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**“Improvement of digitalisation competences of recent and future teachers by
development of advanced training on instructional design of digital training”**

Project number: 2023-1-BG01-KA220-HED-000155494



WP2 Instructional design of digital training - curriculum, training course and portal with help desk

**R2: 2-semester course as part of Master pedagogical degree in design for digital
learning and use of educational technology as a foundation for creative thinking and
inclusion**

April, 2025

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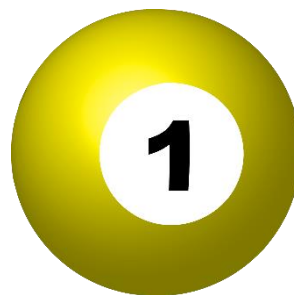


Facultad
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MODULE



Name of the leading partners:

National University of Distance Education, Spain

Plovdiv university "Paisii Hilendarski", Bulgaria

Bulgarian Inclusion Support Team, Bulgaria

DESCRIPTION

1. Title of the module:

Module 1. Theories and models for instructional design of quality digital learning.

2. Duration of the module

30 hours

3. ECTS credits / ECVET credits

2 credits / 1 credit

4. Authors

UNED

Prof. Cristina Sánchez Romero, PhD. (coordinator)

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5. Learning outcomes for the course – acquired knowledge, skills, competencies (goals)

Those who have successfully completed training in this discipline:

- *Will know:*
 - ✓ Online teaching models
 - ✓ UDL (Universal Design for Learning)
 - ✓ The barriers that threaten the instructional design of digital learning.

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- *Will be able to:*
 - ✓ Create an instructional design for digital learning.
 - ✓ Implement a Universal and Accessible curriculum.
 - ✓ Implement UDL principles in digital instructional design.

- *Will be competent to:*
 - ✓ Digital competences, particularly Implement universal e-learning standards.
 - ✓ Digital competences, particularly designs according to the universal standards and accessibility.
 - ✓ Digital Competence and Sustainability Competence, particularly to provide learning opportunities in digital environments with sustainable development in mind.

6. Teaching methods

Interactive methods, gamification, MOOC or microcredential course.

7. Prerequisites (knowledge and skills from previous training) and requirements for other (simultaneous) courses

To have basic knowledge on:

1. Notions about the management of digital platforms.
2. Know how to contextualize digital didactic models.
3. Accessibility basics in curriculum development.
4. Teaching universal design for learning.

8. Content of the module

- **A. Short summary**

Universal Design for Learning, or UDL, ensures that all students have equal opportunities to succeed by providing multiple means of engagement, representation, and action. Digital learning plays a crucial role in this framework, offering diverse and accessible resources for varied learning needs. Carefully crafted teaching units, or didactic units, integrate these principles to create inclusive and effective educational experiences. By combining UDL with digital tools, educators can design lessons

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that cater to a wide range of abilities and preferences. This holistic approach promotes better learning outcomes for every student.

B. Thematical content of the module

a) lectures

1. Digital learning models - **(3) hours**
2. Universal Design for Learning (UDL)- **(3) hours**
3. Teaching unit design **(3) hours**
4. Digital assessment of students' competencies (digital, learning to learn...) - **(2) hours**
5. Tutor support competences - **(2) hours**
6. Digitally inclusive and accessible learning design- **(2) hours**

b) practical activities

The students will be able to choose one of the following options:

Option A. Designing a MOOC (Massive Open Online Course) **(12) hours**, involves several key steps:

- **Define objectives and audience:** Determine the learning objectives and target audience for the course. Identify what learners should know or be able to do by the end of the course.
- **Create a detailed course outline:** Develop a comprehensive syllabus that outlines the modules, topics, and key learning activities. Break down the content into manageable sections.
- **Develop engaging content:** Create diverse content including videos, readings, quizzes, and interactive activities. Ensure the content is engaging and accessible to a wide range of learners.
- **Incorporate Universal Design for Learning (UDL):** Use UDL principles to make the course accessible to all learners. Provide multiple means of engagement, representation, and action.
- **Leverage digital tools:** Utilize digital tools and platforms to enhance the learning experience. Incorporate forums, live sessions, and multimedia elements to facilitate interaction and engagement.
- **Pilot and refine the course:** Test the course with a small group of learners to gather feedback. Make necessary adjustments to improve the course based on their input.

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- **Launch and monitor:** Launch the MOOC and continuously monitor its progress. Collect data on learner engagement and outcomes to make ongoing improvements.

By following these steps, you can design a MOOC that is engaging, accessible, and effective in achieving its learning objectives.

Option B. Designing a teaching unit (12) hours.

Here is a guide to help you design a teaching unit:

- **Define learning objectives:** Clearly outline what students should know or be able to do by the end of the unit. These should be specific, measurable, achievable, relevant, and time-bound (SMART).
- **Identify key content:** Determine the main topics and concepts that will be covered in the unit. Ensure that the content aligns with the learning objectives and standards.
- **Plan assessments:** Develop formative and summative assessments to measure students' understanding and mastery of the content. Include a variety of assessment methods such as quizzes, projects, presentations, and written assignments.
- **Design learning activities:** Create engaging and diverse learning activities that support the objectives. These can include lectures, group work, discussions, hands-on experiments, and multimedia resources. Incorporate activities that cater to different learning styles and abilities.
- **Develop a timeline:** Outline a timeline for the unit, including the duration of each lesson and the sequence of activities. Ensure that the pacing is appropriate for the students' level and allows time for review and reinforcement.
- **Incorporate resources and materials:** Gather all necessary resources and materials, such as textbooks, articles, videos, and tools. Ensure that these resources are accessible to all students.
- **Integrate technology:** Use digital tools and resources to enhance learning. This could include educational apps, online collaboration tools, and interactive simulations.
- **Include differentiation strategies:** Plan for differentiation to meet the needs of diverse learners. This might involve modifying tasks, providing additional support, or offering extension activities for advanced students.
- **Plan for reflection and feedback:** Include opportunities for students to reflect on their learning and for you to gather feedback on the unit. This can help in making adjustments and improvements for future iterations.

- **Prepare for flexibility:** Be prepared to adapt the unit as needed based on student progress and feedback. Flexibility is key to addressing unexpected challenges and ensuring all students succeed.

By following these steps, you can create a well-rounded and effective teaching unit that promotes student engagement and learning.

C. Equipment required for the delivery of the module:

- Personal electronic devices (computer systems and audio-video equipment, smartphone);
- Smart technologies (virtual glasses, 3D printers, 3D scanners, micro modules, microcontrollers, adapters, cameras, smart displays with movement, educational robots, and others);
- Software;
- Electronic platforms, including adaptive electronic platforms.

9. References (main bibliography)

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10. Planned learning activities

Teamwork, problem-solving, digital learning, project-based learning, teaching unit design.

11. Methods and criteria for assessment

Development of instructional design e-learning materials according to all quality standards.

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12. Languages

English, Spanish, Bulgarian, Portuguese, Turkish

13. Internship/ practice

Development of instructional design e-learning materials with implementation of the e-learning standards.

UNIT 1 DIGITAL LEARNING MODELS

Presentation and learning objectives

Objectives: To understand the different models of online learning and digital instructional design as well as appreciating their characteristics, identifying the advantages and limitations of each model and reflecting on the application of these models in different educational contexts.

1. Introduction to digital learning models

In the age of information and technology, digital learning has become a fundamental tool for education and continuous development. Its importance lies in its ability to democratize access to knowledge, allowing people from different contexts and locations to access quality educational resources. Through digital learning, students can learn at their own pace, access up-to-date and relevant materials, and engage in interactive and personalized learning experiences.

In addition, it fosters essential digital skills, such as technological competence, problem-solving, and self-directed learning, preparing them for the challenges of an increasingly digitized world.

In today's education, digital learning models have emerged as innovative responses to the changing needs of students and educational institutions. With the rapid evolution of technology and access to the internet, digital learning models allow for more flexible and accessible ways to acquire knowledge.

These models include synchronous learning, where students and teachers interact in real-time, and asynchronous, which allows students to access content and participate in activities according to their own schedule.

Also noteworthy are *blended learning* approaches, which integrate the best of online and face-to-face learning, offering a hybrid learning experience. Or the latest trends such as *m-learning*, mobile learning, or *u-learning*, which is ubiquitous and situated learning.

Not only do these models improve accessibility and flexibility, but they also promote more student-centred learning, where content and teaching methods can be customized to

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meet diverse needs and learning styles. In a world where lifelong learning is crucial, these digital models are revolutionizing education, making it more inclusive and adaptable to the constant changes in society and the labor market.

1.1. Fundamentals of digital learning

1.1.1. Definition of digital learning

It refers to the use of digital technologies to facilitate access to educational materials and improve learning experience. This includes the use of the internet, electronic devices, learning management platforms (LMS), education applications, augmented and virtual reality, among others.

Digital learning can take place entirely online, hybrid (combining online and face-to-face), or through mobile and ubiquitous approaches, where learning happens anywhere and at any time.

1.1.2. Historical evolution and current trends in digital learning

From the 1960s to the 1980s, the first computers were introduced in the educational field, driving the development of computer-assisted teaching programs. Subsequently, in the 1990s, the emergence of the Internet and e-mail revolutionized the forms of communication and learning, giving rise to online courses and the creation of digital educational materials. Already in the 2000s, the expansion of learning management platforms (LMS) such as Moodle and Blackboard was consolidated, at the same time as MOOCs (Massive Open Online Courses) emerged, expanding access to education. Finally, between 2010 and 2020, online education became popular at all levels, integrating multimedia resources, mobile learning, and new emerging technologies such as virtual reality (VR) and augmented reality (AR), profoundly transforming teaching and learning methodologies.

Emerging trends in digital education include data-driven learning and the use of learning analytics to personalize learning experiences and optimize educational outcomes. In this context, gamification is consolidated as an effective strategy to increase the motivation and commitment of students, by incorporating game-specific dynamics in educational environments. Likewise, artificial intelligence (AI) offers new possibilities through systems that allow the personalization of learning, automated tutorials and intelligent answers to student questions. Added to this is the growth of mobile learning, driven by the development

of educational applications accessible from mobile devices, which facilitates access to content due to its ubiquity, and microlearning with the use of short and specific educational content to facilitate learning in times of limited time availability, such as micro-credentials.

1.1.3. *Comparison between traditional and digital learning.*

Traditional and digital learning are two different approaches that have characteristics in common. Although both approaches have significant differences, as detailed in Table 1, they also share common elements of relevance. Both traditional and digital learning pursue the objective of facilitating the acquisition of knowledge and the development of skills, which requires rigorous planning and a solid pedagogical structure to ensure its effectiveness. Likewise, in both models, interaction between teachers and students is essential as a key element of the training process (García et al., 2007).

The following table shows the comparison between the two:

Board 1. *Comparison of traditional and digital learning*

Comparative Category	Traditional Learning	Digital Learning
Modality	Face-to-face, in physical classrooms.	Online, hybrid, or through mobile devices.
Place and time	Fixed: Students and teachers must be in an established place and time.	Flexible: Access to content from anywhere and at any time.
Educational materials	Printed books, notebooks, blackboards, slides.	Digital resources: Videos, PDFs, simulations, interactive multimedia.
Interaction	Face-to-face, in real time.	Real-time (synchronous) or deferred (asynchronous) interaction through forums, video calls, chats.
Role of the teacher	Leading provider of knowledge, master classes.	Learning facilitator, guide and support in content navigation.
Student role	Passive, receiver of information.	Active, manager of their own learning, with greater autonomy.

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Evaluation	Assessment based on exams and written assignments, usually at the end of the course.	Continuous evaluation, through quizzes, discussion forums, and online participation.
Accessibility	Limited by geographical displacement factors.	Spacious: It can be accessed from anywhere with an internet connection.
Adaptability	Less customization capability; generalized approach for the whole group.	High: Use of analytics and platforms that allow the pace and content to be customized according to the needs of the student.
Costs	It requires physical facilities and printed materials.	In some cases, it can reduce costs, eliminating the need for travel and the use of physical materials.
Feedback	Usually in person and at set intervals (e.g., tutoring, exam correction).	It can be instantaneous (in real time) and more frequent thanks to digital tools.
Student collaboration	Face-to-face, in class, or in extracurricular activities.	Facilitated through online collaborative tools such as forums, wikis, and shared documents.

In summary, the comparison between traditional and digital learning highlights not only their methodological and contextual differences, but also their points of convergence, which shows the need for integrative pedagogical approaches that take advantage of the strengths of both models.

1.2. Digital learning models

1.2.1. *What is and what is not a model?*

According to the Royal Academy of Language (RAE), a model is a "theoretical scheme of a system or a complex reality that is developed to facilitate its understanding or explanation". In the context of digital education, a model refers to a structured framework that guides how learning through digital means can be implemented and organized.

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An example of a digital learning model is blended learning (b-learning), which we will talk about later. This is an educational model that combines face-to-face teaching with online teaching. This model represents a way of integrating both modalities in a way that complements each other. Simply using a video conferencing platform to teach a traditional online class is not a model in itself; it is rather a tool or method. For it to be a model, it would need a structured approach and a set of principles or strategies to guide its use and implementation.

Distance education and online, digital or virtual learning have evolved significantly in recent years, giving rise to a wide variety of learning models and approaches that take advantage of digital and mobile technologies.

Thus, the main models that we can find are:

- **E-learning** can be defined as that which is based on the use of digital technologies to facilitate distance learning, allowing students to access online educational materials from anywhere. (Lima, 2016; Rotcha et al, 2020)
- **Asynchronous learning**. Students can access content and complete assignments on their own time. They use discussion forums, pre-recorded videos. (Lima, 2016)
- **Synchronous learning**. Real-time sessions where students and teachers interact directly. They require students and the teacher to be connected at the same time, allowing for real-time interactions, such as video conferencing (Zoom, Microsoft teams, Google Meet) and live chats. (Lima, 2016)
- **Blended learning** (b-learning). This term is usually used for that modality in which face-to-face and online classes are combined, where synchronous and asynchronous activities are mixed, offering flexibility and opportunities for interaction in real time. This model seeks to integrate the best of both worlds, facilitating access to information both inside and outside the classroom (Díaz, 2020; Lima, 2016; Rotcha et al, 2020)

Other models such as m-learning, u-learning, i-learning, p-learning are currently being developed and gaining strength:

- **M-learning (Mobile Learning):** It focuses on using mobile devices such as smartphones and tablets to access educational materials, allowing students to learn on the go and anywhere. (Díaz, 2020; Lima, 2016; Rotcha et al, 2020)
- **U-learning (Ubiquitous learning):** This model is based on the idea that learning can happen anytime, anywhere, using ubiquitous technologies that allow constant access to information. Therefore, it extends learning to any context and time, using ubiquitous technologies that allow for a continuous and omnipresent educational experience. (Lima, 2016; Rotcha et al, 2020)
- **I-Learning:** Uses immersive technologies such as virtual reality to create immersive educational experiences that increase student motivation and interest. (Makransky & Petersen, 2021; Rotcha et al, 2020)
- **P-Learning (Personalized or adaptive learning):** Personalize the educational process according to the individual needs and preferences of each student, using adaptive technologies. (Rotcha et al, 2020)
- **T-Learning (Television learning):** Uses television as a medium for the delivery of educational content, especially useful in contexts where access to the internet is limited. (Rotcha et al, 2020)

We can also find another type of model classification. Thus, depending on the dimension observed, we find the following approaches:

Depending on the type of platform:

- **MOOCs (Massive Open Online Courses):** Massive and open online courses that allow a large number of students to access high-quality educational content for free or at a low cost. In other words, they are courses accessible to a large number of people, often free, with paid certification options. Some examples of platforms that offer these massive courses are Coursera, edX, Udacity, among others, many universities are teaching MOOCs in their training offer. (Rotcha et al, 2020)
- **Learning Management Systems (LMS):** These platforms are primarily used by educational institutions to manage and deliver online courses. Examples: Blackboard, Moodle, Canvas.

- **Microlearning:** A learning approach that uses small units of educational content, facilitating the assimilation of information in short periods of time. They offer short and concise content for quick and specific learning of skills. Examples: Duolingo, Khan Academy. (Rotcha et al, 2020)
- **Self-Learning:** Students choose courses based on their interests and progress at their own pace. (LinkedIn Learning, Skillshare etc.).

Depending on the pedagogical approach we can define:

- **Traditional models:** They are based on the transmission of information from the teacher to the student, like face-to-face classes.
- **Active models:** Focused on manipulation, contact, and direct experience with the objects of study.
- **Collaborative models:** They seek to develop creativity and critical thinking, using methodologies such as project-based learning or collaborative learning. Students work together on projects and assignments, encouraging interaction and cooperation. They use shared documents such as Google Docs for group work, social networks, discussion forums...
- **Flipped classroom:** Theoretical content is studied asynchronously, and class time is dedicated to practice and discussion. That is, students study the material at home and carry out practical activities in class (synchronous).

Each of these models has its own advantages and disadvantages, and choosing the right model will depend on factors such as course content, student needs, available resources, and educational goals. Research on digital education models is a dynamic and constantly evolving field. But it is still possible to develop a deep understanding of how these changing models can improve teaching and learning in the current and future context.

Depending on the device type:

- **Computer-based eLearning (PC/laptops):** Ideal for graphics-rich content, simulations, and detailed learning.
- **Mobile eLearning or m-learning (smartphones/tablets):** Designed for learning on the go, with short and responsive modules.

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- **eLearning on wearable devices:** Used for microlearning, quick training, or augmented/virtual reality.
- **Educational television:** Used in regions with limited internet access, combining visual and dynamic content.

All models described in this section, each of these models has specific advantages and limitations, so the choice of the most appropriate approach must take into account multiple factors, including the nature of the content, the characteristics and needs of the students, the technological and pedagogical resources available, as well as the training objectives pursued. In this sense, a strategic combination of both models can offer a more flexible, inclusive and effective response to the current challenges of education.

1.3. Digital instructional design models

Once the teaching modality and the way in which learning will be taught with the models of the previous point are available, the question remains of how learning will be designed. Instructional design (ID) is a systematic process used to develop education and training programs consistently and reliably (Senadheera et al., 2024).

Instructional design in virtual learning uses a variety of models to guide the creation of effective learning experiences. Models such as ADDIE, rapid prototyping, ASSURE, Dick and Carey, and IDEA are some of the most recognized and used in this field.

ADDIE Model

The ADDIE model is one of the most widely used frameworks for instructional design, composed of the phases of Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). During the analysis phase, educational needs are identified and learning objectives are established. In the design phase, instructional strategies are selected, and the necessary materials are planned. The development phase involves the creation of learning materials and activities. In the implementation phase, the delivery of the program is carried out, and finally, the evaluation consists of measuring the effectiveness and making necessary adjustments.

Advantages and disadvantages: ADDIE is known for its clear and systematic structure, which facilitates planning and execution (Branch, 2009). However, it can be seen

as a rigid and linear approach, which might not be suitable for more dynamic learning environments.

Rapid Prototyping Model

The rapid prototyping model focuses on preliminary prototyping of instructional material to receive early feedback and adjust the design before final implementation (Jones & Richey, 2000). This approach allows you to quickly iterate on instructional design, incorporating improvements based on user feedback.

Advantages and disadvantages: Rapid prototyping is advantageous for saving time and resources, as it allows problems to be identified and corrected at an early stage (Jones & Richey, 2000). However, it may lack the detailed planning and structure of other models, which could affect the quality of the final product if iterations are not properly managed.

Modelo ASSURE

The ASSURE model is an instructional design approach that emphasizes the use of technology and media in teaching. Its steps include analysing student characteristics, setting goals, selecting methods and means, using materials, requiring active student participation, and evaluating (Heinich et al., 1999). This model explicitly integrates the use of educational technologies to improve the teaching-learning process.

Advantages and disadvantages: The ASSURE model stands out for its focus on technology integration and for being student-centred (Heinich et al., 1999). However, it can be complicated to apply in educational settings with limited technological resources.

Dick and Carey's Instructional Design Model

Dick and Carey's model considers learning as a complete system in which all components interact to facilitate effective learning (Dick, Carey, & Carey, 2014). This systemic approach includes identifying objectives, conducting instructional analysis, designing assessments, and developing instructional strategies.

Advantages and disadvantages: Its detailed and comprehensive approach allows for close alignment between learning objectives and assessments, promoting effective learning (Dick, Carey, & Carey, 2014). However, it can be seen as a complex and laborious process.

Modelo IDEA (Identify, Design, Evaluate, Adjust)

The IDEA model emphasizes an iterative process in which needs are identified, solutions are designed, evaluated, and adjusted based on the feedback obtained (Morrison

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et al., 2010). This flexibility allows instructional design to be adapted quickly to the changing needs of the educational environment.

Advantages and disadvantages: The main advantage of the IDEA model is its adaptability and focus on continuous improvement, allowing for rapid adjustments based on evaluation (Morrison et al., 2010). However, it may lack the formal structure of other models, which could lead to a less systematic approach in some cases.

Below is a comparative table (Table 2) of instructional design (ID) models, including their features, advantages, disadvantages, and functionality:

Board 2. Comparison of digital instructional design models

ID Model	Characteristics	Advantages	Disadvantages	Functionality
ADDIE	Generic process with five phases: Analysis, Design, Development, Implementation, Evaluation.	It provides an organized and holistic process for the development of instructional materials.	It can be perceived as the rigid or linear, of which may not suit all contexts.	Used in online, blended, and face-to-face courses.
Rapid Prototyping	Agile approach that allows for rapid course development.	Effective in situations with limited time and resources.	It requires a high level of expertise in using the model.	Ideal for developing new courses on tight deadlines.
Model 4C/ID	Focused on the development of complex competencies and professional skills.	Effective in meeting learning objectives and ensuring student satisfaction.	It can be complex in its implementation and requires careful planning.	Designed for educational programs that teach complex skills.

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Morrison, Ross, and Kemp (2004)	Model focused on the needs of adult learners.	Adaptable to different contexts and learning needs.	It may not be as well-known as other models, which can make it difficult to adopt.	Used to meet the learning needs of adult learners.
IDEA	Focused on the integration of information literacy in academic courses.	Promotes critical skills in the use of information.	It may be limited in its application to courses that do not focus on information literacy.	Integration of information literacy into course design.
ASSURE	Model that incorporates multimedia and technology learning.	Enhance the learning experience through technology.	It may require technological resources that are not always available.	Used to enrich learning in online environments.
Blended Learning Conversion Model in Six Steps	Structured process for developing blended courses.	It provides a clear and systematic approach to blended course design.	It may be less flexible compared to other, more adaptive models.	Focused on creating courses that combine online and face-to-face learning.
New Models	Developed according to the specific needs of the courses.	Adapted to local contexts and specific learning needs.	They cannot be generalized; Their effectiveness depends on the context in which they are used.	They vary depending on the specific goal, such as improving problem-solving skills or work-based learning.

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In the case of developing an inclusive and accessible digital design, it is necessary to know the regulations on inclusion and accessibility. To this end, we have collected a series of laws that should be considered.

EU Directive 2019/882, the UNE 71362:2017 Standard, the European Education Area and the Digital Education Action Plan share an approach focused on the quality, accessibility and inclusion of digital educational resources. These regulatory and policy tools complement each other to ensure that the digital transformation in European education is inclusive, innovative and focused on quality learning.

— **EU Directive 2019/882**

Directive [\(EU\) 2019/882](#), known as the European Accessibility Act, is a directive that aims to improve the functioning of the internal market for accessible products and services, removing barriers created by divergent rules in Member States.

