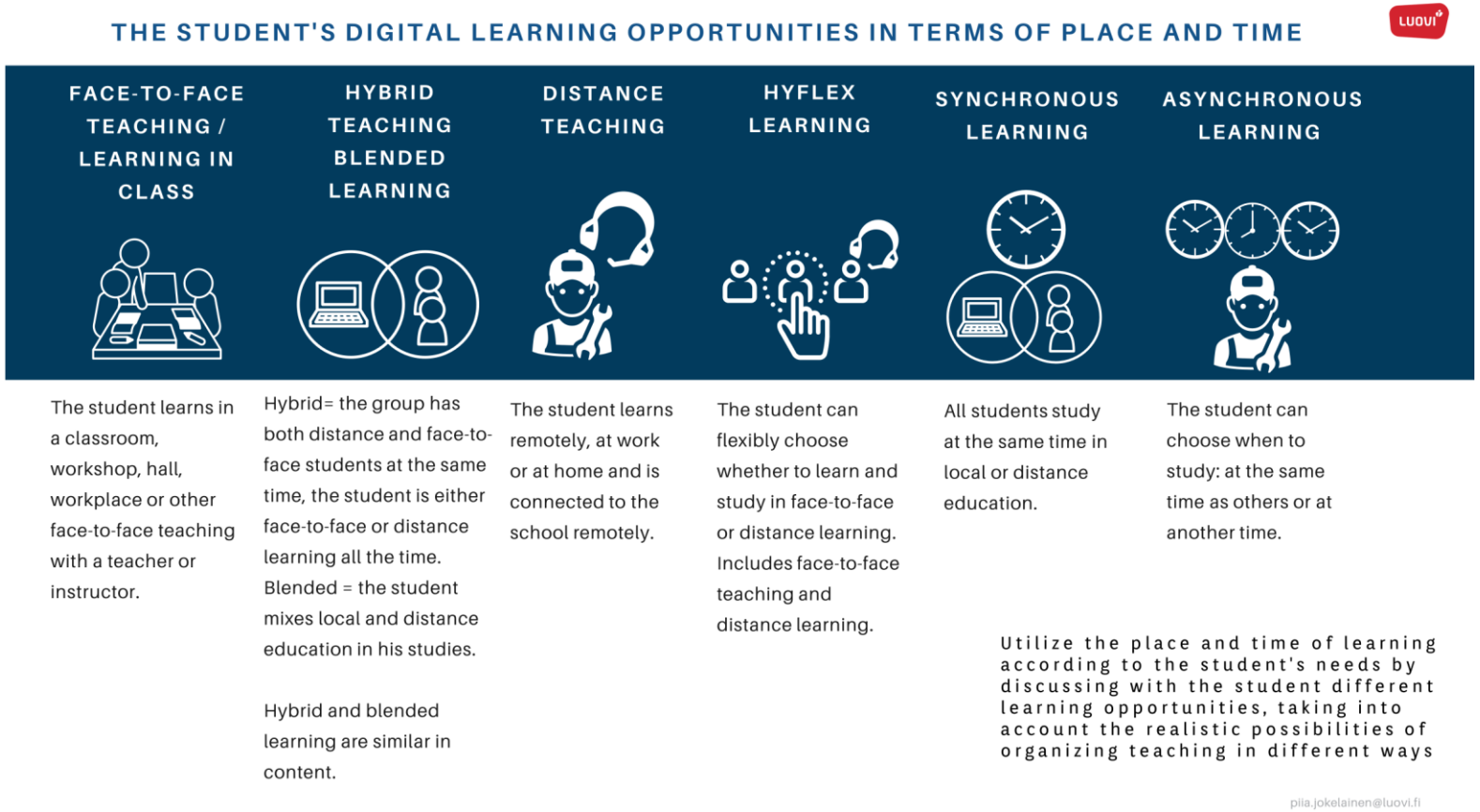
Groups that support the use of communication programs in social media like Facebook and Instagram. For example: Microsoft or Google in Education

Lifelong and continuous learning.

Most of the flexible digital support comes from the closest ones. Digital skills are also learned in free time, through public training and other activities outside the organization. If you use digital skills acquired outside work, make sure that it is suitable for use in your job.