This European directive of the European Parliament and of the Council, adopted on 17 April 2019, sets out accessibility requirements for products and services in the European Union's single market. Its main objective is to ensure that people with disabilities have access to products and services in a similar way to any other citizen, promoting inclusion and equal opportunities. The key points of the directive are as follows:

- **Accessibility requirements:** Products and services must be designed in such a way that they can be used by people with disabilities, without physical or digital barriers, facilitating their participation in society and the economy. This includes features such as intuitive interfaces, support for assistive technologies, and equitable access to digital content.
- **Scope:** It covers a wide range of essential products and services, such as electronic devices, payment terminals, telecommunications services, transportation, banking services, and online commerce, among others.
- **Technical standards and harmonisation:** Member states must ensure that products and services comply with the accessibility standards set by the EU, based on common criteria to facilitate access to national and international markets.

- **Surveillance and enforcement:** The directive sets out assessment and monitoring procedures to ensure compliance with accessibility standards, including cooperation between national authorities and the EU to ensure uniformity.
- **Social inclusion objective:** The law seeks to eliminate accessibility barriers faced by people with disabilities, improving their quality of life and favoring their social, educational, and labour inclusion.

This Directive (EU) 2019/882 represents an important step in the EU legal framework to foster a more inclusive, accessible and equitable Europe for all citizens, regardless of their abilities. Its implementation reinforces Member States' commitment to the principles of universal accessibility, in line with Article 9 of the United Nations Convention on the Rights of Persons with Disabilities, adopted on 13 December 2006.

— **Norma UNE 71362**

In relation to this directive and already entering the educational field, we find the [UNE 71362:2020 Standard](#), which establishes the requirements to guarantee the **quality of digital educational materials**. It establishes **standardized criteria** of didactic, technological and accessibility quality.

The **UNE 71362:2020 Standard** aims to ensure that materials are accessible, appropriate and effective in the teaching-learning process, favouring the inclusion and interaction of students with different abilities. It seeks to create quality educational resources and to be able to evaluate them accurately and objectively, in order to choose the best accessible resources. The key aspects of the standard are:

- **Accessibility:** Materials must be accessible to people with different disabilities, following digital accessibility guidelines.
- **Interactivity:** The creation of interactive content that facilitates the active participation of the student is encouraged.
- **Usability:** Materials should be easy to use, with an intuitive and user-friendly interface.
- **Adaptability:** The content must be adjusted to the needs and characteristics of the students, including tools that allow its personalization.

- **Standards compliance:** The standard promotes the use of technical standards to ensure the interoperability of educational materials across different devices and platforms.
- **Assessment and feedback:** Materials should offer tools to assess student progress and provide constructive feedback.

In summary, **UNE 71362:2020** establishes a series of guidelines for the creation of digital educational materials that are accessible, inclusive and of quality, in order to support a more efficient and equitable educational process. In addition, the quality of digital educational resources can be assessed based on 15 criteria established in the standard, which are described below:

1. **Didactic description:** Evaluates the clarity and precision of the objectives, recipients, competencies, instructions for use, estimated time and previous knowledge required.
2. **Quality of content:** Values coherence with the didactic objectives, clarity, veracity, timeliness and respect for copyright.
3. **Ability to generate learning:** Analyses whether the content facilitates the relationship with previous knowledge, stimulates reflection, critical capacity and its practical applicability.
4. **Adaptability:** Consider whether the material fits the needs and expectations of the student and their previous knowledge, offering different levels and formats that facilitate learning.
5. **Interactivity:** Examines the presence of interactive activities, student learning control, progress monitoring, and a variety of exercises.
6. **Motivation:** Assess whether the material promotes autonomous learning, presents attractive and innovative content, favours communication and collaboration, and whether the learning time is adequate.
7. **Format and layout:** Analyses the ease of use, clarity, organization, quality of multimedia elements, variety of formats, and visual appeal of the material.
8. **Reusability:** Consider using the material to create new resources and their applicability to different disciplines or groups of students.

9. **Portability:** Evaluates whether the material can be used on various devices (computer, tablet, mobile) and its operation with or without an internet connection.
10. **Robustness and technical stability:** Examines the reliability of the material during use, speed of response and availability of aids in the event of technical problems.
11. **Structure of the learning scenario:** Assesses the organization and sequencing of content, facilitating a logical progression in learning.
12. **Navigation:** Analyses the clarity and functionality of the links, ensuring intuitive and efficient navigation through the material.
13. **Operability:** Consider the ease of use of the material with different input devices (mouse, keyboard, touch screen) and the adaptation to the user's needs.
14. **Accessibility of audiovisual content:** Evaluates the contrast of colours, control of reproduction and availability of textual alternatives for audiovisual content, facilitating its use by people with disabilities.
15. **Accessibility of textual content:** Analyses the readability of texts, including font size, spacing, and formatting, ensuring their accessibility for all users.

At the National Institute of Educational Technologies and Teacher Training (INTEF) we can find for download ANNEX [F of the UNE 71362 standard](#) that provides us with the rubrics to evaluate the accessibility of digital resources according to the 15 criteria, both by the student and the teacher.

This UNE 71362 standard focuses on guaranteeing the quality of digital educational materials. The objectives and criteria of the standard are aligned with the priorities of the European Education Area and the Digital Education Action Plan.

— **European Education Area**

The European Commission proposed at the Gothenburg Social Summit (2017) the creation of a [European Education Area by 2025](#), as part of the debate on the future of Europe. This vision aims to maximise the potential of education and culture as drivers for job creation, social justice, active citizenship and European identity (European Commission, n.d.). This European Education Area (EEA) seeks, among other things, to strengthen cross-border mobility, invest in education and promote a common European identity:

- **Cross-border mobility:** Promote Erasmus+ and create the EU student card.

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- **Investment in citizens and education:** Increase investment in education to 5% of GDP.
- **Strengthening European identity and cultural heritage:** Through initiatives such as the European Agenda for Culture and support for common values.

Cooperation between Member States should be based on mutual trust, mobility, recognition of qualifications, and the exchange of good practices; to address challenges such as digitalisation, increasing inequalities and an ageing workforce and aims to improve key competences, highlighting media literacy and critical thinking.

The proposal seeks to prepare Europe for the challenges of the future through inclusive, digitalised and culturally rich education, which fosters cooperation between Member States and promotes active and cohesive citizenship.

The five main themes of the EEA are:

- **Educational quality and equity:** Guarantee inclusive and high-quality education, reducing inequalities in education systems.
- **Digital education:** Integrate digital technologies in teaching and learning to improve the digital skills of students and teachers.
- **Ecological education:** Promote sustainability and environmental awareness in educational programs.
- **Support for educators:** Promote professional development and support for teachers and school leaders to improve educational quality.
- **International dimension:** To promote academic mobility and global cooperation to enrich education and cultural diversity in Europe.

— **Digital Education Action Plan (2021-2027)**

The Digital Education Action Plan 2021-2027 is a key factor in realising the goal of achieving a European Education Area by 2025. It contributes to the achievement of the objectives of the European Skills Agenda, the European Pillar of Social Rights Action Plan and the "Digital Compass 2030: Europe's approach to the Digital Decade". It is a key tool for modernising education in Europe, fully aligned with the European Education Area and the issues it addresses, such as mobility, equity, sustainability and international cooperation.

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This plan proposes a set of initiatives for inclusive and accessible digital education in Europe that is characterised by its high quality. It has two long-term strategic priorities:

- Foster the development of a high-performance digital education ecosystem. By establishing structured dialogues with Member States, creating recommendations on blended learning and connectivity, and developing a European framework for digital educational content.
- Improving digital skills for digital transformation. Through guidelines to promote digital literacy, the updating of the European Digital Competence Framework and the promotion of female participation in STEM (science, technology, engineering and mathematics).

The plan includes the creation of a **European Digital Education Hub** that will strengthen cooperation in digital education at European level.

The [European Digital Education Centre](#) is an online community that connects digital education enthusiasts across Europe. Its mission is to overcome the existing fragmentation in the policies, research and practices of implementation of digital education at European level. To achieve this, the Centre promotes the exchange of best practices, peer-to-peer learning and collaboration across all sectors of education and training. Since its inception in June 2022, the Centre has reached more than 5,500 members, published more than 100 papers and carried out more than 200 activities, consolidating itself as a key platform for collaboration and the development of digital education in Europe.

Red eTwinning

Another online community that connects schools across Europe to foster collaboration between teachers and students is the [eTwinning Network](#). This project was launched in 2005 as an initiative of the European Commission within the framework of the **Lifelong Learning Programme** and was a precursor to many other European educational cooperation programmes. Its initial objective was to create a digital space for collaboration between schools, strengthening the international dimension of education and the construction of a European citizenship. It allows schools from different countries to work together on educational projects and collaborative learning activities, promoting cultural exchange, the use of digital technologies and the development of transnational skills.

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1.4. Conclusion

The journey made throughout this module has allowed a deep understanding of the different digital learning models that make up the current educational landscape. From a theoretical and applied perspective, the foundations of digital learning, its historical evolution, as well as the emerging trends that are transforming pedagogical practices at all educational levels have been analysed.

Digital learning models – such as e-learning, b-learning, synchronous and asynchronous learning, m-learning, u-learning, among others – offer new opportunities to design educational experiences that are more inclusive, flexible, accessible and student-centred. Each of these models responds to different realities and training needs, which implies that their application must always be aligned with the educational objectives, the profiles of the students, and the institutional or technological context.

In addition, the importance of instructional design as a key element for the effective implementation of any digital model has been highlighted. Tools such as the ADDIE, ASSURE or Dick & Carey models provide systematic structures that allow coherent, innovative and meaningful learning experiences to be planned, developed and evaluated.

One of the main learnings of this module has been to understand that there is no single or superior model, but that the real value lies in the teacher's ability to select, adapt and combine models and strategies according to the specific circumstances. This integrative vision is essential to address the current challenges of digital education, from equity in access to the design of motivating and effective learning environments.

In short, knowledge of digital learning models and instructional design provides education professionals with solid tools to face the ongoing educational transformation. This transformation not only demands technical competence, but also a critical, creative and ethical attitude towards the use of technologies in the teaching-learning process. Thus, progress is made towards a truly inclusive, adaptive education aimed at the integral development of people in the knowledge society.

1.5. Assessment exercises

Learners will then be able to reflect on digital learning with the following short, multiple-choice questions:

Short questions (open-ended)

1. What is the main difference between synchronous and asynchronous learning?
2. Why is instructional design important in digital environments?
3. He mentions two digital learning models and a distinctive feature of each.
4. What role does flexibility play in digital learning?
5. What is meant by m-learning and in what contexts is it usually applied?

QUIZZ MODULE 1

Multiple choice questions (with solution)

1. Which of the following models combines face-to-face teaching with virtual activities?
a) e-learning
b) b-learning
c) u-learning
→ Correct answer: b) b-learning
2. The ADDIE model is mainly used to:
a) Evaluate technological resources
b) Design courses and learning experiences
c) Measure digital competencies
→ Correct answer: b) Design courses and learning experiences
3. Asynchronous learning is characterized by:
a) Requires the simultaneous presence of the teacher and the student
b) Takes place in real time with direct interaction
c) Allows the student to access the content at any time
→ Correct answer: c) Allows the student to access the content at any time
4. Which of the following statements best defines m-learning?
a) Use of mobile technologies for learning anytime, anywhere

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- b) Gamification-based learning
 - c) Personalized teaching on LMS platforms
 - Correct answer: a) Use of mobile technologies for learning anytime, anywhere
5. What model promotes ubiquitous learning through contextual and intelligent technologies?
- a) b-learning
 - b) u-learning
 - c) e-learning
- Correct answer: b) u-learning
6. Digital learning is distinguished by:
- a) It always requires the physical assistance of the student
 - b) It is based on exclusively traditional methods
 - c) It incorporates technology as a means to facilitate and enrich teaching
- Correct answer: c) It incorporates technology as a means to facilitate and enrich teaching
7. One of the advantages of e-learning is:
- a) Greater rigidity in schedules
 - b) Limited multimedia resources
 - c) Accessibility from different places and times
- Correct answer: c) Accessibility from different places and times
8. Which of the following models relies more on informal and contextual learning?
- a) u-learning
 - b) b-learning
 - c) e-learning
- Correct answer: a) u-learning
9. In the ASSURE instructional design model, the "R" stands for:
- a) Review the technology used
 - b) Reinforce participation
 - c) Require student participation
- Correct answer: c) Requires student participation

10. A virtual learning environment (VLE) is:

- a) A tool exclusively for teachers
- b) A digital environment where training processes are managed and developed
- c) A passive repository of documents

→ Correct answer: b) A digital environment where training processes are managed and developed

UNIT 2 UNIVERSAL LEARNING DESIGN FOR A DIGITAL ENVIRONMENT

Universal Design for Learning (UDL) is a pedagogical approach that seeks to ensure that all students, regardless of their abilities, learning styles or personal contexts, can access, participate in and progress in educational processes. In digital environments, UDL takes on even greater relevance, as technologies offer multiple opportunities to personalize teaching, eliminate barriers, and promote educational equity (*further information you can find in Module 2*).

Applying UDL in the digital field involves creating flexible, accessible and responsive learning experiences, which contemplate different ways of representing information, involving students and offering alternatives for expression and action. Thus, digital learning not only adapts to the diversity of the student body but also becomes a powerful tool for inclusion and active participation.

2.1. Virtual learning environments

Virtual learning environments (VLEs) allow access to different educational and communicative resources to facilitate learning through a virtual platform. The management of virtual platforms focuses on providing tools for online learning, communication, and assessment. Among the key advantages of a virtual environment, we highlight flexibility, accessibility, collaboration, and integration of different resources. Virtual learning environments are used for training at any educational level, creating enriching experiences adapted to the profile of students and promoting autonomous and guided learning.

Efficient management of virtual learning environments (VLEs) requires adequate structuring and organization of resources. This facilitates constant feedback between teachers and students, promoting active and motivating communication.

The management of a virtual learning environment must have an adequate structuring and organization of resources to develop feedback between the teacher and the student in it.

Among main features are:

- **Content and activity management:** They allow you to design and organize resources and tasks that enhance learning.
- **Continuous feedback:** They favour an effective interaction between the teacher and the student, ensuring active and meaningful participation.
- **Motivation and autonomy:** They seek to involve students in their own learning process, stimulating their commitment and responsibility.

Virtual learning environments offer essential advantages, such as the personalization of the training process ("just in time" and "just for me"), the integration of both synchronous and asynchronous communication tools, and the promotion of group and collaborative dynamics. According to Cabero (2006), these spaces facilitate the development of students' autonomy by allowing them to interact actively with the members of the virtual educational community (students, teachers, and tutors), promoting collaboration and knowledge exchange. Participation in forums and other online activities not only enriches individual learning but also strengthens the collective construction of knowledge in an inclusive and dynamic digital environment. Today, these virtual environments need to be adapted to multiple devices to demonstrate the **flexibility** and **ubiquity** of learning as key features.

According to MacDonald (2008), to achieve effective intervention in virtual environments, it is essential to build trust by creating a safe learning space that motivates students. In addition, communication must be adapted to the individual needs of each student, promoting a personalized approach. It is crucial that the study is placed at the centre of the experience, ensuring that the content and activities are relevant and meaningful. Intervention should be timely, providing support when it is really needed and helpful. Flexible support should also be offered, allowing students, both individually and in groups, to review and reflect on resources and activities.

Finally, the environment must be accessible and available to an adequate number of students, ensuring inclusion and active participation of all.

Case example - the tutorial function at the UNED

The tutorial function at the UNED is conceived as a student-centred process, promoting their active participation in learning and overcoming the traditional model in which they acted as a passive receiver of information. In this context, the tutor becomes a key agent who accompanies and guides the student in their training path. According to Medina, Domínguez and Sánchez (2010), it is a "virtual accompaniment" in which the tutor not only guides, but also facilitates activities aimed at the acquisition of key skills for professional life. This approach encourages the autonomy, critical capacity and reflection of the student, fundamental aspects for their effective integration into the workplace.

The functions of the tutor

In accordance with article 6 of the UNED Tutor Teacher Statute, the tutor's functions include:

Function	Description
Provide guidance	Guide in the preparation of the subject and clarify doubts about content following the guidelines of the Department.
Perform, track and grade internships	Supervise and evaluate the practices, in accordance with the indications of the teaching team.
Correct continuous assessment tests	Correct and explain the criteria used in the continuous assessment tests.
Report on the level of preparedness	Communicate to the teaching team the level of preparation of the students, especially through continuous assessment.
Guidance for face-to-face tests	Advise students in the preparation of face-to-face tests.
Participate in the follow-up of the virtual course	Collaborate in the virtual course according to the guidelines set.

Source: UNED (n.d.). [Tutor Teacher Statute](#)

— The digital tutor: competencies and roles in virtual environments

Teacher support in digital environments is essential to guarantee a personalized and enriching educational experience. As García Aretio (2023) states, the digital tutor performs multiple functions ranging from pedagogical design to guidance, motivation, and evaluation,

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thus contributing to effective teaching in virtual scenarios. In addition to this approach, recent studies highlight the strategic value of e-tutoring in distance education, both for its academic effectiveness and for its emotional and organizational impact (Maré & Mutezo, 2021; Raviolo et al., 2023).

Key competencies of the digital tutor

The specialized literature identifies various competencies necessary for the effective performance of the digital tutor.

These include:

a) Pedagogical competencies

They imply the ability to design learning strategies adapted to the virtual environment, facilitate autonomous and collaborative learning, provide effective feedback and promote critical skills.

b) Socio-emotional competencies

Related to emotional support and motivation, they allow the tutor to generate a positive virtual environment, promote resilience and respond to the affective needs of the students.

c) Organisational and administrative skills

These include planning activities, time management, attention to course logistics and efficient interaction with the educational platform.

d) Technical skills

Fundamental for the management of platforms, they allow the implementation of technological resources and solve basic incidents in virtual environments.

e) Social competencies

Linked to the creation of positive relationships with students, they promote participation, collaboration and a sense of community.

f) Informational competencies

They refer to the ability to search, evaluate and use relevant and truthful information.

Authors such as Raviolo et al. (2023) order these competencies according to their perceived importance: first pedagogical competencies, then socio-emotional, organizational, administrative, technical, social, and informational support competencies.

In addition, they propose a **distinction between two types of tutor: *the support tutor (online)* and *the discipline tutor***. The first is in charge of organizational, administrative and social aspects, and does not require scientific specialization; the second has in-depth training in the subject and focuses on the pedagogical aspects of the content, although its availability is usually less.

This functional division allows tutoring services to scale in university settings, being especially useful when the number of students increases. According to Raviolo et al., when both roles are merged into a single figure, the academic dimension tends to prevail, to the detriment of organizational and emotional orientation.

Fundamental roles of the tutor in digital teaching

Based on García Aretio (2023), the following roles of the tutor in virtual environments are identified:

- **Process designer and manager:** Plans and manages course resources.
- **Personal counsellor:** Diagnoses needs and personalizes teaching.
- **Information provider:** Selects and presents relevant content.
- **Group facilitator:** Promotes collaboration and interaction between students.
- **Motivator and facilitator:** It stimulates interest and helps to solve difficulties.
- **Supervisor and evaluator:** Carries out continuous and formative monitoring.
- **Quality agent:** Reflects on their practice and applies improvements.

Virtual learning environments promote "just in time" and "just for me" training, incorporating synchronous and asynchronous tools that facilitate interaction between students, teachers, and tutors (Cabero, 2006). One of the most outstanding strategies in this area is **e-tutoring**, which has proven its effectiveness in universities such as South Africa (Unisa). According to Maré and Mutezo (2021), students who actively participate in e-tutoring spaces obtain better academic results and reduce their sense of isolation, while reinforcing collaborative learning. This finding reinforces the need to properly expand and structure digital tutoring services to improve student success.

2.2 Introduction to universal learning design (UDL)

2.2.1 What is the UDL?

Universal Design for Learning (UDL) is an educational approach that seeks to remove barriers to learning, providing all students with equal opportunities to learn. UDL is based on the premise that not all students learn in the same way, so it is critical to design flexible learning environments that can accommodate different needs, abilities, and preferences. This approach arises in response to the need for a more inclusive education, considering the diversity of students, including those with disabilities, learning difficulties, cultural and linguistic differences (Meyer, Rose, & Gordon, 2014).

History of UDL

The concept of UDL is based on the principles of neuroscience and research by the **Centre for Applied Special Technology (CAST)** in the 1990s. CAST investigated how technologies could improve teaching and learning, and developed a framework to help educators create materials and methods accessible to all. In 2008, UDL was included in the Individuals with Disabilities Education Act (IDEA) in the United States, cementing its importance in education (Meyer et al., 2014).

2.2.2 The Three Pillars of UDL

UDL is structured around three fundamental pillars that promote flexibility in teaching and learning:

1. **Provide multiple means of representation.** This principle refers to the need to present information in different ways so that students can understand it according to their preferences and cognitive abilities. Some students may need simplified graphics, videos, or texts, while others might benefit from more detailed texts or in-depth analysis.
Example: Using subtitles in educational videos to support students with hearing difficulties or those who are learning a new language (Rose, 2000).
2. **Provide multiple means of action and expression.** This principle recognizes that students vary in the way they can express themselves and, in their motor, organizational, and planning skills. Therefore, flexibility should be offered in how students respond or demonstrate their knowledge.

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Example: Allowing students to choose between taking a written exam, a video presentation, or a multimedia project to demonstrate their understanding of a topic (Rose & Meyer, 2002).

3. **Provide multiple means of involvement.** The third principle highlights the importance of motivating students in different ways. Some students may feel motivated by challenges, while others may need emotional support and frequent feedback.

Example: Include gamification elements or provide collaborative learning opportunities online to increase student engagement (CAST, 2018).

Further information you can find in Module 2.

UNIT 3 APPLYING UDL IN ONLINE LEARNING

In digital learning environments, UDL provides a crucial framework to ensure that online platforms are accessible to all learners. With the rise of distance learning, especially after the COVID-19 pandemic, the application of UDL in virtual environments has become more relevant.

3.1. *Principles of UDL on digital platforms*

- **Representation:** Digital platforms should offer multimedia resources such as videos, infographics, and accessible texts (using screen readers, subtitles, and transcripts).
- **Action and expression:** Provide tools such as discussion forums, spaces to upload work in different formats (audio, video, text), and assistive technology for students with disabilities.
- **Involvement:** Use interactive techniques such as quizzes, educational games, and collaborative exercises that keep students engaged (Hall, Meyer, & Rose, 2012).

3.2. *How to implement the UDL?*

- **Moodle:** Learning platform that allows the integration of a wide range of multimedia resources, supports forums, quizzes and allows the adaptation of activities.
- **Google Classroom:** Provides a flexible structure where teachers can assign work in different formats and provide individualized feedback.
- **Microsoft immersive reader:** Facilitates access to texts by personalizing reading, providing tools such as reading aloud and text translation.

UNIT 4 TOOLS AND RESOURCES FOR IMPLEMENTING UDL

To apply UDL in digital environments, teachers can use various technological tools and resources that facilitate accessibility:

Online accessibility tools

- **Accessible multimedia resources:** It is crucial that the resources used in the virtual classroom (videos, graphics, presentations) include accessibility options, such as subtitles, audio descriptions, and transcripts.
- **Assistive technologies: Programs** such as screen readers (NVDA, JAWS) and assistive touch devices for students with visual impairments.

Platforms for collaboration and content creation

- **Padlet:** Collaborative tool that allows expression in multiple formats (text, image, audio) and facilitates the exchange of ideas.
- **Kahoot:** Gamification platform that can increase student engagement by offering interactive quizzes and real-time review games.

4.1. Inclusive assessment in digital environments

Inclusive assessment, aligned with the principles of UDL, seeks to measure learning so that all students have the opportunity to demonstrate their knowledge without being limited by barriers to access or expression.

Characteristics of an inclusive assessment

- **Flexibility in response forms:** Students should have the opportunity to choose from several formats to demonstrate their understanding (written essays, multimedia projects, oral presentations).
- **Continuous and formative assessment:** Use formative assessments (self-assessments, frequent feedback) rather than relying only on summative tests.
- **Transparency in assessment criteria:** Ensure that all students have a clear understanding of assessment objectives and criteria, providing detailed rubrics and examples of successful work (Ketterlin-Geller & Johnstone, 2006).

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Digital tools for inclusive assessment

- **Google Forms:** Allows the creation of custom quizzes that can include different types of questions (multiple choice, short answer, open-ended questions).
- **Edpuzzle:** Tool that allows teachers to insert questions within videos to assess real-time comprehension.
- **Flipgrid:** Video assessment platform where students can record and share their answers, facilitating oral and visual expression.

4.2. HERRAMIENTA_RUBRIC BASED ON UDL (CAST) FOR TEACHERS TAKING INTO ACCOUNT THE UNIVERSAL DESIGN OF LEARNING.

Rubric evaluation

The main objective of this rubric is to analyse the effectiveness of Universal Design for Learning (UDL) in promoting equal educational opportunities for curriculum design. We have used the guidelines and principles of CAST, developing the variables according to the principle as a tool to assess the curriculum.

Universal design involves planning learning activities that are accessible and challenging for all from the outset. This framework provides a structure to guide the design of learning activities and assessments, enabling the participation and progress of all. We propose analysing curricula using this framework:

Figure 3. Principles and UDL Variables. Original work based on CAST (2018)

Principle	Learning	Variable
Principle I Provide multiple means of representation	The "what" of learning	V1. Provide options for perception
		V2. Provide options for language, symbols, and mathematical expressions
		V3. Provide options for comprehension
Principle II		V4. Provide options for physical interaction

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Provide multiple means of action and expression	The "how" of learning	V5. Provide options for expression and communication V6. Provide options for executive functions
Principle III Provide multiple means of engagement	The "why" of learning	V7. Provide options to capture interest V8. Provide options to sustain effort and persistence

Using the table 4 of principles and variables, we have developed a comprehensive rubric to guide the design and evaluation of the modules.

4.2.1. UDL evaluation rubric questionnaire modules-scale:

This rubric-based questionnaire can be used to systematically evaluate a module's adherence to UDL principles. Each principle and variable is scored individually, allowing for targeted feedback and improvements. We propose this rubric as a tool for the development of future modules, ensuring that they are designed to be inclusive and accessible for all learners.

UDL evaluation rubric questionnaire modules-scale:

Please rate each of the following principles and variables based on how well the module implements them. Use the following scale (Sánchez-Romero, 2024 - based on CAST (2018): **1 = Not Implemented; 2 = Partially Implemented; 3 = Fully Implemented**

Board 4. Rubric-Module Evaluation Based on Universal Design for Learning (UDL) – Principles and Variables - based on CAST (2018)

PRINCIPLE AND VARIABLE	RATING
Principle I: Provide Multiple Means of Representation (the “what” of learning) This principle focuses on how content is presented to students to ensure accessibility and understanding.	
V1. Provide options for perception	

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Has the content been presented using multiple formats (e.g., text, images, ☐ 1 ☐ 2 ☐ 3 videos, or audio)?

Are alternatives available for students with visual or auditory impairments ☐ 1 ☐ 2 ☐ 3 (e.g., subtitles, audio descriptions, color contrast)?

V2. Provide options for language, symbols, and mathematical expressions

Has the content been made accessible through different language, ☐ 1 ☐ 2 ☐ 3 symbols, or mathematical representations (e.g., glossaries, explanations, visual symbols)?

V3. Provide options for comprehension

Have strategies or activities been provided that support understanding ☐ 1 ☐ 2 ☐ 3 (e.g., summaries, concept maps, additional examples)?

Principle II: Provide Multiple Means of Action and Expression (the “how” of learning)

This principle focuses on how students can express their learning and interact with content.

V4. Provide options for physical interaction

Are there activities allowing students to physically engage with materials ☐ 1 ☐ 2 ☐ 3 (e.g., manipulatives, hands-on activities)?

Are these activities adaptable for students with motor impairments? ☐ 1 ☐ 2 ☐ 3

V5. Provide options for expression and communication

Have students been given different ways to express their knowledge (e.g., ☐ 1 ☐ 2 ☐ 3 oral presentations, written essays, visual or digital projects)?

V6. Provide options for executive functions

Have tools or strategies been provided to help students organize, plan, ☐ 1 ☐ 2 ☐ 3 and monitor their learning (e.g., calendars, time management tools, goal-setting)?

Principle III: Provide Multiple Means of Engagement (the “why” of learning)

This principle focuses on how to engage and motivate students in the learning process.

V7. Provide options to capture interest

Have engaging and relevant activities and materials been used to spark ☐ 1 ☐ 2 ☐ 3 students' interest?

Are real-world examples or cases integrated into the learning content? ☐ 1 ☐ 2 ☐ 3

V8. Provide options to sustain effort and persistence

Are there strategies in place to help students face challenges ☐ 1 ☐ 2 ☐ 3 progressively and remain motivated (e.g., feedback, motivational tips, collaborative opportunities)?

V9. Provide options for self-regulation

Have strategies been included to encourage self-regulation, such as goal-☐ 1 ☐ 2 ☐ 3 setting, self-assessment, or progress monitoring?

Overall comments and suggestions for improvement:

Strengths:

(Provide an overview of areas where the module effectively uses the UDL principles and variables.)

Areas for improvement:

(Provide recommendations for improving the module's alignment with the UDL framework.)

Suggestions for future enhancements:

(Propose any additional strategies or tools that could be implemented to further support UDL in the module.)

Scoring Summary:

- Principle I (Representation): ____/9
- Principle II (Action and Expression): ____/9
- Principle III (Engagement): ____/9
- Total Score: ____/27

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Summary of the evaluation:

After completing the evaluation, an analysis should be made to identify strengths and areas for improvement in each of the principles and variables of UDL. The following steps can be used:

- **Strengths:** Identify areas where the module has successfully provided multiple forms of representation, expression, and engagement, allowing students to access and participate effectively.
- **Areas for improvement:** Determine if there are any principles or variables in which the module has not been sufficiently flexible or accessible and propose adjustments to offer more options to students.
- **Suggestions:** Propose practical changes, such as incorporating more multimedia resources, offering more forms of expression in assessments, or designing activities that promote self-regulation and perseverance.

4.3. Conclusion

Universal Design of Learning in digital environments not only facilitates accessibility for students with disabilities but also creates a more inclusive and equitable environment for all. Implementing UDL principles and using inclusive digital tools allows teachers to deliver more personalized and effective learning experiences. This approach encourages student participation, expression, and motivation, removing barriers and optimizing learning opportunities.

4.4. Assessment exercises

Learners will then be able to reflect on digital learning with the following short, multiple-choice questions:

Short questions:

1. What is the objective of Universal Design for Learning (UDL)?
2. What role do virtual learning environments play in educational inclusion?
3. What is the role of the virtual tutor?
4. He mentions a technological tool that facilitates the application of the UDL.
5. What characteristics must an evaluation have to be considered inclusive?

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QUIZZ MODULE 1 (OPTIONAL)

Multiple-choice questions (with solution):

1. Which of the following principles is NOT part of the UDL?

- A. Multiple Representation
- B. Methodological uniformity
- C. Involvement

Correct answer: B

2. What tool allows you to insert questions within a video to assess comprehension?

- A. Edpuzzle
- B. Padlet
- C. Flipgrid

Correct answer: A

3. What is a key feature of virtual learning environments?

- A. Exclusively face-to-face learning
- B. Limitation of access to content
- C. Flexibility and accessibility

Correct answer: C

4. Which platform allows you to use rubrics, forums and resources adapted according to the UDL?

- A. Moodle
- B. PowerPoint
- C. Zoom

Correct answer: A

5. Which of the following exemplifies the principle of "action and expression" in the UDL?

- A. Subtitles on videos
- B. Choosing between delivering a video or a text
- C. Online Infographics

Correct answer: B

6. Which tool allows collaborative and expressive participation in text, image and audio formats?

- A. Flipgrid

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- B. Padlet
- C. Google Meet

Correct answer: B

7. What is a benefit of continuous assessment under the DUA?

- A. Relying on a final exam only
- B. Allow for frequent feedback
- C. Eliminate teacher participation

Correct answer: B

8. Which principle of UDL is directly related to student motivation?

- A. Involvement
- B. Representation
- C. Action

Correct answer: A

9. What is a tool that facilitates the accessible reading of texts in digital environments?

- A. Microsoft Immersive Reader
- B. Excel
- C. WhatsApp

Correct answer: A

10. According to the DUA, what allows the use of multiple response formats in evaluations?

- A. Standardization of learning
- B. Inclusion of all student profiles
- C. Reduction of evaluation time

Correct answer: B

Appendix I: Elements of the inclusive didactic unit

Below, we show the key elements for the design of a didactic unit:

TITLE OF THE DIDACTIC UNIT			
Context:			
The following will be taken into account:			
Description of the reality of the educational context	Interests of the students.	Starting point:	Final Product:
Remains of the 21st Century and Sustainable Development Goals 2030 Agenda			
JUSTIFICATION			
Justification of learning and how it is related:			
What is the purpose of this learning if we relate it to the development of the curriculum?			
How do we relate this learning in relation to our educational context?			
Educational Level	Area/Subject	Number of sessions	Timing
Stage/ Course			
DESCRIPTION OF THE TASK OR PROPOSAL:			
What and for what?			
Participating teachers:			
OBJECTIVES OF THE PROPOSAL:			

What do you want your students to learn?

CURRICULAR SPECIFICATION				
KEY COMPETENCIES	SPECIFIC COMPETENCE	EVALUATION CRITERIA	OUTPUT PROFILES	BASIC KNOWLEDGE
Recommendation of the Council of the European Union (2018): 1. Linguistics (CCL). 2. Multilingual (CP) 3. Mathematics and competence in Science,				

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Technology and Engineering (STEM).				
4. Digital (CD)				
5. Personal, Social, and Learning to Learn (CPSAA)				
6. Citizen (CC).				
7. Entrepreneur (CE).				
8. Cultural Awareness and Expression (CCEC)				

How do you want your students to learn?

ORGANIZATION	Sequencing of activities	Organization of Spaces/Times	Groupings	Resources and materials
			• Individual • Small group. • Medium Group. • Great group.	

ACCESSIBLE LEARNING Eliminate/minimize barriers to group learning and participation				
Physical Accessibility	Cognitive Accessibility	Sensory Accessibility	Emotional accessibility	
• Students can participate in any activity inside and outside the Center: • Physical possibilities: • Move autonomously around the classroom/center/playgrounds: Ramps, elevators, space around the tables in the classroom, etc. • Material possibilities.	• It refers to understanding the activities, the environments, the process, the tools, which benefits the level of understanding	• Students can access, through the senses, the information necessary to carry out activities, manipulate objects and move around environments. • For example: • Students with a physical disability are taken into account	• Students feel competent, safe and welcomed in the learning context. For example: • Take into account students with a	

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• School supplies, computers, furniture, etc. • Economic possibilities.	g. Resources: • Do all the students have the basic knowledge to carry out the activity? • Anticipation of the activities: What activities are we going to do? When are we going to hold them? Where, in the classroom, on the virtual platform, etc.? • Graduation of activities with different degrees of complexity. • Flexibility in the organization of the	when designing the activity. • Students with hypo/hypersensitivity are kept in the basin. • Take into account the lighting in our classroom, taking care of its acoustics. • Augmentative and Alternative Communication Systems, adapted ICTs.	history of school failure when carrying out activities. • Good atmosphere of work in the classroom
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	time of the activities. • Virtual spaces and platforms for greater accessibility. • Learning accessible through: Different formats (visual, auditory, multimedia) • Easy-to-read texts: Posters with different font with larger size, different colors, etc. • Vocabulary appropriate to the students. • Easy-to-read infographics.		
Uses multiple formats/tools to present information			
All students feel committed and motivated in their learning process.			
Learning is accessible both culturally and economically for all students.			
Free of gender stereotypes			
Gain access to presence, participation and learning for all students			

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METHODOLOGICAL AND DIDACTIC STRATEGIES	• Direct teaching. • Cooperative learning. • Learning communities. • Inquiry methodology. • Project-based learning. • Problem-based learning. • Thinking-based (critical) learning. • Education 5.0. • Service-Learning. • Learning Landscapes. • Flipped Classroom. • Gamification.
EDUCATIONAL RESPONSE TO DIVERSITY FOR INCLUSION	• Flexible layouts, featuring personalised options that allow students to progress from where they are. • Multiple forms of Representation, Expression and Involvement (UDL). • Various ICT resources in the teaching-learning process. • Flexible organization of spaces and times, curricular, methodological and monitoring/evaluation. • Educational response measures to diversity (early detection, preventive, ordinary, specific).

MODULE



Name of Lead Partner:

ASSOCIATION OF EARLY CHILDHOOD CARE PROFESSIONALS, AMPAT

DESCRIPTION

1. Module Title:

Module 2. Methodology for applying a contextualized and appropriate pedagogical design in innovative, attractive and quality electronic learning courses and resources.

2. Duration of the module

30 hours

3. ECTS credits / ECVET credits

2 credits / 1 credit

4. Authors

Prof. Pilar Gutiez Cuevas, PhD. (coordinator)

Castellar Lopez Guinea, PhD

Carmen Gutiez - Expert in Training Professionals in Technologies: Digital Training

5. Course learning outcomes: knowledge, skills and competencies acquired (objectives)

Those who have successfully completed training in this discipline:

- *You will know:*
 - ✓ Extensive theoretical knowledge of teaching methodology
 - ✓ Main methodologies for digital learning
 - ✓ Universal Design for Learning (UDL)
 - ✓ Learn about training technologies and methodologies that respect UDL
 - ✓ the special needs that determine/limit the use of methodologies in the instructional design of digital learning.
- *You will be able to:*

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- ✓ Adapt/create digital learning instructional design methodologies for different types of special needs.
- ✓ Establish teaching strategies that define what is going to be done.
- ✓ Know and apply the necessary technological resources that allow teaching and programming to be implemented.
- ✓ Develop skills in the practical application of basic person-centered methods.
- ✓ plan all the resources, appropriate to the characteristics of the students and inclusive, that will be inserted in the course.
- ✓ Select the necessary materials and technological tools for building e-learning courses.
- *It will be competent to:*
 - ✓ Effective communication that helps students achieve learning objectives while respecting UDL.
 - ✓ Increase the potential learning pathways available to students, especially where physical barriers or mobility challenges exist.
 - ✓ Increase digital skills in the use of assistive technologies.
 - ✓ Digital competencies, particularly on implementation of universal e-learning standards;
 - ✓ Digital competencies: Design generic, inclusive and specific aspects of each technology subject that facilitate inclusive educational practice.

6. Teaching methods

1. Employ a variety of teaching methods, practical activities and collaborative learning, real-life situations to engage students effectively.
2. Use interactive methods, role-playing and interactive games, MOOCs or microlearning courses.

7. Prerequisites (knowledge and skills from previous training) and requirements for other courses (simultaneous)

Have basic knowledge of:

1. Have knowledge about the management of digital platforms
2. Learn about the contextualization of classic and digital teaching models
3. Navigation in Moodle
4. Instructional Design (Distance Education and Virtual Education, Learning Models and Styles)

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5. Electronic strategies in the virtual classroom
6. Designing virtual classrooms: training proposals
7. Assessment as a teaching strategy
8. Electronic moderation and virtual tutoring (simulation)

8. Module content

A. Brief summary

This module will provide multiple forms of representation (the what of education), action and expression (the how of education) and participation (the who of education).

Its objective is to achieve the full participation of all students in the teaching and learning process, with the design of a curriculum, teaching methods and evaluations to be considered. Those who have any kind of difficulty or have any kind of disability. It allows to guarantee the inclusion of all students.

The methodology must ensure that all students have equal opportunities to succeed, offering multiple means of participation, representation and action. Technology plays an important role, as it offers diverse and accessible resources, while considering different learning needs.

The methodology must integrate these principles into the design of teaching units. Creating inclusive and effective UDL-compliant educational experiences with digital tools allows educators to design lessons that can accommodate a wide range of abilities and preferences.

This makes it easier to achieve the best learning outcomes for all students.

B. Thematic content of the module

a) theory

1. Methodological requirements of Universal Design for Learning (UDL) - **(7) hours**
2. Design of the methodology of the teaching unit - **(3) hours**
3. Methodological strategies for the digital assessment of students' skills (digital, reading to learn...) - **(3) hours**
4. Methodology in the design of inclusive and accessible learning - **(2) hours**

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b) practical activities

Learners will be able to choose one of the following options:

- Make a course/program proposal, based on the universal design for learning about digital competence to work with students with a specific pathology.
- Establish a search for tools that facilitate learning for the population with certain difficulties.
- Find adapted materials and relevant assessment systems to evaluate the progress made, considering the universal design of learning and the difficulties of that group of students.
- Find a good practice that includes basic aspects (objectives, methodology and evaluation system), as well as relevant technological tools that promote the development of that group of students.

C. Equipment required for teaching the module

- Personal electronic devices (computer systems and audio and video equipment, smartphones)
- Smart technologies (virtual glasses, 3D printers, 3D scanners, micromodules, microcontrollers, adapters, cameras, smart displays with movement, robots and others)
- Electronic platforms, including adaptive and other electronic platforms.

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10.Planned learning activities

Teamwork, problem solving, digital learning, project-based learning, teaching unit design

11. Evaluation methods and criteria

- Summative assessment
- End-of-unit summative assessments, final projects, or tests
- Development of e-learning instructional design materials according to all quality and UDL standards.

12. Languages

English, Spanish, Bulgarian, Portuguese, Turkish.

13. Internship/practice

Development of instructional design of e-learning materials with implementation of e-learning standards.

INTRODUCTION

ORIGIN

Universal Design emerged in the 1980s at the Center for Applied Special Technology (hereinafter CAST). Following the recognition of the rights of people with disabilities, Universal Design (UD) emerged in the United States and it proposed making designs that considered the diversity of the population as a whole, without architectural barriers, accessible to all people, with and without disabilities, while demonstrating that changes made to respond to the needs of people with disabilities benefited everyone (Center for Universal Design, 2008). The contributions of technologies offer multiple means of representation, action, expression and involvement that promote and guarantee an education accessible to all students.

CONCEPT

Universal Design for Learning (UDL) is a set of principles for developing curriculum that provides all students with equal opportunities to learn (CAST, 2011). One of the first ideas that we must keep in mind when referring to UDL is that this approach does not arise in the educational field, but comes from architecture. It involves a new approach to universal accessibility in education, to respond to the needs of all students, to guarantee an inclusive, equitable and quality education. This means offering environments that eliminate the barriers to learning that many students face. Talking about Universal Design automatically brings us to think about inclusion. Traditional teaching approaches, with generalist proposals, the use of traditional materials, aimed at the majority of students do not always respond to the needs of all students. UDL is a teaching model for inclusive education that recognizes the uniqueness of each student's learning, facilitates educational accessibility by making the curriculum flexible so that it adjusts to the needs, pace and characteristics of each student. Therefore, the main purpose of Universal Design (UD) is to promote: the design of products and environments that anyone can use, to the greatest extent possible, without the need for subsequent adaptation intended for a specific audience (CUD, 1997).

THE UDL

It constitutes an inclusive framework from which it is understood that there is no single way to motivate to get the student involved with a flexible scheme that can be adapted to the context and needs of the classroom.

UDL is based on the contributions of neuroeducation:

- Based on three neural networks involved in information processing or teaching and learning processes.
- The importance of these networks lies in the fact that they are linked to the “why”, the “what” and the “how” of the teaching and learning processes (Alba Pastor, 2019).
- Flexibility in objectives, content, materials and evaluation becomes relevant (Sánchez-Fuentes, 2023)

Networks and their connection with UDL are:

Affective networks:

- Responsible for assigning emotional meanings, they determine the degree of involvement of each student with the tasks, the learning and with the environment that surrounds them. They are linked to the “why” we learn something.

Recognition networks:

- They specialize in the recognition of the information presented, while facilitating the incorporation of the information into the body of knowledge that the student possesses. Therefore, it is linked to the “what” of learning.

Strategic networks:

- Those responsible for executive functions allow the student to complete the task, having designed a prior action plan. These networks connect with the “how” of learning.
- Based on a set of principles derived from the field of neuroscience, learning theories and contributions from technologies (Rose and Meyer, 2002), UDL attempts

to overcome one of the main difficulties faced by teachers in school classrooms: an inflexible curriculum.

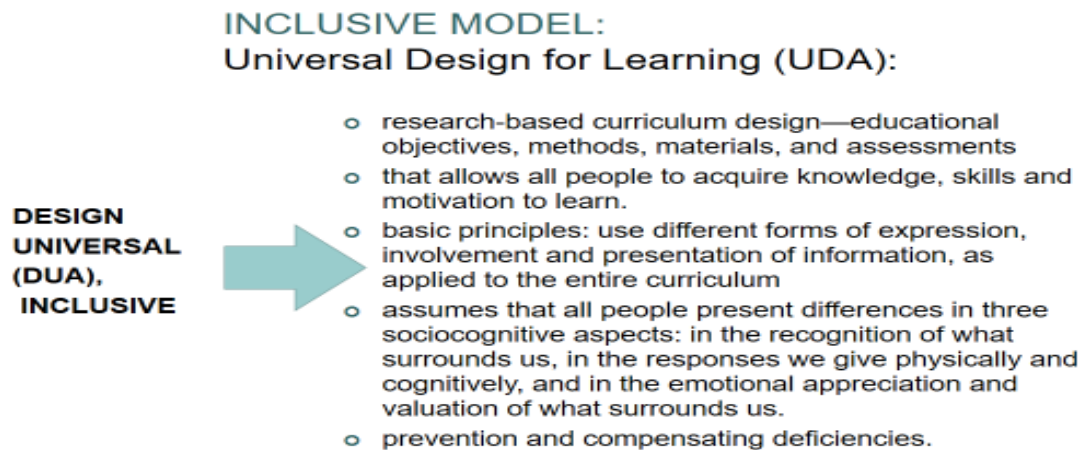
Your goal is to reduce exclusion in and from education and promote participation in learning for all students.

Universal Design for Learning brings together different pedagogical models and proposals that allow for providing and guaranteeing an inclusive, equitable and quality response to all students in the classroom.

Educating in and for diversity means diversifying the curriculum, with changes that educational centers must undergo, to configure them as an educational space open to all people. It involves establishing a pedagogical framework aimed at increasing the alternatives for access to learning by a diverse student body, which must consider prior knowledge, learning styles, pace and personal interests (López, 2008) and constitutes a step forward for inclusion, since it makes it easier for ordinary classroom teachers to direct their pedagogical practices in such a way, the use of resources, so that students benefit from the same opportunities (Rose and Meyer, 2002).