LEARNERS' DIGITAL LEARNING OPPORTUNITIES IN TERMS OF PLACE AND TIME

Face-to-face, hybrid and distance learning, as well as HyFlex, synchronous and asynchronous learning (i.e. digital ways of learning), are already used in most educational institutions. The terminology is flexible depending on the source. Another term besides hybrid and blended learning, is “flipped classroom or learning”, which means that the learners complete theoretical studies independently (studying e-learning materials, files and videos), after which they work together with the teacher, focusing on applications, problem solving and discussion. When teachers and learners are aware of different ways of learning, they can influence the possibilities of studying in different ways, increasing equality regardless of geographical location.



BENEFITS AND CHALLENGES OF DIGITAL LEARNING

Increases productivity and collaboration. Access to online content supports learning productivity by optimising teaching time, and digital chat services fuel collaboration

Makes communication between teachers and students easy. The entire community has quick access to the same resources.

Encourages critical thinking. Diverse sources of information bring new perspectives to students.

Increases motivation. Fast and agile technology increases motivation. Digital tools are often easy for new generations to handle.

Benefits of digital learning

Promotes flexibility and autonomy in learning. Digital options such as online courses allow learning at own pace and optimize time, regardless of location. Learning can take place outside the school building

Digital and interactive services in learning support learners' concentration and understanding and therefore they assimilate concepts faster

Education professionals can introduce new teaching methods. Their use promotes the development of digital skills.

Everyday activities are made easier by the availability of newer and more relevant information and easier note-taking

BENEFITS AND CHALLENGES OF DIGITAL LEARNING

Digitalization means unrestricted access to multiple sources of information, and they distract attention from the topic. Sometimes this can interfere the flow of lessons

Physical relationships and human contact with teachers and other learners are reduced, which can be seen as social exclusion and an obstacle to the development of social skills

Learners do not always have information on what can and cannot be done with devices or digital services obtained from school

Theft of personal data. Awareness of the safe use of digital services reduces misuse of services

Excessive and inappropriate use of digital services can lead to a learner's compulsive relationship with technology, an inability to control the use of technology, and thus adversely affect the learner's health and social life

Misinformation. Mastering critical media literacy is essential to detect false news

Challenges of digital learning

A complex theme and one of the biggest risks is bullying. Misuse of technology can lead to digital bullying situations

The use of digital learning environments, which requires a lot of self-management, is not equally suitable for all students

Digitalisation in teaching requires the use of a wide range of services or programs, for example, when producing e-learning materials. Some people think the workload has increased; others just think it's distributed differently

Skills such as writing, public speaking or reasoning may be impaired if digital services are used extensively so that they are not practiced in learning. The social skills of new generations are based on the digital environment, which can influence "live encounters" with people