The formation of Initial training by university professors is essential, since they will be the ones who implement inclusive teaching practices (Lewis, 2019; Schwab and Alnahdi, 2020), although, currently, the deficiencies in their initial training do not facilitate their acquisition of the appropriate skills to respond to the educational challenges posed by inclusion (Cremades-Andreu, 2023). There is a significant imbalance between basic pedagogical skills, both in generalist teachers and in specialist or support teachers. It is necessary for them to know the theoretical-practical foundations, the essential elements to plan, program the teaching and learning process, the resources that can be used, from an inclusive approach: UDL, as well as the different methodological strategies with the purpose of students learning (Gil Izquierdo et al., 2018).

For this reason, it is considered necessary that Universal Design for Learning be a content to be worked on in their initial training.



Source: CAST, 1996

Unit 1 Methodological requirements of Universal Design for Learning (UDL)

Universal Design for Learning - It is the current educational paradigm, which implies a new vision in education. By placing ourselves in this paradigm and knowing it, it is necessary to be able to guarantee inclusive, equitable and quality education to all students. It allows us to talk about universal accessibility in education, by offering understandable, accessible environments that can be used by all people and by promoting the affective network in education, eliminating the barriers to learning that many students suffer from. From the UDL approach, it is possible to create, from the beginning, teaching programs and learning environments that eliminate barriers to presence, learning and achievement.

The three principles are:

- a) provide multiple forms of representation (the “what” of learning); Provide information in more than one format
- b) provide multiple avenues for action and expression (the “how” of learning); Students should be offered more than one way to learn
- c) provide multiple ways to engage (the “why” of learning). Each principle is further divided into three specific guidelines that specify in more detail different ways to follow those principles.

The beginning of the UDL depends on following principles:

- **Equal or equivalent:** The design should be easy to use and suitable for all people, regardless of their abilities and skills. It should offer the means as similar as possible for all users, identical when possible, equivalent when not. It should avoid prejudicing or stigmatising one type of user.

- **Offer flexible use:**

The design must be adapted, the reality of each classroom, to individual differences, abilities and preferences and include different alternatives for use by everyone.

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- **Functional and simple use:** The design should be simple to understand, regardless of the individual's level of concentration, knowledge or experience, language or. It eliminates unnecessary complexity. It is intuitive to use, simple in instructions.

- **Comprehensible Information:** The design communicates necessary information to the user, even if the user suffers from sensory impairment. It uses different forms of information (graphic, verbal, tactile). It provides adequate contrast between the information and its surroundings (use of colour). It maximises the legibility of essential information. It provides devices or technical aids for people with sensory limitations.

- **Security:** The design minimizes the hazards and adverse consequences of accidental or unintentional actions. It arranges elements in such a way as to reduce the possibility of risks and errors (protecting, isolating or eliminating what is a potential risk). It minimizes the possibility of performing unconscious acts that imply risks.

- **Under Physical Effort:** The design can be used efficiently and comfortably with minimal fatigue. It allows the user to maintain a neutral body position while using the item. It uses operating force in a reasonable manner. It minimizes repetitive actions and physical effort.

- **Appropriate dimensions:** It provides spaces of appropriate sizes for approach, reach, manipulation and use, regardless of the size, posture or mobility of the individual. It provides a clear line of vision and reach towards the elements, both for those who are standing and sitting. Some spaces consider extra elements for support or assistance of people.

- **Contextualized.** It is not possible to claim to apply UDL without taking into account the context, a fundamental issue in the UDL paradigm proposed by CAST (2008, 2011, 2018, 2024).

Based on concepts from neuroscience and cognitive psychology UDL should:

- provide forms of involvement (the why of learning) ...

-offer means of representation (the what of learning).

- provide means of action and expression (the how of learning)

- recognize the diversity of students

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- promote complex and flexible contexts and strategies to respond to differences in the learning process
- provide resources for learning from diversity.

Scott, McGuire and Shaw (2001) proposed the application of the 7 original principles of universal design and add two more principles, related to important aspects of education:

- a) learning communities and
- b) the instructional educational climate.

ICTs promote social interaction among peers (Meskhi et al., 2019). and with teachers, as more communication channels emerge between them (Ngubane-Mokiwa & Khoza, 2021).

The lack of teacher training is another problem when it comes to including students with disabilities (Doménech et al., 2023; Pérez-Castro, 2021; PérezJorge et al., 2021).

Among the measures for inclusive higher education, the use of ICT stands out. However, its use implies the appearance of some difficulties (Bong & Cheng, 2021; Perera Rodríguez & Moriña, 2019).

Among the main challenges are:

- high cost of certain resources (Seale et al., 2021) or
- the dependence on network connection to perform certain tasks (Cotán et al., 2021)
- the lack of digital competence of teachers (FernándezBatanero et al., 2022), who find limitations for the training and use of ICT such as technophobia, lack of time, absence of planning, lack of incentives, job saturation and/or the university accreditation model (Mercader, 2020).

ICTs offer numerous opportunities to teachers and students with disabilities (Chun & Williams, 2021; Roldán-Álvarez et al., 2021). Digital resources are essential in UDL, as they offer the possibility of presenting content in different formats, offering possibilities for participation and expression of knowledge (Xie & Rice, 2021). They allow adjustments in the

teaching-learning process, adapting it to the abilities and interests of students (Montenegro & Fernández, 2019).

Teachers have been identified as one of the main obstacles, since sometimes they do not know how to adequately address the diversity present in their classrooms (González & Colmenero, 2021).

- There are still teachers with negative attitudes towards disability (Lorenzo-Lledó et al., 2020).
- The need for greater flexibility and/or sensitivity on the part of teachers makes it difficult for these students to participate in the teaching-learning process (Majoko & Dunn, 2018).

It requires trained professionals who are capable of carrying out the necessary actions, from the very structure of the system, the organization of the centers and considering the learning context, to activate the mechanisms that allow responding to all the differences. And it poses a real challenge for educators.

Lack of knowledge about inclusive practices (UDP) can mean that students with disabilities have difficulties learning in an appropriate way (Cotán et al., 2021).

Educators/teachers should consider the following:

- Must include all students in the classroom to be active players.
- Create objectives, content, methods, materials and assessments must be based on diversity, allowing everyone to learn and participate, using a flexible approach that facilitates participation and learning for all students, considering the needs and capabilities of all of them.
- They must develop a general education curriculum, which offers inclusive and effective learning opportunities for all students.
- reduce barriers in the educational field, to facilitate the learning process for all students.
- In the design of the curriculum, the diversity of the students that exists in the classroom must be considered from its initial approach,

- All students should have the opportunity to access and participate in the general curriculum, which connects with the approaches of universal design.
- The research work carried out has allowed the establishment of strategies based on the flexible use of methods and materials, which they called Universal Design for Learning. Steinfeld and Maisel, 2012

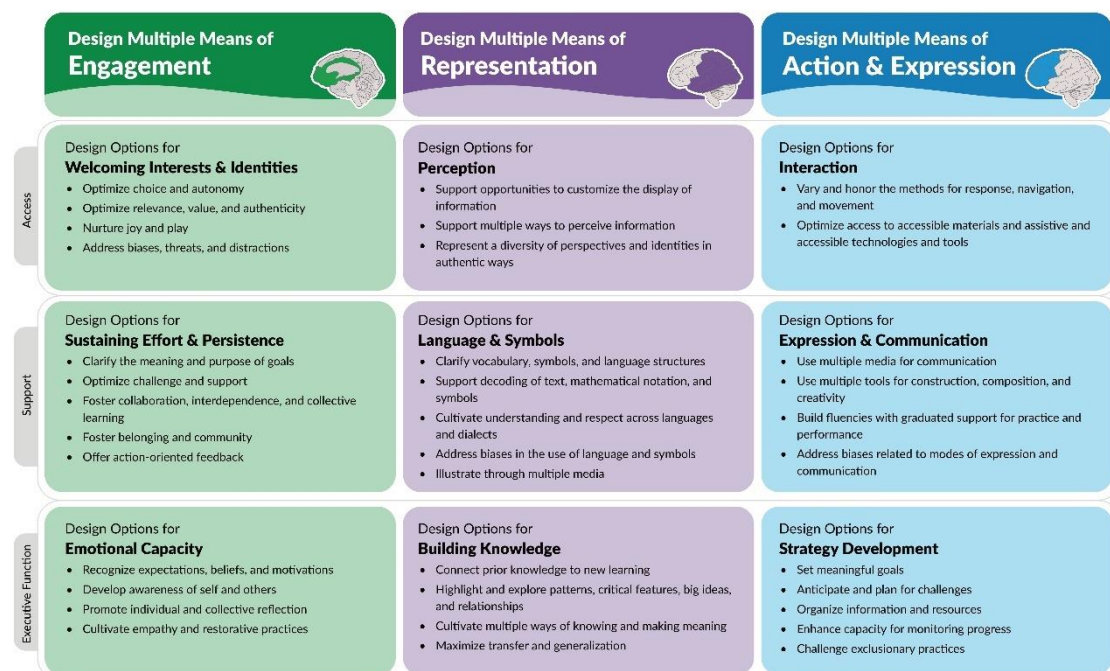
“Good design enables, bad design disables” | Stockholm Declaration May 2004

The use of information and communication technologies (ICT) facilitates and guarantees the success and permanence of all students,

Technology must meet accessibility guidelines to achieve this goal.

The Universal Design for Learning Guidelines

The goal of UDL is **learner agency** that is purposeful & reflective, resourceful & authentic, strategic & action-oriented.



Unit 2 Design of the methodology of the teaching unit

1st METHOD: CONCEPT

It is a set of steps, a general purpose-oriented procedure.

2nd METHOD: TECHNIQUE

It is a specific skill, tools to perform a task.

Techniques are different ways of applying the method and is therefore a more specific procedure than a method.

3rd METHOD: STRATEGY

It is an action plan to achieve a long-term goal.

Different possibilities must be anticipated and used.

Learning activities must be varied, with different modalities or access routes to the content and different degrees of difficulty.

We must ensure that the teaching materials are varied, more or less complex, or more or less practical and that they respond to different levels of learning, well organized, so that they cover all the steps of the learning process.

Forms of student grouping linked to a flexible organization of space and time must be proposed, combining individual, group or large group work and organizing flexible groupings outside the classroom, when there are students who need support (Roberts, Hine, Morey et al., 2013);

4th MODEL - A CONCEPTUAL FRAMEWORK

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Educational Methods and Techniques arise to respond to the needs of teachers in their activity and to solve the problems of their students based on the proposed objectives and the available resources.

KEY ASPECTS IN EDUCATION AND TRAINING

Emerging technology and a powerful tool for inclusion:

- It facilitates a greater degree of personalization, accessibility and efficiency in the education of students with disabilities or special needs.
- Machine learning algorithms can help teachers tailor knowledge to each student's abilities and needs
- Personalization includes adaptation, flexibility of content, pace and level of difficulty. Adapting teaching based on student responses.
- It makes it easier for all students to understand the material and leads to the creation of inclusive educational resources. -It must be used appropriately and ethically.

BENEFITS ASSOCIATED WITH AI IN THE TEACHING-LEARNING PROCESS

Technologies provide an opportunity to improve the lives of people with disabilities.

benefits (CERMI,):

- Facilitate access to information and communication itself in all media and formats.
- Facilitate decision making.
- Improve accessibility in the environment.
- Programming robots that facilitate personal assistance.
- Personal assistance with AI Systems included in robots (androids);
- Foster collaboration and social learning.
- It can improve classroom efficiency and free up time for human interaction.
- Automotive AI systems

(Mubasher and Mirza (2021). (Hutchins, 2017; UN (2019); UNESCO (2021); (Sanabria and Cepeda, 2016).

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KEY ASPECTS IN EDUCATION AND TRAINING OF PEOPLE WITH DISABILITIES:

REQUIREMENTS

- It is necessary to understand the capabilities and limitations of technology
- Learn how it can be applied to improve learning and inclusion.
- **It is essential that educators prepare to use it effectively in the classroom.**
- Importance of redefining the role of teachers and considering them not only as instructors, but also as companions in the process
 - Prepare to face the current and future requirements of the society of which they are part as digital citizens
- **Inclusive technologies** and technological support products facilitate the tasks and routines of people with disabilities (equipment and programs to increase mobility, hearing, vision or communication skills).
- Robotization and digitalization

They reduce the barriers of discrimination based on variables such as physical strength, inertia or roles that have harmed people with disabilities.

- The consolidation of teleworking

allows people with disabilities to carry out their jobs, avoiding the displacement factor.

- Improve quality, reduce dependency and increase autonomy and independence.

CHALLENGES FOR A MORE INCLUSIVE TECHNOLOGY

Accessibility, usability, legibility and readability

- Inclusive design must offer accessible channels, content, information and usable technologies.
- Clear and simple, legible communication
- Access to information benefits people with disabilities, migrants without a language, the elderly or people with low educational levels.
- **Unconscious biases and artificial intelligence** - The need to educate machines and ensure that those who develop them are prepared to banish prejudices,

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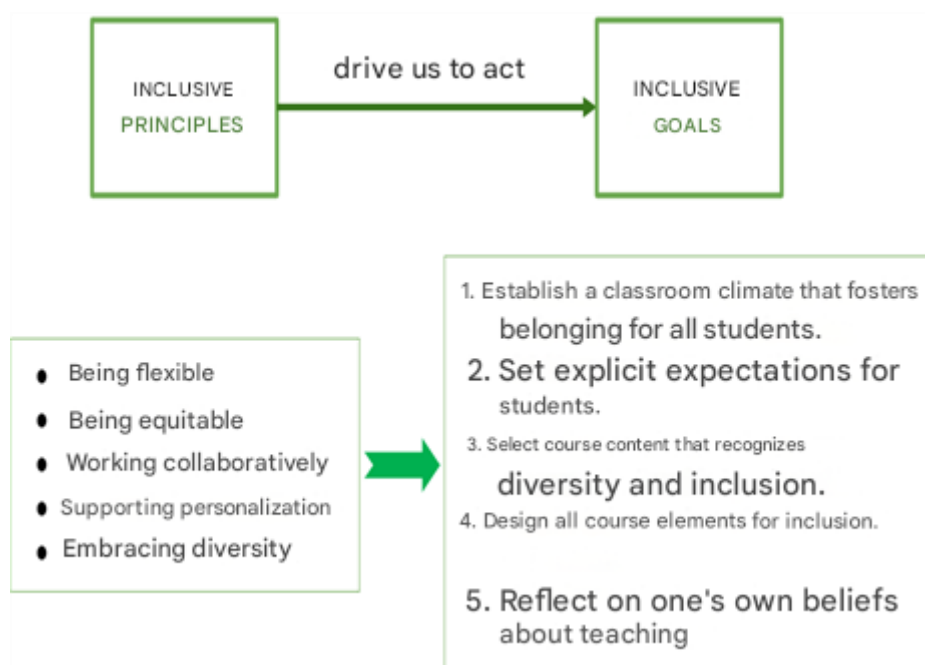
- **Technology, a great ally for social and labor inclusion** helping to eliminate physical barriers in the work environment (mobility or communication), access to training
- **Cognitive accessibility** with intellectual disabilities can understand texts, signs or technology (easy reading will have more importance in the coming years).
- **Design of accessible hardware, technological adaptations or gadgets.** Technological adaptations to facilitate vision, hearing or mobility and reduce barriers

RISKS

Digital gaps

- Unequal access to technology
- Lack of “resources” in schools
- Economic cost
- The functional complexity of some technological devices
- the “fear of the unknown”
- bias and mass surveillance (data privacy)

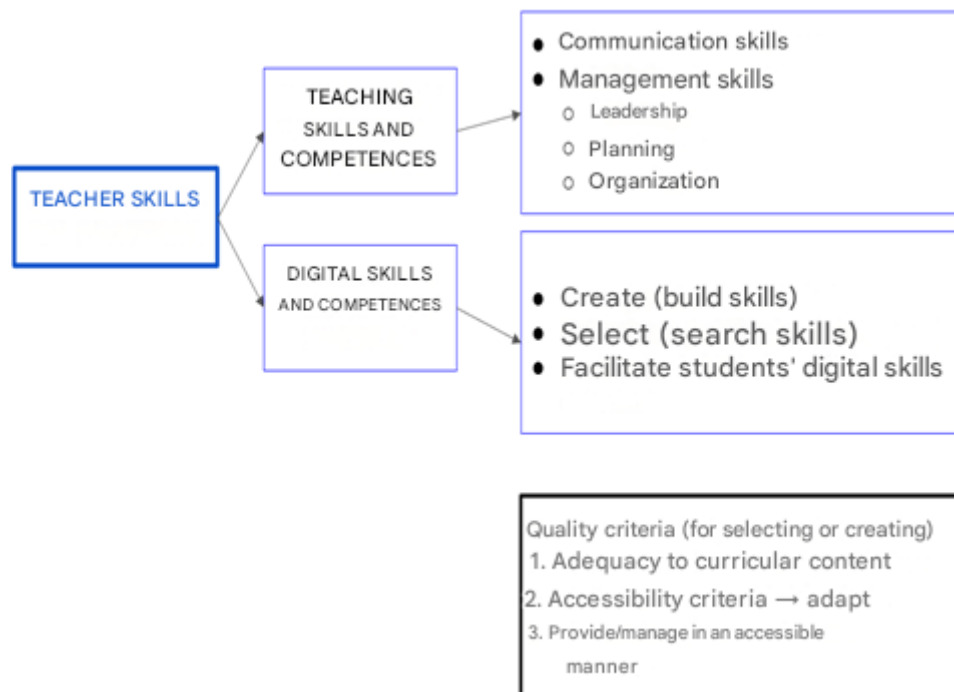
INCLUSIVE PRINCIPLES AND OBJECTIVES



To speak is about the inclusive principles that drive us to act to achieve inclusive goals

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Inclusive principles need to be flexible, equitable, collaborative, supportive, and embracing of diversity, that carries with an arrow to establish a classroom climate that fosters belonging for all students, to set explicit expectations for each student, to select course content that recognizes diversity and inclusion, to design all elements of the course for inclusion, and to reflect on one's own beliefs about teaching.



*Principles of the **total quality in education**:*

- > The most important thing is customer satisfaction, at the lowest possible cost. The successful company will be the one that identifies and meets the expectations of its customers.
 - > The total quality process begins with the detection of problems and deficiencies and the proposal of certain solutions.
 - > Quality management is based on the continuous development of comprehensive plans, not on the execution of simple isolated or specific actions.
 - > Decision making should be based on data and evidence, not assumptions and opinions.
- Therefore, it is necessary to evaluate.
- > Quality basically depends on people, which is why it is essential to pay attention to aspects such as: Participation; Commitment; Voluntary involvement; Collaboration; Teamwork; Training of people; Promoting the personal development/growth of each individual as a key to the growth and enrichment of the organization

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> Total quality involves the entire organization.

And it must be taken into account that the circle of a quality system is recursive: plan, execute, evaluate and adjust.

DESIGN should address:

- Useful and marketable to people with diverse abilities;
- Adaptable to a wide range of individual preferences and abilities;
- Communicates necessary information effectively to the user, regardless of environmental conditions or the user's sensory capabilities;
- Usable efficiently and comfortably, and with minimal fatigue

TEACHING TECHNIQUES

We suggest the use of didactic resources, used in person or virtually to test previous knowledge, and evaluate the new knowledge acquired, such as:

- Questionnaires
- Summaries and essays
- Conceptual maps
- Analogies
- Word search and/or crossword puzzles
- Required and suggested readings, reflection
- Videos and reflection
- On-site visits and reflection
- Others

classification by the characteristics and complexity of the procedure, by what its nomenclature represents or how it is applied:

TECNOLOGIES APPLICATIONS FOR EDUCATIONAL USE

All these little tips can be applied in any classroom, even when there are no specific resources. Mental health:

- Make the educational load more flexible, taking into account that sometimes the mind is not prepared to concentrate, either due to overload or simply due to the medication that may be being taken at that time.
- Break down homework into shorter activities, including tests and/or exams.
- Empathize, put yourself in the other person's shoes.

Unit 3 Personalized tools for students with disabilities

VOICE RECOGNITION SYSTEMS

- for dictation: Dragon Professional, Happyscribbe or Amazon Lex.
- for the execution of instructions: OK Google, Siri, Alexa.
- for subtitling: Microsoft Teams, Zoom, Google.
- Images: Google lens, iOS camera, Taptapsee.
- Facial: Android, iOS

TEXT LANGUAGE PREDICTORS

- Language predictors based on the recognition of gestures or eye movements.
- Help teachers detect learning problems and student needs.
- Conversational robots act in the same way as chatbots but their responses are emitted in voice mode.
- Document recognition: These are programs that allow you to “read” documents (ID cards, texts, invoices, etc.) by photo or scanner. They also allow you to recognize characters, such as the numbers on a car license plate.
- Smart translators: They process text. They are tools to translate text between different languages, automatically.
- Chatbots, conversational robots and assistants

DIGITAL TOOLS FOR PEOPLE WITH HEARING IMPAIRMENTS

Hearing Impairment:

- Sit closer to the teacher, where you can lip-read well.
 - Support interventions and explanations with images, gestures and visual stimuli.
 - Keep the classroom well lit.
1. [Audioin text forWhatsApp](#):allows you to transcribe all audios received to WhatsApp.
 2. [Pedius](#):allows deaf people to make phone calls. During the call, a voice reads what is written and everything the interlocutor says is converted to text in real time.
 3. [Visualfy](#):The app offers a solution to the multiple notifications (sounds) that are received daily on devices and that facilitates the delivery of this real-time information in a visual and sensorial way.
 4. [Deaf help](#):This application helps deaf people by translating voice into text, thus facilitating communication between hearing and deaf people.
 5. [Rogervoice](#):caption phone calls.
 6. [Ava](#). Automatic sign language translation tool

DIGITAL TOOLS FOR PEOPLE WITH VISUAL IMPAIRMENTS

Visual impairment: *(the underlined text contains URLs)*

- Take turns speaking, avoid unnecessary noise, especially during explanations.
 - Music and background noise can be distracting for students with visual impairments.
1. [BrailleBack](#): App allows you to connect a compatible braille display to your device via Bluetooth. It is used in conjunction with the TalkBack app to provide a combined voice and braille experience.
 2. [GoogleTalkback](#): audio guide within the mobile system, with spoken comments for each menu and vibration to navigate through Android.
 3. [Voice Synthesis](#): text is transferred to voice.
 4. [TapTapSee](#): take photos of objects and have the app identify what they are.
 5. [Lazarillo](#): app that uses GPS and reports routes, environments, stores

6. **TalkBack**, a system that can read aloud all the elements that appear on the mobile screen. Blind or visually impaired people can navigate through applications without problems
7. **smartphone**, tool capable of detecting where there is a door, through the mobile camera
8. **DOT WATCH: THE FIRST SMARTWATCH IN BRAILLE**
9. FingerReader, a wearable ring attached to the finger, capable of reading any text by passing the fingertip over a printed text and its technology will be able to decode it and read it aloud.
10. JAWS(Job Access With Speech) – recognize and read text on the screen aloud

DIGITAL TOOLS FOR PEOPLE WITH REDUCED MOBILITY

Motor disability:

- Take into account the spaces, remove excess furniture if it is not going to be used for a specific purpose.
 - A clean, dust-free classroom helps people with respiratory problems feel better.
 - Motor difficulties do not necessarily have to be associated with cognitive disability.
-
1. AccessibilityPlus: allows you to find points of interest that have enabled facilities.
 2. Disabled park: helps you quickly and easily find parking spaces reserved for people with disabilities.
 3. It is accessible: allows you to add those locations that are specially designed to facilitate your circulation.
 4. SerenaTelecare: allows you to request help in case you have problems both outside and inside the home.