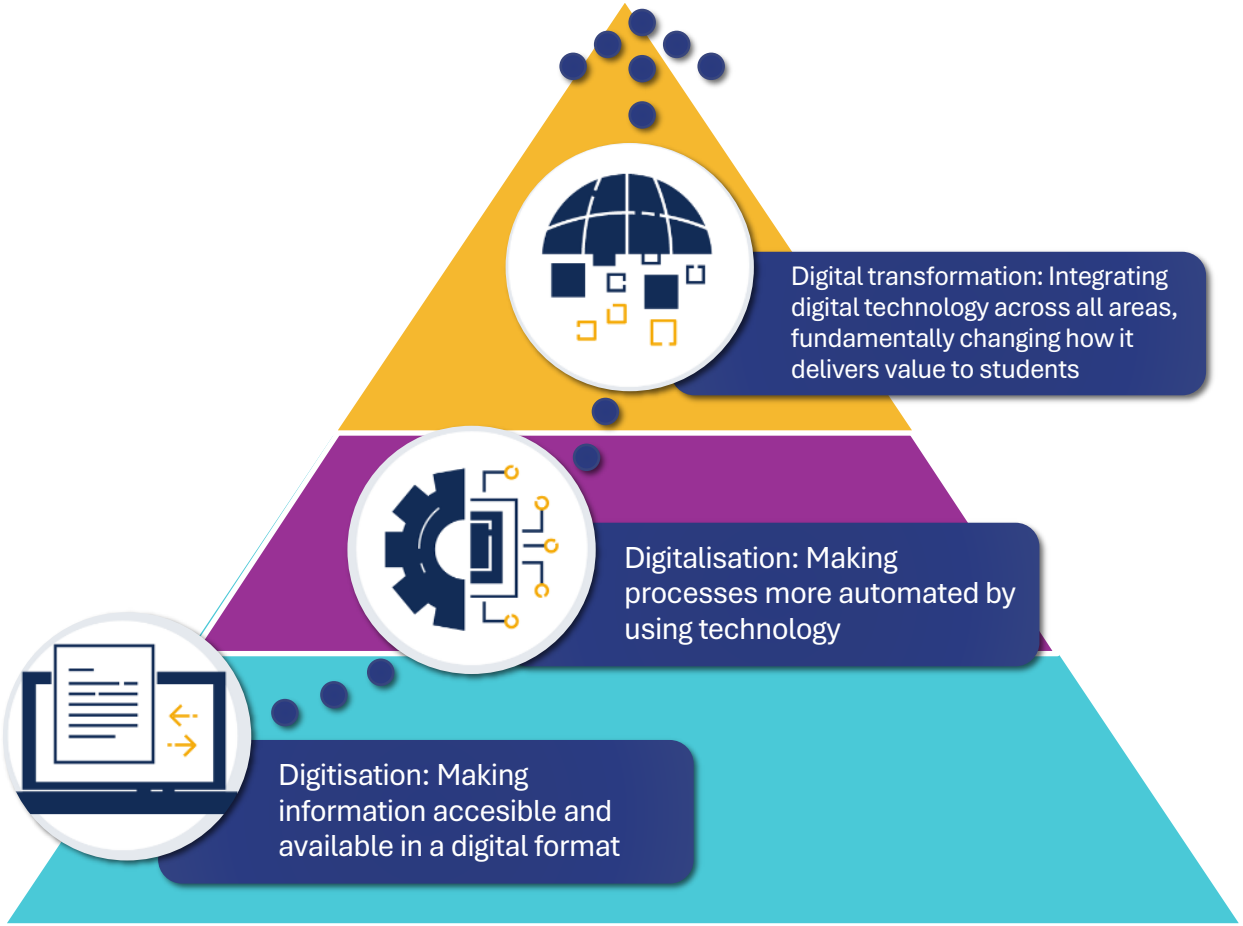
Forgetting the device at home will cause problems if learning materials are not available in a physical version

DIGITAL TRANSFORMATION IN EDUCATION

A step forward is the Digital Transformation of schools. We need to differentiate between Digitisation, Digitalisation and Digital Transformation.

- **Digitisation** is about converting old-school analogue data into digital format. For instance, replacing the use of paper for e-data and store them in cloud systems.
- **Digitalisation** is the act of taking analogue processes and making them digital. For instance, replace or complement the educational process of a real workshop with virtual environments. Also, AI is a good example of how a process can improve operations in factories.
- **Digital transformation** is the process that an organization applies to integrate digital technology across all areas, fundamentally changing how it delivers value to customers. The organisation adopts innovative digital technologies to make cultural and operational shifts that adapt better to changing customer demands. In an educational environment, our students are our customers and our goal is to provide them with the best experience that will support them with skills for future work and learning.

DIGITAL TRANSFORMATION IN EDUCATION



DIGITAL TRANSFORMATION IN EDUCATION

One of the goals of the digital transformation is to reach a more diverse circle of students/staff to ensure **accessibility** of the education center.

DIGITAL TRANSFORMATION IN EDUCATION

Digital transformation is addressed within the scope of the DITRAVET project. The learner of this module can explore the different units devoted to the 3 target groups of the digital transformation of a school:

1. **Directors/Leaders:** they need to understand what changes are required to ensure a successful implementation of a digital strategy within your educational center.
2. **Teachers:** they will acquire competences in the digitalization of the classroom.
3. **Students:** very final target group of our project. They have a say in digital transformation and can gain digital competences, for instance, through the use of our AR/VR experiences.

All units can be accessed without previous registration here.

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