TOOLS FOR PEOPLE WITH INTELLECTUAL DISABILITIES

Intellectual disability:

- Summarize, adapt explanations, replace specific and complex vocabulary using other terms.
 - Make schedules more flexible and adjust the teaching load, which should be greater in the morning or early afternoon than at the end of the day, when the mind is more tired.
1. Say It: allows a user with functional diversity to use phrases that are adjustable to their particular circumstances, routines and needs.
 2. VideoresumeFull Inclusion Madrid: video resume app adapted to people with intellectual or developmental disabilities.
 3. I am capable: It allows greater freedom and security for people with intellectual disabilities. It has 4 basic functions for the user: My Calendar, Where Am I?, My Jobs, I Need Help.

AutismApps: app where you can stay up to date with the best applications that are being used with and by people diagnosed with autism, Down syndrome and other needs

OTHER DIGITAL TOOLS

Disability detection systems AI to analyze data on academic performance, reading, writing, and math skills to detect early problems and improve the academic performance of students with disabilities. Ex: Cognii and A2i.

Identification of needs

AI can help detect patterns and trends in students' academic work, allowing teachers to intervene early and provide support if needed.

Relate, from Google. It is a project consisting of an application capable of understanding people with speech difficulties. It transcribes their voice into text. Or, it simply repeats what the person has said through a synthesized voice to create a more fluid conversation.

Knewton. Learning systems that adapt the content and teaching methodology according to the individual needs of students with disabilities, (learning through reading, listening, and/or manipulation).

ALEKS(Assessment and Learning in Knowledge Spaces). Automatic adaptation systems that use AI to personalize the level of difficulty of exercises and tasks based on the academic performance of students with disabilities.

All Access Life, a platform for reviewing assistive products.

Unit 4 Methodological requirements of universal design for learning (UDL)

Methods that promote comprehensive and inclusive learning processes. Supported by various technological resources, promote a comprehensive, innovative education

Teacher training must prioritize reflection in and on action.

Teaching methodology committed to the education of all students, researching and **investigating new practices and strategies, to respond to current and future challenges.**

Different types of methods

Different types of methods

Expository method
•Socratic method or problem situations
•Case method
•Service Based Learning
•Collaborative learning
•Problem-based learning
•Project Based Learning
•Others

Different teaching techniques

used in the creative educational process, constructive criticality, simulation and problem solving.
•Mental maps
•Debates
•Round table
•Brainstorming
•Role play or simulation
•Others

THE TEACHING UNIT.

The teaching units are made up of a series of components related to what, how and when to teach and evaluate the objectives and contents corresponding to said Unit. These components or elements could be configured in the following way:

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Before determining the objectives, content and other elements of the Unit, it is advisable to explore the characteristics of the context in which the unit will be developed as well as identify the interests and motivations of the students.

Each Unit should be stated:

- The initial diagnosis of the work context,
- the prior knowledge required,
- the moment of the course in which it will be put into practice,
- duration,
- teaching resources that will be used in its development,
- Achieving this, among other things, would involve the following: - analyzing the circumstances under which the unit will be developed-
- take into account the characteristics of the students,

Objectives of didactic (why should we teach): The objectives of a teaching unit must express, as precisely as possible, the capabilities that students must develop throughout the unit. By associating certain skills with certain learning outcomes, the teaching objectives define the educational intentions of the corresponding Unit (what to teach) and simultaneously express the knowledge that must be assessed (what to evaluate). From this perspective, these objectives function as evaluation criteria for the Unit.

When setting the objectives of a teaching unit, it is essential to identify the content that will be worked on in order to develop certain skills, indicating the type and degree of learning and specific needs.

- **Contents** (what needs to be taught): The selection of content, with which it is intended that students achieve the proposed didactic objectives, balances content related to concepts, procedures and attitudes,

To facilitate attention to the diversity of students, in the selection of contents of each teaching unit it must be determined in advance which ones are basic or nuclear (and, therefore, common to the entire group) and which ones are considered to be of extension or deepening.

The contents of each teaching unit must serve to specify the teaching objectives and to specify the teaching and learning activities.

Methodology (how to teach):

In the programming of teaching units, methodological decisions (how to teach) are usually made when planning the corresponding sequence of classroom activities.

- Each activity requires specifying the role that the teacher will play and the type of tasks that the students will have to perform (individually or in groups), the time and space in which the activity will be carried out, the resources that will be used, etc.
- It is important to select a variety of teaching resources and strategies in order to facilitate the acquisition of the basic programmed learning by all students, since not all of them learn in the same way, at the same pace or with the same level of autonomy, nor can they reach the same level of learning.

All decisions that relate to how to teach, such as:

- Methodological options
- Decisions on teaching resources and student groupings
- The role of teachers
- Complementary activities
- use of available spaces and times.
- The measures planned to address student diversity.

The methodology of the teaching units must be consistent with the proposed objectives and determined when programming the teaching and learning activities.

INNOVATIVE LEARNING METHODOLOGIES

Diverse methodologies: for students with certain characteristics it may not be so for students with different characteristics

We must also know and select the educational methodologies/approaches that can help us address diversity and promote learning for all.

Educational research provides us with new methodological proposals. Here is our selection of innovative methodologies based on our selected pedagogical approaches (constructivist, collaborative, research-based, reflective).

- Personalized learning adapts what, when and how we are teaching each student
- Project-based learning (PBL) is an effective method that helps students drive their own learning journey.
- Inquiry-based learning develops thinking and problem-solving skills
- Gamifying the classroom
- Flipped classroom.
- Storytelling and interactive classes.
- Cross-learning.
- Computational thinking.
- Metacognition.
- Have students build a learning journal (portfolio)Facilitate reflective thinking.

Unit 5 Methodological strategies for the digital evaluation of students' competences (digital, reading to learn...)

- **GENERAL ACTIVITIES**

- Activities must be coherent and develop the target learning capacity.
- They must be as significant and enjoyable as possible, appropriate to the development and capabilities of the group and the students.
- There are many different activities to achieve a goal, there are
- The same activity can give different results.
- Each objective has its specific experiences.
- Learning experiences should be selected for their applicability, possibility of student participation, convenience and usefulness.
-

Specific activities that use artificial intelligence (AI) tools and resources to promote educational inclusion, following the principles of Universal Design for Learning (UDL):

1. Simulations of everyday situations

- Objective: Develop social and problem-solving skills.
- Description: Use AI-powered simulations to practice social interactions, such as asking for help or making friends.
- Resources: Social simulation applications or interactive role-playing games.
- Adaptations: Include visual scenarios and simplified response options.

2. Virtual assistant for tasks

- Objective: To assist in the organization and planning of tasks.
- Description: Implement a virtual assistant that helps students organize their day, reminding them of tasks and offering support in time management.
- Resources: Applications like Google Assistant or Siri.

- Accommodations: Set up visual and auditory reminders, and allow students to customize their assistant.

- **3. Virtual simulations**

- Tool: Labster

- Activity: Use virtual lab simulations to have students perform experiments in a safe environment. This is especially helpful for students who may struggle in physical labs, allowing them to learn through practice.

- **4. Creation of multimedia content**

- Tool: Canva or Adobe Spark

- Activity: Students can create presentations, infographics, or videos using these tools. AI can suggest layouts and visual elements, making it easier to express themselves creatively and present information in an engaging way.

- **5. Personalized learning games**

- Tool: Kahoot! or Quizizz

- Activity: Create interactive quizzes that adapt to students' skill levels. AI can help adjust question difficulty based on each student's performance, ensuring everyone is engaged and learning at their own pace.

- **6. Personalized learning platforms**

- Tool: DreamBox Learning or Knewton

- Activity: Implement platforms that adapt content and activities based on each student's progress. This allows each student to progress at their own pace and receive specific support in areas where they need more help.

- **7. Text and sentiment analysis**

- Tool: MonkeyLearn or TextBlob

- Activity: Students can analyze texts to identify emotions and themes. This can be useful in literature or social studies classes, fostering empathy and understanding of different perspectives.

8. Virtual Tutors

- Tool: Khan Academy or Socratic
- Activity: Students can use virtual tutors who offer explanations and exercises tailored to their needs. This provides additional support and allows students to work on areas where they need more practice.

9. Interactive classes with instant feedback

- Tool: Edpuzzle
- Activity: Use interactive educational videos that include questions and instant feedback. This allows students to reflect on their understanding and receive immediate support.

10. Interactive stories with AI

- Objective: To promote reading comprehension and creativity.
- Description: Use an AI app that generates personalized stories. Students can choose characters, settings, and plots. Then, they can illustrate their story.
- Resources: Apps like ChatGPT or storytelling tools.
- Adaptations: Provide images and visual options to help in choosing story elements.

11. Adaptive reading

- Tool: Rewordify or Natural Reader
- Activity: Use these tools to simplify complex texts. Students can enter a text and receive a more accessible version, allowing them to better understand the content. This is useful for students with different reading levels.

12. Creating automatic summaries

- Tool: SMMRY or Resoomer

- Activity: Students can use these tools to summarize long articles or texts. This helps them identify main ideas and practice summarizing information, making learning easier for those who may struggle with long texts.

13. Writing assistants

- Tool: Grammarly or ProWritingAid

- Activity: Students can write essays or reports and use these tools to receive instant feedback on grammar, style and clarity. This allows them to improve their writing skills autonomously.

Considerations:

- Evaluation: Use rubrics that consider individual progress and participation in activities.
- Collaboration: Involves special education specialists to adapt activities to students' specific needs.
- Feedback: Provides constant, positive feedback to motivate students.

These activities not only encourage learning, but also promote inclusion and active participation of all students.

SPECIFIC ACTIVITIES

- **ACTIVITY 1: “Exploring the Map of Spain with AI and Technology”**

General Objective: To facilitate the learning of the map of Spain (provinces and autonomous communities) in 11-year-old children with intellectual disabilities through computer tools and artificial intelligence, with an inclusive approach based on Universal Design for Learning (UDL).

Technological Tools:

- 1. Interactive map platforms: - Google Earth, Google Maps, or Scribble Maps to explore Spain.
- 2. Artificial Intelligence (AI) applications: - ChatGPT to answer questions and provide educational clues. DALL·E to generate personalized images of autonomous communities.
- 3. Gamification apps: Kahoot or Genially to create interactive quizzes.

Activity Structure:

1. Introduction: “A trip through Spain with AI” (10 minutes) Activity: Project an interactive map on Google Earth; Relate the map of Spain to a “puzzle” in which each autonomous community is a piece; Explain: “Today we will help a traveling robot (AI) explore Spain and learn more about it.”

Reference: According to Meyer et al. (2014), presenting content in multiple formats (visual, auditory, narrative) facilitates access to information.

Activity 1: “Discovering the Autonomous Communities with AI” (15 minutes) Tools used: Google Earth and ChatGPT.

1. Digital exploration:

- • Each child selects an autonomous community to explore with Google Earth.
- • AI helps answer questions:
- • “What is the capital of this community?”
- • “What important rivers or mountains are there here?”

2. Personalized cues:

- • AI can generate visual descriptions with DALL·E.
- • Example: “Generate an image of a typical Andalusian landscape”
- • .

Activity 2: “Building the interactive map” (20 minutes)

Tools used: Scribble Maps or Genially.

1. Digital game:

- Children drag and place autonomous communities in their correct place within a digital map.

2. Interactive challenges:

- AI asks questions to guide the process:

- “Find the smallest community in Spain.”
- “Put the Balearic Islands in the correct place.”
-

Activity 3: “Interactive competition in Kahoot” (15 minutes)

Tool used: Kahoot.

1. Create the quiz:

- Design a questionnaire with questions tailored to communities and provinces.
- Example: “Which autonomous community is north of Madrid?”

2. AI Reinforcement:

- AI explains the correct answers after each question, reinforcing learning.

Closing: “We are expert explorers” (10 minutes)

1. Group reflection:

- Project a complete map and review what you have learned with open questions:
- “What community would you like to visit?”

2. Digital reward:

- Generate personalized diplomas with DALL E or Canva. Reference:
- Expected results:
- Children identify at least 10 autonomous communities and their main provinces.

- They understand basic elements of the map of Spain thanks to the use of accessible technology and AI.
- They increase their participation and motivation in an inclusive digital environment. Conclusion:

ACTIVITY 2: “Learning Mathematics with Interactive Robots”

Qualification: Solving Math Problems with Robots and Universal Design for Learning (UDL)

- **Justification:** The use of interactive robots in the classroom promotes motivation and meaningful learning, as well as facilitating access to abstract concepts through practical experiences. This activity offers students with motor, visual or cognitive disabilities the opportunity to actively participate in solving mathematical problems, using voice commands, adapted controls and simple programming (Barajas et al., 2007).

Goals:

1. Solve basic mathematical operations by programming and controlling interactive robots.
2. Promote collaborative and inclusive work.
3. Enhance logical-mathematical skills through practical experiences.
4. Promote accessibility through tools adapted to diverse needs.

Development of the Activity:

1. Introduction (20 minutes)
 - Presentation of the robots (BeeBot, Dash & Dot, Lego Mindstorms).
 - Explanation of basic programming with simple commands and adapted controls.
2. Math Challenge Solving (60 minutes)
 - Students program the robot to move around a giant board containing math problems.

- Upon reaching a square, the group solves the corresponding operation to move forward.
- Inclusive options:
 - Voice commands for students with motor difficulties.
 - Audio feedback for students with visual impairments.
- 3. Reinforcement and Creativity Activity (30 minutes)
 - Design new mathematical challenges that other groups will solve using the robots.

Assessment:

- Ability to correctly solve mathematical challenges.
- Active participation in programming the robots.
- Quality of collaborative and inclusive work.

Necessary Resources:

- Programmable interactive robots.
- Game boards with mathematical problems.
- Adaptive controls and voice commands.

ACTIVITY 3: “Creative Writing with AI Assistants”

Qualification: Create your story: inclusive writing with smart text assistants

Justification: AI-powered text assistants (such as ChatGPT or WriteSonic) enable students with learning disabilities, such as dyslexia or motor difficulties, to fully engage in creative writing activities. Through voice dictation, auto-correction, and content suggestions, this activity fosters creativity and improves language skills.

Goals:

1. Write creative stories using AI tools.
2. Promote written and oral expression in an accessible way.
3. Improve language skills through automated correction and adaptive feedback.

Development of the activity:

1. Introduction (30 minutes)
 - Explanation of the activity and presentation of the smart text assistant.
 - Demonstration of the use of voice commands and AI suggestions for writing.
2. Story Creation (60 minutes)
 - Students dictate or write their story with the help of the AI assistant. • Inclusive options:
 - AI suggestions for vocabulary and grammar structure.
 - Voice dictation for students with motor difficulties.
 - Read-aloud modes to review the created text.
3. Presentation (30 minutes)
 - Each student presents their story in oral, visual or digital format according to their preference.

Assessment:

- Creativity and coherence of the story.
- Effective use of AI tools for writing.
- Active participation and reflection on the creation experience. Necessary Resources:
- Accessible intelligent text assistants.
- Devices with dictation and reading aloud function.

ACTIVITY 4: Title: Exploring History Through Educational and Educational Video Games

Adaptive Controls

Justification: Educational video games allow us to simulate historical events and encourage active learning. Using adapted controls, this activity allows students with motor or cognitive disabilities to explore and understand historical events in an accessible and interactive way (Palacios Núñez et al., 2021).

Goals:

1. Explore historical events through educational video games.
2. Encourage active and collaborative participation through accessible controls.
3. Reflect on the relationship between history, technology and inclusive education.

Development of the Activity:

1. Introduction (30 minutes) • Presentation of the selected educational video game (eg, Civilization, Discovery Tour by Assassin's Creed). • Explanation of the use of adapted controls.
2. Exploring the Historical Environment (60 minutes) • Students navigate the virtual environment, interact with historical figures, and complete challenges related to key events. • Inclusive options: • Accessibility controls set up for each student. • Automatic audio descriptions and captions.
3. Reflection and Debate (30 minutes) • Group discussion on lessons learned. • Reflection on the use of video games as an inclusive educational tool.

Assessment: • Ability to identify and explain key historical events. • Effective use of adaptive controllers and active participation. • Critical reflection on the educational experience. **Required Resources:** • Video game consoles with support for adaptive controllers. • Educational video games with historical content. • Accessibility settings enabled. These activities integrate innovative technologies to enhance inclusion and

academic learning, aligning with UDL principles and promoting meaningful experiences for students with disabilities.

ACTIVITY 5: “Exploring the Solar System with AI Assistants and Augmented Reality”

Qualification: Traveling through Space: Discovering the Solar System through AI and Universal Design for Learning (UDL)

Justification: Teaching spatial concepts can be challenging for students with visual, hearing, or cognitive disabilities. Integrating Artificial Intelligence (AI) along with augmented reality (AR) applications allows for multiple forms of representation and expression, aligning with UDL principles. This inclusive activity facilitates learning about the Solar System through customizable and accessible experiences, enhancing the understanding of key concepts through multisensory and adaptive experiences (Sánchez-Fuentes, 2023).

Goals:

1. Understand the main characteristics of the planets of the Solar System through inclusive technologies.
2. Promote the use of AI and AR to create accessible educational resources.
3. Promote active participation of students in inclusive collaborative activities.
4. Develop observation, analysis and synthesis skills through multisensory experiences.

Development of the Activity:

Introduction to the Solar System (30 minutes)

- Brief presentation about the planets, their characteristics and location in space.
- Use of an AI assistant (ChatGPT or similar) to answer questions in real time about the Solar System.

1. Augmented Reality Exploration (45 minutes)

- Students use AR apps (such as Solar System Scope or JigSpace) to observe 3-D models of the planets projected onto their mobile devices or tablets.
- Accessibility options enabled
- Audio descriptions for students with visual impairments
- Automatic captions for real-time descriptions for students with hearing impairments
- Observation of details about the size, distance, and composition of the planets

2. Group Activity (40 minutes)

- Each group chooses a planet to create an interactive worksheet that includes:
- AR image of the planet captured during the exploration.
- Description of its characteristics (size, atmosphere, temperature).
- Curiosities or relevant data about the planet.
- Students can present their worksheets through explanatory videos, voice recordings or digital presentations, according to their preferences of expression.

3. Inclusive Reflection (20 minutes)

- Group discussion on how the technologies used helped to better understand the topic.
- Reflection on the barriers removed thanks to the use of AI and AR.

Assessment:

1. Evaluation Criteria:

- Correct identification of the characteristics of the planets of the Solar System.
- Effective use of AI and AR technologies for exploration and learning.
- Creative and inclusive presentation of the information collected.

Critical reflection on the inclusive educational experience.

Tools:

- Collaborative assessment rubric.
- Individual learning journal.
- Direct observation during the activity. Necessary Resources:
- AR-capable mobile devices or tablets.
- Augmented reality educational apps.
- AI assistant for queries and content generation.
- Adapted materials for students with specific needs (auditory descriptions, subtitles).

This activity promotes inclusive learning through the design of innovative and technological experiences, promoting the active participation of all students.

MODULE



Name of the leading partner:

Plovdiv University "Paisii Hilendarski", Bulgaria
Bulgarian Teachers' Union

DESCRIPTION

1. Title of the module:

Module 3. E-learning quality standards and ability to apply them in e-learning design (courses, learning activities and resources).

2. Duration of the module

30 hours

3. ECTS credits / ECVET credits

2 credits / 1 credit

4. Authors

On behalf of Plovdiv University:

- Prof. Dora Levterova-Gadjalova, DSc
- Associate prof. Vanya Sivakova, PhD
- Assistant prof. Maya Fyodorova-Radicheva, PhD

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With contributions of:

Associate prof. Ivan Trichkov, PhD

Associate prof. Albena Alexsandrova, PhD

Associate prof. Diana Dimitrova, PhD

Assistant prof. Lilyana Chobanova, PhD

5. Learning outcomes for the course – acquired knowledge, skills, competencies (goals)

Those who have successfully completed training in this discipline:

- *Will know:*
 - ✓ The specifics of e-learning;
 - ✓ Factors impairing e-learning quality;
 - ✓ E-learning quality standards.
- *Will be able to:*
 - ✓ Create a qualitative e-learning designs according to the specifics of instructional design;
 - ✓ Implement the standards for a particular curriculum;
 - ✓ Implement the standards for assessment.
- *Will be competent to:*
 - ✓ Digital competences, particularly Implement all e-learning quality standards;
 - ✓ Digital competences, particularly Assess the quality of e-learning designs according to the standards.
 - ✓ Team work in digital space.
-

6. Teaching methods

Interactive methods, problem-solving methods, methods for social-emotional learning.

7. Prerequisites (knowledge and skills from previous training) and requirements for other (simultaneous) courses

To have basic knowledge on:

- Module 1. Theories and models for instructional design of quality digital learning and
- Module 2. Methodology for applying appropriate, contextualized pedagogical design in innovative, engaging and quality e-courses and resources.

8. Content of the module

- **A. Short summary**

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The development of modern technology has enabled the widespread digitalization of education worldwide. That created new challenges that require innovative solutions in instructional designs and methods. In this context, quality standards for e-learning materials form the basis of the qualitative education in the contemporary digital world. This module is dedicated to the standards which determine the success and quality of e-learning instructional design materials.

B. Thematical content of the module

a) lectures

1. Digitally inclusive nature (communities, faith, values, social acceptance) of the course and learning materials - **(1) hour**
2. Access, accessibility and digital technologies - **(1) hour**
3. Structure and interface of the study course and study materials - **(2) hours**
4. Design of the Training: Teaching and Learning- **(2) hour**
5. Tutor support - **(1) hour**
6. Digital assessment of students' competencies (knowledge, skills, attitudes) - **(2) hours**
7. E-learning quality standards - **(3) hours**
8. Ability to apply E-learning quality standards in e-learning design (courses, learning activities and resources) **(3) hours**

b) practical activities

1. Access and accessibility to various digital and smart technologies. - **(2) hours**
2. Objectives, content of multimedia learning content, personalized learning, assessment. - **(3) hours**

Basic information about the learning material, personalized design of multimedia material, motivation to learn, feedback through exercises and monitoring of learning progress, personalized individual tasks according to the needs of learners.

3. Learning technologies - **(3) hours**
4. Learners' cost— expectations- benefit considerations – **(2) hours**
5. Organization and management of educational activities - **(3) hours**
6. Multi-functionality, stability and multiple and personalized use of learning components of the training course - **(2) hours**

C. Equipment required for the delivery of the module

- Personal electronic devices (computer, laptop, tablet, smartphone);

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10. Planned learning activities
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Teamwork, problem-solving, digital learning, project-based learning.

11. Methods and criteria for assessment
--

Development of instructional design e-learning materials according to approved quality standards.

12. Languages

English, Spanish, Bulgarian, Portuguese, Turkish

13. Internship/ practice

Development of instructional design e-learning materials with implementation of the e-learning standards.

THEMATICAL CONTENT OF THE MODULE

Unit 1. Digitally inclusive nature (communities, faith, values, social acceptance) of the course and learning materials

The digitally inclusive nature of any e-course and e-learning materials cannot be applied without adopting the philosophy of digitally inclusive education. Digital inclusion is a multidimensional concept, and in this regard:

- is realized as a process;
- reveals and removes barriers;
- is associated with presence, participation and success for all educators and learners;
- encompasses “factors such as access, infrastructure, use and outcomes” (Park, 2017; Helsper, 2012).

Digital inclusive education follows the philosophy and principles of inclusive education by implementing a multi-variable educational inclusive process in a virtual environment.

The digitally inclusive nature of the e-course and e-learning materials is achieved by accepting the differences in digital mediation. “Digital mediation is implemented through information technologies or other means that provide interactive communication in the pedagogical interaction of a teacher and students. A large part of the courses, programs, lessons and classes conducted in distance education rely on the support of trainers, the older and more capable” (Levterova-Gadjalova, 2024).

Digital mediation creates conditions for:

- improving social interactions within the school organization and "between family and school;
- creating more open and collaborative educational communities (León-Nabal et al, 2021);
- creating new educational technologies that favor active learning of students;

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- taking into account the specifics of learning of different generations of learners (Y, Z Alfa and possibly Beta);
- creating shared e-learning resources, e-learning materials and shared goals.-

Qualitative e-learning begins with the identity of the respective educational community. The online community from the institution must be fully integrated into the larger academic community of that institution. The following **recommendations for e-course design to be digitally inclusive** can be derived (Quality Standards for Online Learning, https://www.apu.edu/live_data/files/334/online_learning_standards.pdf):

- Course design and active learner presence foster a sense of community among diverse online learners and affirm that online learners are equal and valuable members of the community who seek to advance their work through academic achievement.
- Course design best promotes both academic freedom and best practices in e-learning. In doing so, it creates a learning experience that leverages best practices and reflects the individuality of the faculty.
- The course creates a sense of community by introducing the learners at the beginning and through introductory materials, presentation, and trainer performance.
- The course design encourages student community and collaboration, interaction between faculty and learners through various course elements.
- The instructor maintains a presence, responds to learners emails and messages, and immediately and actively engages students through forums, chats and other course communication elements.

The digital inclusive nature of an e-learning course and e-learning materials depends on:

- social acceptance of e-learning by all actors on the educational scene and generational perceptions of e-learning;
- synergy between organizational and human factors, and digital technologies in the educational organization or digital transformation of learning;
- “empowering learners to take responsibility for their own learning journey;
- integration with artificial intelligence (AI) to enhance the learning experience and personalize feedback;

- flexible learning environments with online and blended learning models, allowing learners to access educational resources anytime, anywhere” Moleka (2023);
- ensuring a dynamic, flexible and inclusive educational environment using smart technologies;
- structuring strategies and quality standards for inclusive digital education
- digital competencies of teachers and administrative staff;
- creation and implementation of innovative e-learning models;
- didactic multifunctionality and interactivity of e-learning;
- creation of educational profiles of learners;
- personalized learning with personalized learning paths;
- stimulation of active learning and engagement of learners;
- development of models for e-teaching styles and e-learning styles;
- socio-emotional learning in a digital environment;
- formation of transversal skills: communication, critical thinking,
- collaboration and creativity, cultural awareness and connectivity;
- awareness (mindfulness) and e-well-being of all learners, teachers and administrators;
- building models of tolerance and justice for the achievements of all learners;
- creation of a positive educational digital environment.

The digitally inclusive nature of an e-learning course and e-learning materials is presented by:

- ensuring digital access, digital accessibility and digital security of an e-course;
- ensuring accessible design in a digital environment (separation of content and structure from presentation, separation of function from management method, provision of equivalent alternatives in other
- modalities; content from structure, and labels and resources (according to Treviranus, & Roberts, 2006);
- usability of learning content presented in e-materials;
- the social digital presence of trainers and learners;

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- specifications and standards for interoperability of electronic devices through which e-learning is conducted;
- alternative access systems or assistive technologies;
- application of universal design (UD), created by Mace;
- application of universal design for learning (UDL), created by Rose and developed by CAST;
- application of universal design for measurement (UDA);
- application of different models of instructional design in a digital environment;
- implementation of quality standards for e-courses and e-materials;
- knowledge and consideration of the strengths of learners and their needs;
- adapting the learning content to the individual needs of the learners;
- adapting the instructions to the individual needs of the learners;
- personalizing the e-learning;
- conceptualizing and personalizing the feedback;
- creating a positive e-learning environment;
- implementing an inclusive pedagogical approach in action (IPAA).

The Inclusive Pedagogical Approach in Action (IPAA):

- emerged from a research into the skills of teachers who are able to sustain high levels of academic achievement in diverse classrooms (Florian & Black-Hawkins, 2011).
- responds to the diversity of learners in ways that avoid the marginalization of some learners in the classroom community (Florian & Black-Hawkins, 2011).
- acknowledges that there are individual differences between learners, but avoids the problems and stigma associated with labeling some learners as different (Florian & Black-Hawkins, 2015).

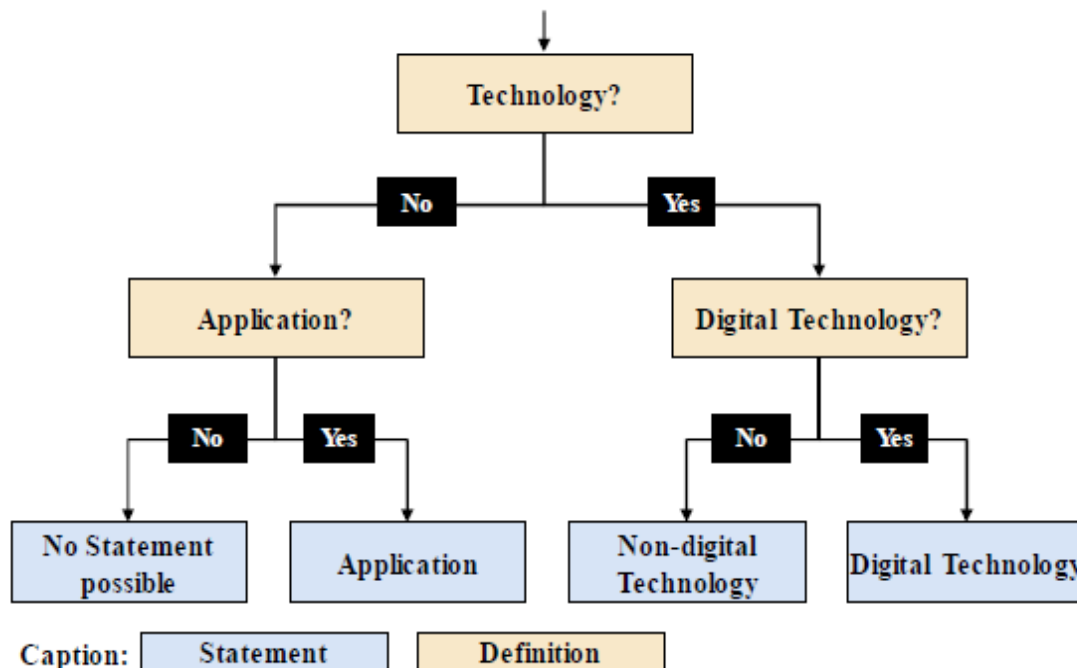
• According to Treviranus, & Roberts (2006), **inclusive e-learning takes into account the preferences and interests of learners** by:

- “providing the ability to configure the operating system or “system preferences” (e.g., visual cues rather than system sounds, higher speaker volume),
- configuring application or browser settings (e.g., larger text fonts, larger buttons),
- re-formatting content (e.g., using cascading style sheets, CSS, or XSLT),

- launching and configuring alternative access systems (e.g., text-to-speech systems),
 - supplementing content with additional information (e.g., definitions, caption files),
 - replacing the resource with an equivalent resource that meets the learner's access and needs;
- describing and cataloging learning resources so that they can be linked to each other and compared according to learner preferences.”

Unit 2. Access, accessibility and digital technologies

Digital technologies are defined as “knowledge, skills and know-how for the creation, processing, transmission and use of digital data as well as systems and procedures for practical implementation” (Lipsmeier et al, 2024). In the context of clarifying whether a technology is digital, they create a **Multilevel decision-tree**, which is used for systematic decision-making; in this case, for identifying digital technologies or making a distinction between an application, digital technologies, and non-digital technologies.



The Figure is from Lipsmeier, et al (2024).

Berger et al. (2018) identify seven DT archetypes: platform, connectivity, actor-based product, sensor-based data collection, analytical insight generation, analytical interaction, and augmented interaction.

Digital technologies have created the digital transformation of the world, which inevitably set requirements for access, accessibility, equality, and fairness in the use of digital technologies by all people.

"Access" as a concept is most often defined as "the ability of a certain system, space, materials, products, without requiring any changes to them, to be used by all people completely independently." (ITU, 2019).

*In the context of using digital technologies, access is interpreted as "**digital access**".*

"Digital access is interpreted in several spaces:

- ✓ **physical access** (access to objects and places) (Jaeger and Bowman, 2024);
- ✓ **access to electronic devices and digital technologies** (computers, smart phones, etc.);
- ✓ **access to the Internet network and the quality of Internet connectivity** (fast or high-speed Internet or Internet with a download speed of 100 Mbps and above and an upload speed of 10 Mbps and above, with optical Internet connectivity being better than cable Internet connectivity; Broadband access or the ability to simultaneously transmit data, video, and voice channels, usually with a communication access rate of over 256 kbit/s. Broadband access can be wireless and mobile Internet access);
- ✓ **carriage, devices, software tools, content/services, service/access provision, and literacy/social facilitations (skills)** Gurstein (2003);
- ✓ **intellectual access** (access to ideas, which in turn includes access to education) (Jaeger and Bowman, 2024);
- ✓ **personal digital skills** for surfing, navigating, digital safety and digital security in a virtual environment context;
- ✓ **digital inclusion** i.e. "different strategies designed to ensure that all people have equal access, opportunities and skills to benefit from digital technologies and systems" (ITU, 2019).

Lack of access leads to a digital divide. According Carpentier (2015), the **core of the digital divide** discourse is based on the articulation of three elements:

- (1) the importance of access to online computers, whose use
- (2) results in increased levels of information, knowledge, communication or other types of socially valued benefits, which
- (3) in turn, are so vital that the absence of access and the resulting 'digibetism' (or computer illiteracy) will eventually create or maintain a dichotomized society of haves and have-nots.

Accessibility is the minimum for use by all people regardless of their differences in means. Accessibility should not be confused with usability, which is “the extent to which a product (such as a device, service, or environment) can be used by specified users to achieve specified goals with efficiency, effectiveness, satisfaction, and convenience in a specified context of use.” (Li et al, 2018, *Web Accessibility Initiative* Retrieved 2020).

Usability is about "designing products to be effective, efficient, and satisfying. Usability includes user experience design." (*Web Accessibility Initiative* Retrieved 2020)

<https://www.w3.org/WAI/fundamentals/accessibility-usability-inclusion/>

„The power of the Web is in its universality. Access by everyone is an essential aspect...” WAI's coverage of web accessibility includes:

- „web contents” - websites and web applications
- authoring tools, such as content management systems (CMS) and blog software
- browsers and other "user agents"
- WAI – ARIA specification for accessible rich Internet applications.”

[\(https://www.w3.org/standards/webdesign/accessibility/\)](https://www.w3.org/standards/webdesign/accessibility/).

Accessibility is the provision of an access, use and benefit from an environment on an equal basis with others, regardless of differences in gender, age, physical or mental condition. “Accessibility refers to the ability of an individual to access, navigate, understand and use the features of an environment, including physical, digital and conceptual environments.” (Harniss, 2014). Accessibility is related to equality and overcoming negative stereotypes and social stigma. Every negative stereotype, every negative stigma is a barrier to forming an actual, virtual and multiple identity.

- There are several **types of accessibility related to digital technologies**:

- **social accessibility**, which is associated with different social groups. Social categorization is derived for people with disabilities, for people who do not speak a given language, etc. For example, disabilities are a social construct and as such, despite their diversity, cannot be synonymous with good or bad, good or evil, right or wrong.. (Goffman, 2009; Shinohara & Wobbrock, 2011; Li et al, 2018);

- **accessibility of the physical environment**, which is most often associated with personal mobility and an independent lifestyle in various variable indoor and outdoor spaces, in different buildings, floors, halls and when using different products and materials in everyday and educational contexts.

- **the accessibility of the learning environment** is "the potential of the learning environment to adapt to the needs of all learners. It is determined by the flexibility of the virtual system (in terms of presentation, control methods, ways of access and support for the learner)" (Cooper, 2006). In this discourse, the learning environment becomes an accessible learning and self-learning environment in relation to the needs of teachers and learners.

- The accessibility of the learning environment increases if the learning process is applied:

- the principles of universal design, universal design for learning and universal design for evaluation;

- learning models related to neuro-education and neuro-pedagogy;

- personalized learning;

- digital technologies, including mobile applications;

- adaptive technologies for teachers and students with SEN;

- assistive technologies;

- innovative learning models with innovative technological solutions and others.

- **accessibility of educational content** for every teacher and student with increased engagement of every participant in the educational process with positive experiences. The investment is worth it because the flourishing of every teacher and student, and their general academic well-being, is visible.

- **digital accessibility**, which is related to Internet access, Internet connectivity, and "a wide range of factors, including accessibility issues with Internet Service Providers (ISPs), the ability to afford the hardware, and web browsers that are not compatible with vital assistive technologies" (Jaeger, 2012). Digital accessibility is inevitably linked to universal access in human-computer interaction (Zubair et al, 2021).

- Digital accessibility is expressed in four principles: Directive (EU) 2016/2102, and in the [Web Content Accessibility Guidelines](https://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html#introduction-fourprincs-head) (WCAG) 2.0 (2008) on World Wide Web Consortium (W3C), (<https://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html#introduction-fourprincs-head>). Digital accessibility is also brought out in used E-learning platforms such as Google Space, Teams Microsoft, DSpace, BlueButton, Moodle, Google Work for Education, Students Portals, Institutional Portals, Portbase 5 and others.

The targeted accessibility models assume ubiquity of access. In this context, Jaeger (2011) notes „the ubiquitous nature of the Internet and accompanying services and technologies now makes equal access to and participation in the online environment a social necessity for education, employment, finance, and civic engagement. “

As they note Lindsay & Brown (2005): "more often, there are accessibility recommendations that are specific to a given context, but there are also important accessibility recommendations that meet the needs of target groups and remain valuable in several contexts." The barriers encountered include: „incompatibility between pages and screen readers, incorrect or non-existent labelling of links, form elements and frames, cluttered and complex page structure, ALT tags non-existent or unhelpful, confusing and disorienting navigation, inappropriate colours and poor contrast, unclear and confusing layout, graphics and text size too small, lack of alternative media for audio and complex language, complicated language/terminology“(Lindsay & Brown 2005).

Accessibility ensures equality, access and quality in and of the educational institution for all the actors on its stage.

Access refers to the possibility of applicability and usability of a place, resources, the Internet, and accessibility refers to the ease with which different groups can reach and use resources, sites or information.

In an example, access is present when a person is provided with the means to reach a particular website through the provision of: an electronic device, internet connectivity, digital skills; and accessibility focuses on the sensory, cognitive and emotional perception of data, images, audio and video, and content on the relevant website.



Accessibility = access + ability (<https://academy.pega.com/topic/accessibility-access-ability/v1>)

Accessibility needs to follow the innovative application of technology or accessibility also needs to evolve in line with technological developments.

In line with the understanding of access, accessibility and usability of digital technologies, digital inclusion, and requirements for teachers' professional competences and quality of the educational product, **the European Framework for the Digital Competence of Educators (DigCompEdu)¹ has been created.** "DigCompEdu details 22 competences organised in six areas:

- Professional engagement
- Digital resources
- Teaching and learning
- Assessment
- Empowering learners
- Facilitating Learners' Digital Competence

The focus is not on technical skills. Rather, the framework aims to detail how digital technologies can be used to enhance and innovate education and training." (https://joint-research-centre.ec.europa.eu/digcompedu/digcompedu-framework_en)

¹ "First published, in English, in 2017, as "European Framework for the Digital Competence of Educators: DigCompEdu" by the European Commission's Joint Research Centre, EUR 28775 EN, ISBN 978-92-79-73494-6, doi:10.2760/159770, JRC107466, <http://europa.eu/!gt63ch>.

Unit 3 Structure and interface of the study course and study materials

E-learning course, e-learning materials

The main **elements of an e-learning course** are curriculum, learning objectives, learning material, test and resources, subjects and processes. An e-learning course enables learning, self-learning and assessment of the knowledge acquired in a subject via digital resources.

The IEEE (Institute of Electrical and Electronics Engineers) defines **a learning object** (LO) as any entity – digital or non-digital, that may be used for learning, education or training. (<https://ieeexplore.ieee.org/document/1032843>). An e-learning **LO** is a digital, open educational resource that is created to assist in a learning event. Learning and reusability reside at its core. Each LO has a learning design. The more granular the LO is, the more reusable it is in other contexts (<https://blog.citl.mun.ca/instructionalresources/what-are-learning-objects/>). LO is created to achieve a specific learning objective.

The e-learning resources include e-materials that provide learning of a module of the course which can include at least several topics. They are universal tool for the organization of technological training in the new information environment (Mihaylova-Blagoeva, 2024).

According to their educational use LO can be classified as follows (<https://campus.paho.org/en/types-educational-resources>):

- Instructional objects: articles, workshops, seminars, case studies, etc.
- Collaboration objects: forums, chat, online meetings, etc.
- Practice objects: simulations, software, online labs, research projects, etc.
- Assessment/evaluation objects: partial evaluation, final certification, etc.

The development of LO is required to be with high quality content using different media and in line with new forms and methods of learning.

"The structure of the e-learning material is a key component that includes the determination of the content, represented knowledge and the connections between them." Various **methods of structuring instructional e-learning materials** have been described but the most popular are (Totkov, Doneva et al. 2014):

- dividing the study material into sections, topics and information frames;
- dividing the course into modules, units and sections, and the information into small portions with hypermedia links between them.
- representing the course as a set of lessons. Each one contains study material, additional web information about the concepts, and a set of exercises and quizzes.

Structure of an e-learning course

When **designing an instructional e-course** according to quality standards, the structure should be in accordance to the best practices in instructional design, pedagogy, and learner's experience. The quality standards ensure that the course is not only effective in delivering content, but also engaging, accessible, and supportive of diverse learning needs. The creation of an effective, inclusive, and capable of providing an educational experience for all learners e-course is a process which includes the following components:

1. **Course design and planning** – analysis of the target audience, needs, and learning objectives, defining measurable outcomes that guide the course design, using universal learning design or incorporating multiple means of presentation, engagement, and expression.
2. **Defining course structure** – breaking the course into modules or learning units with defined objectives, using multimedia content and a variety of formats (videos, infographics, interactive elements) to accommodate different learning styles, respecting the principle of accessibility for all materials, presenting content in a way that avoids overwhelming learners, using interactive elements (quizzes, games, worksheets) to promote active learning, practice-oriented case studies, examples, and assignments.
3. **Assessment and feedback** – use of formative and summative, rubrics and guidelines, self-assessment tools, providing immediate and constructive feedback.
4. **Learner support and interaction** – the instructor is actively present in discussions and guides. The design allows for interaction with other learners through group assignments and discussions in forums, FAQ sections and help.
5. **Design to be accessible and usable.** It is necessary to have intuitive navigation, mobile-friendly design, accessible content for special educational needs.

6. ***Design to be continuously improved***, which can be done by gathering feedback from surveys, course evaluations, etc. and updated based on student feedback and innovations in education.

7. ***Design to provide information on how to complete the course*** and obtain certificates.

8. Maintain ***confidentiality and data protection***.

9. ***Create a community*** of learners and graduates. (by Kurzibova, 2021).

The e-course should include an annotation of the studied topics, syllabus, exam outline, information sources, topics for lectures and exercises, assignments and tests for control and self-control, schedule of classes, information for lecturers, current announcements.

In terms of learners, **the e-learning course must meet the following requirements:**

- be highly interactive for learning - contain not only illustrations but also animations, links to audio and video materials.
- be interactive in self-assessment with feedback after each question and after a test or simulations;
- contain components for messages to and contact with teachers;
- allow access to external sites.

The content of each course must meet the following requirements:

- each section should begin with clearly stated learning objectives;
- each topic should contain a summary of the key knowledge and skills that learners need to achieve;
- each section should contain materials and guidelines for independent work, for a range of e-learning materials that can be used repeatedly.

The learning content of each e-course should cover:

- knowledge and facts to be remembered;
- practical examples to help analyse or synthesise solutions based on the knowledge and understanding of the specific issues;
- tests to assess the level of achievement.

For each e-course required:

- name or title of the course and each part of it;

- description and technical requirements ensuring the visibility of the course: required hardware and software and a list of suitable browsers;
- content of the names of the authors with brief biographical data showing the competence of the authors in the development of the respective course;
- information on copyright and distribution rights;
- information on the target group, i.e. for which groups of learners the course is intended;
- accessibility ensured;
- keywords and concepts with hyperlinks to the main content, where definitions are given or concepts and connections between them are introduced;
- main content;
- date of creation and last revision of the course.

A sample course structure includes: "General - a package for a learner, a news forum, a dictionary of key terms in the course; topic from 1 to ...; exam." The general concept of the structure and content of the e-course should be oriented towards achieving the following characteristics of the virtual educational environment: to recreate the learning process - learning activities, materials and communication, using the advantages of the Internet for access from anywhere and at any time;

- to follow the logical sequence of learning activities;
- to provide e-learning materials and launch e-activities following appropriate pedagogical scenarios and depending on clearly defined learning objectives;
- to use flexible pedagogical scenarios for learning depending on the individual achievements and qualities of the learners;
- to provide automated tools to e-course authors (for designing and preparing e-learning) and to teachers (for designing learning and testing units, for assessment, etc.);
- to enrich e-learning resources according to current results;
- to provide flexible ways of working - for both students and lecturers;
- to use an easy and accessible interface, etc." (Totkov et al., 2014).

The e-course is conventionally presented as a structure with 7 elements, and individual topics (sections) in a 4-level structure. The standardized structure will assist educators in designing and developing new e-courses.

The sample seven (7) level structure of a standard e-learning course includes the following parts:

- Information (general introduction of the discipline and the author);
- Introductory (introduction to the specific e-course);
- Core (presentation of the substantive learning content in individual LO);
- Concludings;
- Control (to what extent the learning content has been mastered and learning objectives achieved);
- Additional topics and LO;
- Self-assessment and monitoring section.

The **self-assessment and monitoring section** includes questions and tasks for learner self-assessment on various topics of the e-course for which they are developed. It should include:

- check questions and tasks concerning the whole learning content or its individual modules;
- sample exam options, the solution of which places the student in a real exam environment;
- accompany all questions, tasks, case studies and other assessment items with answers/solutions for self-monitoring.
- minimum requirements for successful completion that learners must meet in order to receive a passing grade.
- the assessment criteria and the method of final assessment in the discipline.

There are a wide variety of forms for **e-course materials** which are used to implement the above mentioned structure (<https://learningportal.iiep.unesco.org/en/issue-briefs/improve-learning/learning-and-teaching-materials>). Some of them are:

1. Electronic textbooks and workbooks: the most common types of learning materials, providing structured content and exercises for learners to follow.
2. Multimedia presentations: videos, slideshows and interactive content that can make learning more engaging and accessible.
3. Online resources: websites, e-books and digital libraries that offer a wealth of information and interactive learning opportunities.

4. Visual aids: posters, flash cards, graphics and infographics to help visualise concepts.

5. Audio aids: recordings, podcasts, and language labs that support auditory learning.

6. Supplemental materials: newspapers and brochures that provide additional information and context.

(<https://learnexus.com/blog/online-course-design-best-practices-3/>,
<https://www.learnworlds.com/online-course-design/>,
<https://learnexus.com/blog/best-practices-for-online-course-design/>)

Well-known e-learning software platforms are Blackboard or Anthology (<https://www.blackboard.com/>), Learning space (<https://www.learningspace.org/>), Top Class (<https://topclasslms.com/>), ARIADNE (<https://www.ariadnelearning.it/>), ILIAS (<https://www.ilias.de/en/>), Moodle (<https://moodle.org/?lang=bq>), etc. Some of them are commercial and others like Moodle are open source. Some apply e-learning standards in developing learning resources to achieve portability for working with other SEs. These software applications enable the creation of sophisticated learning resources without the need for programming expertise. Organizations that deal with e-learning standards are ADL, ARIADNE, IMS Global Learning Consortium, CEN, etc. Standards for e-learning that are related to e-content are LOM, SCORM, IMS Content Packaging.

Structure of learning topics

For ensuring the ease of the process of learning, the e-course should be divided into learning topics (preferably between 10 and 15). They should be logically connected and represent the main learning content in a concise form and can be grouped into e-modules. The content should be tailored to the audience and learning context.

The structure of a topic usually includes 4 sections: introduction (1); elements of the main learning content (2); conclusion (3); elements for upgrade, self-assessment and control (4).

The introduction part includes:

- Introduction (10 - 15 sentences);
- Application of the topic – why the study of the topic is necessary and its practical relevance;

- Learning objectives (between 5 and 10) – what the student should know or be able to do after mastering the material.

In order to make the e-learning materials prepared by the teacher reach the learner as an interactive multimedia presentation in different media it is necessary to use a Learning Management System (LMS) or a Content Management System (CMS).

One of the most popular set of technical standards for eLearning software products is SCORM (Sharable Content Object Reference Model). The main purpose of the standard is to equalize the writing of the program code behind the different e-learning platforms. This aims to guarantee that online learning content and Learning Management Systems (LMSs) communicate with each other. That way the e-learning content becomes accessible for as many as possible learners.

https://scorm.com/scorm-explained/one-minute-scorm-overview/?utm_source=google&utm_medium=natural_search

In order to create learning content that meets the SCORM standard, a tool that supports this standard must be used. Such tools are Adobe Captivate, Articulate Storyline, Lectora, etc. These tools can be used to create interactive e-courses as content in the form of presentations, interactive simulations and multimedia elements are published after creation in the respective LMS (<https://blog.braincert.com/a-complete-guide-to-create-scorm-content-in-an-lms/>).

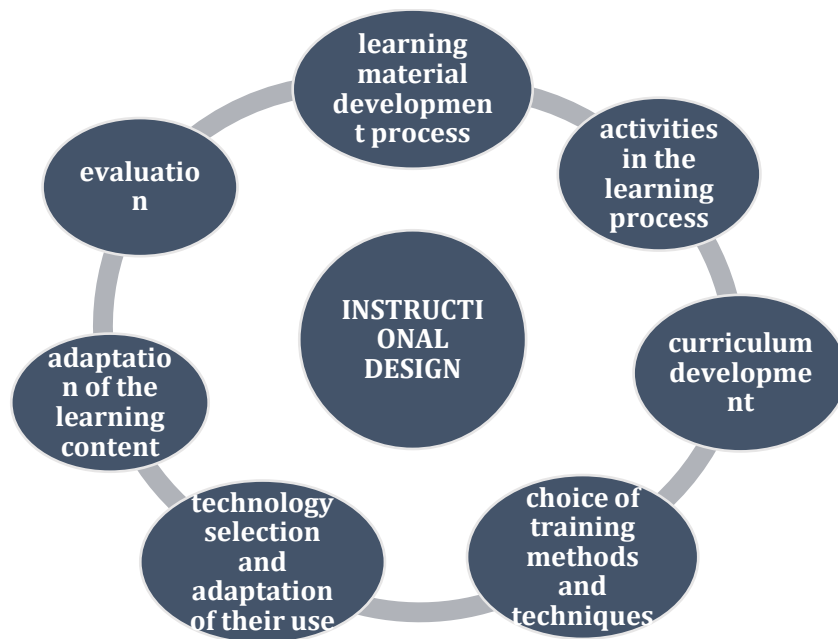
Unit 4 Design of the Training: Teaching and Learning

Design of the training is a complex process of creating and designing effective learning environments, learning resources, and learning products that intrigue, motivate, and engage learners to learn and achieve high academic results. “Training design involves planning a program to meet learning objectives, including structure, content, delivery, and assessments. It considers learner needs, organizational goals, and instructional best practices to create effective, engaging training that boosts skills and knowledge” (<https://www.continu.com/blog/training-program-design#:~:text=Training%20design%20involves%20planning%20a,that%20boosts%20skills%20and%20knowledge>).

“Instructional design is the science and art of creating detailed specifications for the development, evaluation, and maintenance of situations which facilitate learning and performance.” (Richey, Klein & Tracey, 2011).

While the teacher or trainer teach, the instructional designer facilitates and supports independent learning and creates great positive learning experiences. As the theory and practice of learning models, methods, and techniques has been developed and widely applied, emphasis is placed on instructional design.

“Instructional designers are usually behind the scenes, creating training but not delivering it. **Trainers** are usually the people interacting with students and delivering training” (<https://christytuckerlearning.com/is-instructional-design-the-right-career/>).



Source: Authors

Instructional design is a key to the effective transfer of knowledge and skills, with the main aim of ensuring that learners not only absorb the new information, but can also implement it into practice.

“Both the practice and the study of Instructional design can be seen in two ways:

- as strategies for creating particular products and as the implementation and
- management of the overall design process. In either of these orientations Instructional design is a planning process. As such, it is distinguished from development processes, the actual production of instructional materials” (Richey, Klein & Tracey, 2011).

Five principles of instructional design theories, specified for learning are applied when:

1. "learners are engaged in solving real-world problems.
2. existing knowledge is activated as a basis for new knowledge.
3. new knowledge is demonstrated in learning.
4. new knowledge is applied by the learner.
5. new knowledge is integrated into the world of learning." (Merrill, 2009)

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The Figure is from <https://instructionaldesign.com.au/what-is-instructional-design/first-principles-of-instruction/>

Crucial for successful training design are:

- clearly formulated rules and conditions for the training process;
- setting performance standards and goals to achieve;
- motivation for learning of the trainees;
- efficiency of the work process;
- fulfillment of responsibilities;
- regular, effective and constructive feedback.

Important aspects of instructional design

- Accepting learning as an active rather than a passive process;
- Personalized attention to learners through teaching methods and adaptation of learning content, assessment and inclusion methods;

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- Learning methods should be engaging and varied according to the educational profiles of learners;
- Access to learning materials at any time, regardless of location, at your own pace;
- Ability to return and review course materials if necessary;
- Learners must have their own motivation to acquire new knowledge;
- The lack of an access to timely support from a tutor would perhaps at some points have a negative impact on the learning process;
- Learners should have sufficient computer literacy to successfully complete the training course.

Instructional design, teaching and studying through this new type of e-learning, represents a modern approach to education. In it, learning materials and activities are delivered and implemented through the internet and digital platforms. This method of teaching and learning has been described as flexible, interactive, one that can be completely customized to the needs of the learners.

Instructional design is a systematic approach to creating effective courses. Instructional design combines a variety of methods and multimedia to create valuable courses that achieve results and improve performance. E-learning designers focus on creating learning solutions. Success is defined as such depending on the results that learners show.

E-learning, by applying Instructional design, can be conducted both synchronously and asynchronously. Synchronous learning should be implemented in real time, with the active participation of a trainer, a teacher. While in its asynchronous form, the learner carries out the learning process independently. Some of the most commonly used tools for asynchronous learning are forums, blogs and webcasts. E-learning is recommended for application for enriching knowledge in a specific direction and developing the cognitive skills of the individual.

Among the most popular learning models are:

➤ ***UNIVERSAL DESIGN FOR LEARNING***

As stated in Modules 1 and 2, the Universal Design for Learning (UDL) is an innovative and inclusive e-learning model that aims to make e-learning learning content accessible and

engaging for all learners, regardless of their abilities, backgrounds or preferences. UDL is based on three principles: **multiple means of presentation, multiple means of action and expression, and multiple means of engagement**. The first principle requires providing the learners with e-learning content in a different ways so they can access and understand it using their different sensory modalities. The learning content is presented as text, audio, video, images or graphics or through smart digital technologies. The second principle requires providing learners with opportunities in a variety of ways to practice and master the learning content through writing, speaking, drawing, modeling, coding and learning by doing. The third principle requires providing learners with a diverse ways to motivate and stimulate their learning and learning through emotionally positive experiences through choice, feedback, challenge, or collaboration. (<https://www.cast.org/impact/universal-design-for-learning-udi>).

➤ **UNIVERSAL DESIGN OF INSTRUCTION (UDI)**

Universal design of instruction (UDI) is the design of teaching and learning products and environments that are usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. (Burgstahler, 2020). It is based on nine principles: accessibility and equity; flexibility; directness, consistency, and explicitness; tolerance for errors; size and space for approach and use; and three principles for the learning environment, which should be supportive; minimize unnecessary physical effort; and accommodate students and multiple teaching methods. (<https://www.washington.edu/doit/universal-design-instruction-udi-definition-principles-guidelines-and-examples>)

➤ **UNIVERSAL INSTRUCTIONAL DESIGN (UID)**

At the heart of UID is the concept of inclusion and equity. Learning questions and activities should be accessible and fair; direct and consistent; provide flexibility in use, participation, and presentation, and a supportive learning environment; be explicitly presented and easily understood; minimize unnecessary physical effort on learners and ensure learning.

➤ ***ADDIE model***

The ADDIE model (ADDIE - Analysis, Design, Development, Implementation and Evaluation) is a creative model from the ISD (Design System) family and is a creative and popular classic model for e-learning. ADDIE is a linear and systematic process that follows an algorithm of **separate phases of e-learning, from identifying learning needs and objectives, for creating learning materials and activities, to delivering and assessing learning outcomes**. The ADDIE model helps to plan, organize and manage e-learning, ensuring its quality and effectiveness. (<https://www.uwb.edu/it/addie>; <https://educationaltechnology.net/the-addie-model-instructional-design/>).

➤ **GAGNE'S NINE EVENTS OF INSTRUCTIONS**

The framework identifies nine key instructional events to address in order to maximize learning: **gain attention, inform learners on the objectives, recalling prior learning, present the material, provide guidance, elicit performance, provide feedback, assess performance, enhance retention** (<https://educationlibrary.org/gagnes-nine-events-of-instruction/>).

➤ ***KIRKPATRICK Model***

The KIRKPATRICK Model is widely used e-learning model for evaluating the impact and effectiveness of e-learning courses. KIRKPATRICK is a standard for attracting and validating talent investments (<https://www.kirkpatrickpartners.com/the-kirkpatrick-model/>). It is composed of four levels of assessment: **response, learning, behavior, and outcomes**. The first level measures the response of learners to the e-learning course through their satisfaction and engagement. The second level measures the knowledge and skills of learners gained from the e-learning course. The third level measures the application knowledge, skills and competence acquired from the e-learning course through the performance and productivity of learners. The fourth level measures the impact of the e-learning course on organizational objectives, such as return on investment and customer satisfaction.

➤ **BLOOM'S TAXONOMY**

Bloom's Taxonomy provides a useful tool for designing learning objectives and assessments that target specific cognitive skills. By selecting appropriate verbs for each level of the taxonomy, designers can ensure that their learning objectives are measurable and

specific, and that they align with the desired level of cognitive skill development. Phases of Bloom's Taxonomy: **knowledge, comprehension, application, analyzing, evaluating and creating** (<https://bloomstaxonomy.net/>).

➤ **DESIGN THINKING**

• Design thinking is a strategic and practical learning model used by designers and/or design teams to develop design concepts (proposals for new products, services, objects, buildings, machines, etc.). Design thinking is also associated with the processes of creating and developing innovations, innovative products, services and experiences. Design thinking includes five main steps: **understanding and knowing the end user/community, defining the problem, searching for new ideas, creating rapid prototypes, and testing and seeking feedback** (<https://podmosta.bg/dizayn-mislene-znachenie-stapki-v-razvitiето-mu-i-prilozhenie-v-obrazovaniето-na-digitalnata-era/>). Design thinking is a creative process that encourages innovations and helps build complex solutions through ideas. It is an interdisciplinary approach that combines different methods and techniques from different fields. It is a new way of thinking, which makes it applicable in all fields. Design thinking is a creative process for solving complex and seemingly insoluble problems and finding innovative and unconventional solutions for them (http://www.eddev.eu/lzllzдания/AttachmentsEdited/br3_M_Karakehayova.pdf?cls=file).

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➤ **QUALITY MATTERS**

Quality Matters (QM) is a popular e-learning model based on peer review that assesses the quality of online courses based on eight general standards and 42 specific criteria (<https://dlss.flvc.org/qm-about#:~:text=The%20Quality%20Matters%20Higher%20Education,continuous%2C%20collegial%2C%20and%20collaborative>). The eight general standards are: **course overview and introduction, learning objectives, assessment and measurement, learning materials, learner interaction and engagement, course technology, learner support, and accessibility and usability** (<https://www.qualitymatters.org/>).

➤ **MERRILL'S FIRST PRINCIPLES OF LEARNING**

The Merrill model is a set of problem- and task-based learning strategies that create effective learning experiences by engaging online learners, and transferring e-learning content into real-life situations. The Merrill design presents a multi-phase process with five principles for the most effective learning environments: task focus; activation; demonstration; application; integration. (Merrill, 2002; <https://elearningindustry.com/merrills-principles-instruction-definitive-guide>)

➤ **DICK & CAREY MODEL**

The Dick & Carey instructional design model (also known as the Systems Approach Model) is a nine steps process for planning and designing effective learning initiatives. There are nine interrelated components in the model which guide this instructional design process: **identify goals, conduct analysis, analyze learners and contexts, performance objectives, assessments, develop a strategy, instructional materials, formative evaluation, revise.** (<https://worldofwork.io/2019/08/dick-carey-instructional-design-model/>).

➤ **EXTENSIBLE E-LEARNING FRAMEWORK**

The Extensible e-Learning Framework (XLF) is more flexible and adaptable model for e-learning. It is based on the idea of modularizing, reusing, and combining different components of e-learning content, such as learning objects, metadata, learning designs, and learning outcomes. XLF allows for the customization of e-learning content according to the needs and preferences of learners, as well as the context and environment of the e-learning course. XLF supports interoperability with other platforms and systems (<https://www.adaptlearning.org/>; https://www.academia.edu/2819796/An_Extensible_Framework_for_Building_Interactive_Courses_on_Web; https://pubman.e-ucm.es/drafts/e-UCM_draft_181.pdf).

➤ **SAM (SUCCESSIVE APPROXIMATION MODEL)**

The design is flexible, popular model with an iterative process for e-learning instruction and focuses on rapid development, efficiency, and success over perfection by creating meaningful, memorable, and engaging learning experiences that drive measurable gains and deliver working, personalized learning solutions that can be tested for strengths and

weaknesses. This model encourages receiving feedback and making quick adjustments, rather than obsessing over one perfect solution. **SAM involves three sequential phases: preparation** – a rapid assessment of needs and constraints; **iterative design** – rapid prototyping and refinement; and **iterative development** – small, rapid improvements based on feedback. (<https://elmlearning.com/hub/instructional-design/sam-successive-approximation-model>; <https://learn.alleninteractions.com/services/custom-learning/sam/elearning-development>)

➤ ***REVERSE DESIGN (UNDERSTANDING THROUGH DESIGN) (UBD)***

It is defined as backward design, because the desired outcomes are first determined, then acceptable evidence is determined, and only then are the learning experiences, and instructions planned. (<https://authenticeducation.org/the-ae-team/grant-wiggins/>)

To implement an Instructional Design, it is necessary to:

- stimulate active learning;
- have clearly formulated conditions needed for the appropriate implementation of the training,
- personalized attitude towards learners;
- motivate learners by setting standards;
- constantly review the progress of the learners;
- provide feedback;
- vary the methods and techniques of training;
- flexibility of the levels of complexity and the curricula.

Successful E-learning courses according to the Instructional Design are interactive; energetic; dynamic and present the learning content in a multisensory manner.

Unit 5 Tutor support

Tutoring is a specific form of additional academic support and assistance to the learner in order to acquire specific knowledge or new skills. Tutoring is provided by a teacher or a person with expertise and is characterized by the following features:

- Individualized model of implementation;
- Positives learning and attitude towards learning;
- Prevents stress, disappointment and burnout in case of failures;
- Increases school achievement and improves academic performance;
- Improves the confidence, self-esteem and self-esteem of the tutored;
- Increases motivation to learn;
- Provokes the learner's active learning;
- Brings out a different perspective through individual and group learning experiences;
- Improves personal growth and flourishing;
- Improves the attitude towards the subject, specialized field;
- Improves strategies for asking questions and making choices;
- Develops critical and creative thinking;
- Creates opportunities for intensive practice;
- Creates opportunities for a peer-to-peer learning model.

(by <http://www.ltconline.net/green/courses/TutorTraining/whatIsTutoring.htm>;
<https://www.dyndevise.com/en/news/tutor-mentor-coach-the-differences-ELN-1712/>)

Tutoring is useful, inclusive, low-cost technique that can be implemented both from teacher to student and in a peer-to-peer model (Barbetta et al., 1991; Heward, 1994; Mercer & Mercer, 2001). “It can be implemented both on-the-job and off-the-job. Tutors provide their students with new knowledge, but also with guidance, advice, and supervision. Although their role is to instruct, they do not offer ready-made solutions. They should require critical thinking and reasoning from their students” (Barna, 2019).

Tutoring has concerted approaches to mentoring and coaching. Mentoring, coaching, and training are important predictors of human capital. There are similarities between the three constructs in the context of skill enhancement and personal development, but there are also differences.

The differences in the three concepts can be defined as follows:

- **Mentoring** is a voluntary relationship between two people - a mentor and a mentee, which aims to improve the acquisition of new knowledge, skills and experience, as well as the personal development of the young person, through ongoing support. As it is a process of mutual cooperation, a certain period of time is required. Mentoring is carried out confidentially. In modern times, the term mentoring is used to describe a relationship in which someone receives advice and guidance from another more experienced colleague in the field. (Bozeman & Feeney, 2007).

- **„Coaching** (shadowing/guidance) is a personal development methodology in which an experienced person (the coach) supports another person (the coachee) in achieving a specific professional goal. A coach provides support toward the acquisition of a higher degree of awareness, responsibility, choice, confidence, and autonomy.

- **Tutoring** is training support, especially in academia, usually provided by a person with in-depth knowledge or expertise in a particular subject. The tutor provides assistance to one or more people (tutees) on certain subjects or skills. Emblematic is the case of peer tutoring (peer learning) which is based on a cooperative learning model.“ (<https://www.dyndevce.com/en/news/tutor-mentor-coach-the-differences-ELN-1712/>).

E-tutoring is an innovative and effective form with the following characteristics:

- Face-to-face communication;
- Ubiquity (anytime and from anywhere);
- Timely and immediate help;
- Can be applied synchronously, asynchronously and hybridly;
- Provokes positive attitudes towards online learning.

Online tutor is “any person undertaking a role to support and enable students to learn online effectively” (Higgison, 2000).

The e-tutor performs role and behavioral models for:

- providing personalized support to the learner;
- effective communication with the learner;
- accommodation and accompaniment throughout the learning process;
- accompanying the tutored at all times (before and during the integration into the school institution);
- providing tools and keys for remote support;
- improving e-learning directly on the e-platform;
- providing ubiquitous support (at any time and from any place);
- collaborating with the tutored, not being his manager or superior; managing;
- introducing him to the norms, rules, cultural codes and social codes of the school organization;
- encouraging cooperative and competitive learning;
- accessibility, engagement and interactivity;
- supporting adaptability to different learning styles;
- immediate self-assessment;
- providing immediate feedback;
- provokes deepening of understanding;
- encourages critical and creative thinking;
- is inclusive in multilingual learning;

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- eases the workload for teachers;
- creates an online school community, etc.

Unit 6 Digital assessment of students' competencies (knowledge, skills, attitudes)

Evaluation occurs whenever a trainer's opinion or judgment is being shared about a learner's performance. (Bearman, Nieminem, & Ajjawi, 2022) The contemporary model of evaluation invariably involves the use of a competency-based approach that includes the assessment of the three main psychological domains of knowledge, skills, and attitudes. (Chavdarova-Kostova, 2022) Only within its context the actually applicable outcome of training can be assessed. Any assessment starts from structuring a baseline assessment on the core domains of knowledge. It can be argued that any training conducted has a degree of relevance to one of the core competencies. The EU recommendations on key competences include eight core competences, which are: literacy; multilingual competence; mathematical competence and competence in science, technology and engineering; digital competence; personal, social and learning competences; citizenship competence; entrepreneurial competence; competence in cultural awareness and expression. (The European Parliament and The Council of the European Union, 2006) The development of at least one of these competences is necessarily included in any curriculum, i.e. the assessment of learning outcomes can start successfully based on the framework set by this conceptualization.

When it comes to assessment in the context of e-learning instructional design, it is essential to mention the four main components that make up the basic instructional design model. (van Merriënboer & Kester, 2014) These are:

1. Learning tasks - the description and guidelines for the task;
2. Supportive information - illustrated case studies, examples and cognitive feedback;
3. Procedural information - "how to" instructions and corrective feedback;
4. Part-task practice - practical tasks.

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The assessment is a key part of any training as its most important role is to provide feedback on the effectiveness of the training, judging by the new knowledge, skills and attitudes acquired as a result of the conducted learning activities. The evaluation process allows for the provision of well-timed feedback regarding the achievement of the learning objectives. (Bearman, Nieminem, & Ajjawi, 2022) The evaluation of the assignment exercise and the main learning task provides information on the extent of acquisition of the knowledge, skills and attitudes embedded in the instructional design.

If the assessment is conducted correctly and accurately, it becomes the best measure of the quality of all components and stages of conducted learning activities. Both the quality of the training materials, their accessibility, relevance and practicality, and the forms and methods of teaching and learning determine the extent to which the competences set as a learning objective are formed (Bean, 2023).

Achieving consistent results showing a high degree of effectiveness of the training delivered is the optimal desired outcome of any training program. Comprehensive assessment of the knowledge, skills and attitudes acquired from a training can be done not only through different tools but also in different settings.

The digital learning environment can contribute to improving the accessibility of training, allowing digital inclusion and inclusion in learning environments of people from remote areas (suburban areas), maritime, tourism and other territorially remote areas (Warouw, 2024), people with hearing impairments (Ponomarenko, Krasavina, Gareyev, & Shishkina, 2023), intellectual disabilities (Betlej & Danileviča, 2022), learning disabilities (Chadwick, Richards, Molin, & Strnadova, 2023) (Levterova-Gadjalova, Terlemezyan, Tagareva, & Tsokov, 2024), and many others.

In the context of modern requirements for accessibility and digitalization of education, it is particularly important to use the full potential of digital technologies not only in the learning process, but also in the assessment process. For learning in a digital environment, it is essential to provide learners with the opportunity for real-time feedback on the mechanisms and progress of their own personal learning. Modern digital technologies allow the provision of rapid and diverse assessment using a wide range of tools. The availability of these options

is particularly important for digital assessment. When working in a digital environment, it is even more important to have clear evidence of the clarity and purity of the assessment criteria, the instructions to each task, and the provision of a demonstration of understanding of what has been learned (Jurane-Bremene, 2021)

It is only when these criteria are met that we can claim that the obtained assessment is credible and reliable. Different tools and platforms provide opportunities to assess different aspects of the learning process. Because of this, it cannot be argued that there is a universal platform for digital assessment. (Çekiç & Bakla, 2021) The large number of platforms and tools contributes to the availability of a wide range of choices in the development of different instructional designs. Nevertheless, the time-, financial- and learning-efficiency of the digital tools for obtaining feedback and assessment are the main prerequisite for the creation of multiple different platforms with a solid development potential. Some of the most popular tools and platforms are:

1. Google Forms

Link: <https://www.google.com/forms/about/>

Description: Google Forms is a handy tool for creating specific assessments, tests, surveys and self-assessment questionnaires. Google Classroom is integrated, which allows you to easily set the task and collect the answers from it.

Assessed competences: knowledge, attitudes and analytical thinking. Main advantages: automated assessment for tests, the ability to ask different types of questions, information collection and assessments in real time.

2. Microsoft Forms

Link: <https://www.microsoft.com/bg-bg/microsoft-365/online-surveys-polls-quizzes>

Description: Similar to Google Forms, Microsoft Forms allows the trainer to create quizzes, tests, and surveys. Part of the Microsoft 365 suite, making it easy to integrate with other Microsoft tools.

Assessed competences: knowledge, digital literacy, attitudes and critical thinking. Main advantages: a wide selection of options for question types, visualization and analysis of data in real time, integration with Microsoft Teams.

3. Moodle

Link: <https://moodle.org>

Description: Moodle is an open-source learning management system that includes different types of assessment tools, such as quizzes, surveys, and forums. It supports a wide range of question types and assessment strategies.

Assessed competences: knowledge, skills, attitudes and teamwork. Main advantages: a wide selection of test and assessment options, the availability of tools for self-assessment and assessment of other learners, the possibility of detailed assessment and feedback.

4. Kahoot!

Link: <https://kahoot.com/>

Description: Kahoot! is a game-based learning platform that allows trainers to create quizzes, tests, discussions, and surveys. It is often used for formal assessments, engaging learners in real-time, providing immediate feedback on their knowledge.

Assessed competences: knowledge, quick thinking and memory. Main advantages: feedback and real-time score, interactive tests and surveys, reports on the data on the performance of learners.

5. Edpuzzle

Link: <https://edpuzzle.com/>

Description: The platform allows trainers to turn videos into interactive lessons by adding questions during the video. It is especially useful in assessing learners' engagement and understanding of video content.

Competences assessed: knowledge, critical thinking and attention. Main advantages: introduction of interactive questions in videos, tracking answers and learners' engagement, integration with virtual classrooms and platforms (Google Classroom, Canvas).

6. Flipgrid

Link: <https://my.flipgrid.com>

Description: Flipgrid is a video discussion platform where learners can answer questions through short videos. It is an excellent tool for assessing learners' communication skills, creativity and attitudes.

Competencies assessed: communication, creativity and attitudes. Main advantages: video-based answers, interaction and feedback between learners, integration with other educational tools.

7. Socrative

Link: <https://www.socrative.com/>

Description: A cloud-based, learner assessment system that allows trainers to create quizzes, surveys, tests, and final assessment quizzes. It is designed for real-time assessment and instant feedback.

Assessed competences: knowledge, critical thinking and understanding. Main advantages: real-time quizzes and quizzes and instant feedback, reports on the performance of learners, compatibility with different devices.

8. Seesaw

Link: <https://seesaw.com/>

Description: A digital portfolio tool that allows learners to document and reflect on their learning experiences. Trainers can evaluate the work of learners through their digital portfolios and provide them with feedback.

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Assessed competences: skills, attitudes, reflection and creativity. Main advantages: digital portfolios with multimedia support, the ability to communicate, track activities and tasks.

9. Liveworksheets

Link: <https://www.liveworksheets.com/>

Description: An interactive platform that allows you to create "live" worksheets. It allows interaction with the content in real time, engages attention and ensures the participation of learners.

Assessed competences: knowledge, memory and problem-oriented thinking. Main advantages: interactive working materials, the ability to work on different devices, the ability to collect feedback.

10. H5P

Link: <https://h5p.org/>

Description: H5P is an application to existing publishing systems that allows the creation of interactive content. It allows you to create videos, presentations, games, quizzes and learning tree structures.

Assessed competences: knowledge, attitudes, critical thinking. Main advantages: instant feedback through comments from the trainer, the ability to problem-oriented learning, the ability to integrate with other platforms (WordPress, Moodle, Canvas, Brightspace).

11. Mentimeter

Link: <https://www.mentimeter.com/>

Description: A tool for turning online presentations into conversations. Allows the creation of cognitive maps, surveys, both in real time and asynchronously.

Competencies assessed: attitudes, socialization, problem solving. Main advantages: interactive feedback in real time of training, the ability to assess attitudes and increase motivation.

Because of their specific characteristics, skills are assessed by different types of digital tools that allow the application of different technical, interpersonal and practical skills. The assessment of skill acquisition and development can be done through several innovative and traditional methods (Mudhol, 2024):

1. Portfolios and e-portfolios - a collection of the learner's work during the learning process, a physical or digital archive that allows learners to demonstrate the development of their skills and competencies, thereby also facilitating self-assessment;
2. Peer assessment and self-assessment - learners assess their work and the work of their peers according to pre-set criteria. This technique supports the development of reflection and critical thinking, as well as collaboration and teamwork;
3. Simulation-based and virtual lab-based assessment - a widely applicable assessment method based on case studies. Virtual simulated experiments and realistic experimental scenarios, etc.

There are a large variety of digital tools and platforms that enable evaluation according to these methods. As some of the most promising we can mention:

1. Skillshare

Link: <https://www.skillshare.com/en/>

Description: Although the main function of Skillshare is to be a learning platform, it can also be used to assess skills by assigning practical tasks.

Assessed competences: creative skills (design, photography, etc.), technical skills and artistic skills. Main advantages: project-based learning and assessment, access to various useful tips and courses, feedback and community engagement.

2. Codio

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Link: <https://www.codio.com/>

Description: Codio is an educational platform for computer science and programming. It allows trainers to assess learners' code-creating skills through tasks and projects created in a fully integrated environment development.

Competencies assessed: programming, problem-solving, and technical thinking. Main advantages: interactive exercises, real-time feedback based on both the quality and functionality of the created code, automatic evaluation of tasks.

3. Labster

Link: <https://www.labster.com/>

Description: Labster provides the ability to simulate scientific subjects in a virtual laboratory. It allows learners to conduct experiments in a virtual environment, which helps in assessing their practical laboratory skills without wasting the resources of a physically existing real laboratory.

Assessed competences: laboratory skills, application of scientific principles and experiments. Main advantages: realistic laboratory simulations in different scientific fields, immediate feedback and guidance during the experiment, integration with learning management systems.

4. Articulate 360

Link: <https://www.articulate.com/360/>

Description: Articulate 360 is a set of tools for creating interactive content for e-learning, including tasks that simulate real-life scenarios. Although mainly used for on-the-job training, it can also be particularly useful in the development and assessment of social competences and soft skills.

Assessed competences: communication, decision-making, team interactions and other soft skills. Main advantages: tree-based scenarios for decision-making; interactive simulations and puzzles; Tools for creating a video-based assessment.

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5. SimVenture Evolution

Link: <https://simventure.com/products/evolution/>

Description: SimVenture Evolution is a business simulation tool that allows learners to start and run their own virtual company. It is designed to develop and evaluate business management skills in a safe environment, without the risk of losing financial resources.

Assessed competencies: business management, entrepreneurship, decision-making and financial literacy. Main advantages: complex and realistic business simulations that cover various aspects of running a company, developing decision-making skills and developing strategies in real time, detailed performance feedback.

6. Mursion

Link: <https://www.mursion.com/>

Description: Mursion is a virtual reality platform that uses AI-controlled avatars to simulate realistic workplace interactions. It was created to develop soft skills, as well as to assess skills for leadership, customer interaction and education.

Competences assessed: leadership, communication, conflict resolution and interpersonal skills.

Key benefits: virtual, realistic simulations of different scenarios, real-time interactions, performance analysis and feedback.

6. Flipgrid

Link: <https://my.flipgrid.com>

Description: As mentioned above, Flipgrid is ideal for assessing communication and presentation skills. Learners create video responses to different tasks that can be evaluated on different competencies.

Assessed competencies: communication and presentation skills, public speaking skills and reflective thinking. Main advantages: in the assessment of skills are video-based

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answers and peer review, interactive discussion formats and integration with other educational tools.

The availability of a large number of digital platforms and technologies supporting both assessment and learning in general is a valuable capital for the education of the future. The rapid development of society requires changes with which the educational sphere must meet the changing demands on the workforce and on the members of society as a whole. (Mudhol, 2024) Knowledge and active use of the rich set of digital tools is not only a huge advantage for any well-versed trainer, but is also a necessity in relation to modern requirements. Digitalization in education is the logical next step of the education of the future and its implementation in the best colors is the work and responsibility of all participants in the process. Part of this realization is the application in the best possible way of all possible tools and processes, for which the main prerequisite is their in-depth knowledge.

The presence of a plethora of different digital platforms and technologies supporting not only assessment but learning in general is a valuable asset for the education of the future. The rapid evolution of the society necessitates changes by which the education field must meet the changing demands on the workforce and members of the society in general. (Mudhol, 2024) The knowledge and active use of the rich array of digital tools is not only a huge advantage for any highly proficient educator, but it is also a must in meeting today's demands. Digitalisation in education is the logical next step of education of the future and its implementation at its best is the job and responsibility of everyone involved in the process. Part of this realisation is the implementation in the best possible way of all available tools and processes, for which a profound knowledge of them is an essential prerequisite.

Unit 7 E-learning quality standards

In this unit should be noted the United Nations Sustainable Development Goals 2030, in particular Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. In achieving the Goal, UNICEF sets out requirements for the governments, including requirements to “implement and scale up digital learning solutions and innovations to rethink education” and to direct “attention to skills development must be a core component of education.” (<https://sdgs.un.org/goals>; <https://data.unicef.org/sdgs/goal-4-quality-education/>)

The quality of education, including E-education, is determined by standards. Initially, standards were defined as specifications for the standardization of electronic learning resources and represent a set of basic rules and principles. As a result of numerous studies and trials by internationally accredited organizations, the developed specifications are recognized as international standards. (<https://moodle.org/mod/glossary/view.php?id=7594&mode=date>)

The quality standard is most often defined as:

- a *framework* that describes the educational process in order to achieve the desired results of the education system;
- a *process* of transferring knowledge, developing skills and creating abilities
- a *component* that determines the specificity and speed of social and economic development.

The standard is not an imperative administrative document, but provides guidelines and a vision for the implementation of an educational process in different environmental contexts.

Standards in e-learning are specifications, guidelines or instructions for products, services, digital technology resources, etc., which guarantee the quality of education. „An E-Learning standard is a set of rules and requirements of how data is being processed, exchanged, and delivered when learning content is exported to various online platforms.“ (<https://www.ispringsolutions.com/blog/elearning-standards>)

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„**E-learning standards** aim to ensure that different platforms, technologies, and content work together seamlessly. By adhering to these standards, the online teaching and learning process becomes more efficient, accessible, and scalable. E-learning standards have many purposes, including:

- ✓ *Interoperability*
- ✓ *Reusability*
- ✓ *Durability*
- ✓ *Accessibility*
- ✓ *Scalability*“ (<https://www.iseazy.com/blog/introduction-to-e-learning-standards/>)

Among the most significant and most popular E-learning quality standards can be noted:

- **ISO 21001**

The ISO 21001 standard is intended for the Educational Organization Management System (EOMS) of the International Organization for Standardization. The standard offers a common management toolkit for educational organizations aiming to improve their processes and meet the needs and expectations of those who use their services. „The 11 principles of the Educational Organizations Management System benefit an organization in the following ways:

- ✓ Focus on Learners and Other Beneficiaries.
- ✓ Visionary Leadership.
- ✓ Engagement of People.
- ✓ Process Approach.
- ✓ Continual Improvement.
- ✓ Evidence-Based Decisions.
- ✓ Relationship Management.
- ✓ Social Responsibility.
- ✓ Accessibility and Equitability.
- ✓ Ethical Conduct.
- ✓ Data Security and Protection. (<https://www.siscertifications.com/the-principles-of-iso-21001-and-how-can-it-benefit-your-organization/>)

- **AICC**

The first developed e-learning standard that allows for the creation, delivery, and assessment of online courses, but does not provide the ability to track learner progress data. The AICC standard also provides security for data transfer between content, and the LMS, and has implementation flexibility. (<https://en.online-learning.bg/e-learning-standards>; <https://training.safetyculture.com/blog/important-e-learning-standards/>; <https://www.fosway.com/elearning-standards/>; <https://www.ispringsolutions.com/blog/elearning-standards>)

1.5.1.

- **SCORM (1.2 & 2004)**

A standard and reference model for a shared content object and refers to technical standards that allow e-learning courses to work seamlessly with any learning management system (LMS). The SCORM standard allows:

- ✓ *Easy content creation;*
- ✓ *Consistency support;*
- ✓ *Authoring tools support;*
- ✓ *LMS support;*
- ✓ *Easy course catalog building;*
- ✓ *Mix and match content;*
- ✓ *Standardized archiving.*

It also allows to monitor data on course activities and student learning progress with test scores, grades, student papers, etc. It is applicable for regular courses, but lacks interactive and engaging elements. By adding SC Training (formerly EdApp) to SCORM, a short engaging course can be created. (<http://www.adlnet.org/Scorm/scorm.cfm>; <https://en.online-learning.bg/e-learning-standards>; <https://training.safetyculture.com/blog/important-e-learning-standards/>; <https://www.fosway.com/elearning-standards/>; <https://www.ispringsolutions.com/blog/elearning-standards>)

- **xAPI (Tin Can)**

The xAPI standard is an application programming interface (API), also known as the Experience API (xAPI) or Tin Can API, that allows data to be collected from both e-learning

courses and other sources related to team learning activities such as social learning, simulations, mobile learning, e-gaming, etc. Data can be recorded and stored for an individual student or team in a learning record repository (LRS) and used in any learning management system (LMS). The standard is suitable for both online and hybrid learning. (<https://training.safetyculture.com/blog/important-e-learning-standards/>; <https://en.online-learning.bg/e-learning-standards>; <https://www.fosway.com/elearning-standards/>)

- **LRN**

LRN stands for Learning Resource iNterchange and is Microsoft's implementation of the IMS Content Packaging Specification. It consists of an XML-based schema and an LRN toolkit. It provides a standard method for describing content, making it easy to create, reuse, and customize content objects with an XML editor, whether originally developed from scratch or purchased under license from vendors. (<https://www.fosway.com/elearning-standards/>; <https://www.microsoft.com/elearn>)

- **Cmi5**

Using the Cmi5 standard, provides adaptability and stability to any learning technology and adds an additional layer of security when exchanging data between courses and the LMS. The standard is much simpler than older and more ambitious standards such as SCORM 2004. Cmi5 is a bridge between SCORM and xAPI that takes the best of these two standards for LMSs. It can be used for mobile learning and offline learning. (<https://training.safetyculture.com/blog/important-e-learning-standards/>; <https://en.online-learning.bg/e-learning-standards>; <https://www.fosway.com/elearning-standards/>)

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- **WCAG**

The WCAG standard is about making web-based content accessible to all people without limitations and regardless of sensory, motor, or cognitive impairments. The standard is outlined in the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG) 2.0 (2008). E-learning content that meets this standard follows four principles:

✓ „**Perceivable** - Information and user interface components must be presentable to users in ways they can perceive. This means that users must be able to perceive the information being presented (it can't be invisible to all of their senses).

✓ **Operable** - User interface components and navigation must be operable. This means that users must be able to operate the interface (the interface cannot require interaction that a user cannot perform).

✓ **Understandable** - Information and the operation of user interface must be understandable. This means that users must be able to understand the information as well as the operation of the user interface (the content or operation cannot be beyond their understanding)

✓ **Robust** - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. This means that users must be able to access the content as technologies advance (as technologies and user agents evolve, the content should remain accessible)

If any of these are not true, users with disabilities will not be able to use the Web. “

(<https://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html#introduction-fourprincs-head>). The standard provides accessibility models for the use of documents on Word, images non-text objects, data tables, links, images requiring long description, Pdf files, slides of the presentations, video, audio, different types of on-line applications.

• **Standards for Quality Online Teaching**

Quality Matters, Virtual Learning Leadership Alliance and DLAC, bring out an initiative for **Standards for Quality Online Teaching** as a robust framework designed to guide schools, districts, state agencies, statewide online programs, and other educational organizations in enhancing online teaching and learning. This updated edition consolidates the standards into five key categories:

- ✓ *Standard A: Professional Responsibilities*
- ✓ *Standard B: Digital Citizenship*
- ✓ *Standard C: Engagement and Belonging*
- ✓ *Standard D: Learner-Centered Instruction*
- ✓ *Standard E: Instructional Design*

Each standard is supported by specific indicators, offering a detailed view of what constitutes quality online teaching and practical applications (the how), providing educators with actionable insights for implementation (<https://nsqol.org/the-standards/quality-online-teaching/>)

- **IMS Common Cartridge**

“IMS Common Cartridge facilitates interoperability in a given eLearning environment, i.e., it makes third-party content in a platform-specific format available for instructors without any additional effort. Thus, it’s a standard for the hassle-free exchange of learning materials between various publishers rather than a standard for tracking training data.

Common Cartridge enables users to manage different types of content, stream it from a third-party system in real time, and see all changes without reuploading content or hiring a team of developers to set up needed integrations. At its core, Common Cartridge (CC) has so-called Thin Common Cartridge (TCC)

The Thin Common Cartridge connects different systems through internal and external links with learning tools interoperability (LTI) protocols. Processed data is represented in a series of XML files in versions 1.0–1.2 or a single XML file in version 1.3. You can then import the resulting package into any LMS that supports the Common Cartridge standard.

It focuses on interoperability between various eLearning tools and systems, thereby presenting its unique advantages, such as:

- ✓ *Suitable for different tools.*
- ✓ *Extended data exchange.*
- ✓ *Flexibility and speed.*
- ✓ *Content updates made easier.*
- ✓ *K-12 profile.*
- ✓ *Video exchange.”*

The IMS Common Cartridge standard is well suited for personalized learning.

(<https://www.ispringsolutions.com/blog/elearning-standards>)

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- **ARIADNE**

The ARIADNE standard is related to the improvement of online activities such as the placement and use of learning resources, the management of the learning process, the exchange of learning objects between administrative systems and virtual learning environments. The standard consists of seven main categories, called containers, which represent a set of elements. The values that apply to each element can be free text, a fixed list, an extended list and a date type. Some of the elements are mandatory when describing a given learning unit. Other elements can be used, depending on the specific characteristics of the learning resource. The standard defines elements that describe metadata for given learning resources, but does not define their form. (<https://moodle.org/mod/glossary/view.php?id=7594&mode=date>)

- **LOM**

The standard aims to optimize the search, evaluation, acquisition and use of learning resources by learners and is characterized by simplicity, pedagogical independence and general applicability. (<https://moodle.org/mod/glossary/view.php?id=7594&mode=date>)

- **FREMA (eLearning Framework Reference Model for Assessment)**

The standard was created for assessment in e-learning and identifies six domain areas, five of which are the subject of the circular: assessment, learning content, enterprise, personal development planning, and personal learning environments. The learning content domain area reference model involves the specification of services for the design, construction and execution of learning activity that can be used and shared by multiple institutions and the lifelong learner. (<https://web-archive.southampton.ac.uk/www.frema.ecs.soton.ac.uk/presentations/index.htm>).

Unit 8 Ability to apply E-learning quality standards in e-learning design (courses, learning activities and resources)

The design of effective e-learning course is a complex process that requires analytic activities. Essential **e-learning components and best practice for applying e-learning quality standards** are (<https://www.cdc.gov/training-development/media/pdfs/2024/04/CDC-e-learning-essentials.pdf>):

- **Analysis** – to effectively identify learner audiences and meet their needs, it is important to focus on the following aspects: the knowledge or skills to be acquired, clear and measurable learning objectives, and strategies that support the learning process. Learning objectives are statements placed at the beginning of a course to inform learners about its content, and guide designers in creating a course, that aligns with the audience's needs, and desired learning outcomes.

- **Interactivity** – for facilitating learning by applying interactive strategies that engage learners and stimulate recall of prior knowledge. Different levels of interactivity may be used to suit content and audience needs.

- **Interface and navigation** – the interface is learner-friendly with a main menu and other navigational elements that help learners know where they are within the course and move easily through it.

- **Content** – must be accurate and reading level appropriate for the audience. Information is succinct, logical, and clearly divided through the effective use of color, graphics, borders, and white space. All screen elements adhere to organizational guidelines for digital media.

- **Product evaluation** – the course undergoes formative and summative evaluations to ensure that learning strategies are effective and long lasting.

- **Learning assessment** – E-learning products include an assessment that can be completed by all learners. This assessment determines the product's impact on intended learning outcomes.

Interactivity provides opportunities for learners to explore content, apply knowledge, and check understanding through questions, simulations and other activities in e-course.

The US National Standards for Quality Online Courses provide a comprehensive framework to support educational organizations in improving the quality of e-learning. The standards are designed to offer guidance while allowing maximum flexibility for different kinds of users (<https://nsqol.org/the-standards/quality-online-courses/>). They include:

- Standard A: Course Overview and Support;
- Standard B: Content;
- Standard C: Instructional Design;
- Standard D: Learner Assessment;
- Standard E: Accessibility and Usability;
- Standard F: Course Technology;
- Standard G: Course Evaluation.

Each standard is accompanied by specific indicators that provide a detailed framework for defining a quality e-course. Explanations and examples for each indicator are presented to provide deeper context and concrete strategies for implementation. Examples for applying standard B6 are: The online course content and supporting materials reflect a culturally diverse perspective that is free of bias. <https://nsqol.org/wp-content/uploads/2024/04/NSQ-2-pager-April-24-V2.pdf> and how to write about disabilities, <https://adata.org/factsheet/ADANN-writing>.

The implementation of the standards involves using the following strategies:

- Activities should be designed to develop specific skills or knowledge in a structured way.
- Activities should incorporate engaging and interactive elements, such as simulations, problem-solving tasks, or quizzes.
- Activities should be dynamic and memorable, utilizing multimedia resources like videos and animations (<https://link.springer.com/article/10.1007/s10796-020-10097-2>).
- Activities are accessible and inclusive to all learners, including those with disabilities (<https://link.springer.com/article/10.1007/s12528-024-09424-2>).
- Activities must follow standards like the WCAG (Web Content Accessibility Guidelines) or SCORM to ensure usability (<https://www.academia.edu/80888185/>

Analysis of Accessibility of the e Learning Platforms According to the WCAG 2.0 Standard Compliance).

- Ensure content is culturally sensitive and relevant to the learners' context (<https://elearningindustry.com/cultural-sensitivity-in-elearning-the-future-of-localized-digital-education>).
- Avoid stereotypes and embrace diversity in examples and scenarios (<https://files.eric.ed.gov/fulltext/EJ1266011.pdf>).

The interface, appearance and layout of an e-learning course, is the point at which the course communicates with the learner, determining how a learner will engage. Navigational elements contribute to the interface and how a learner moves through the course. Functionality and design of a course, interface and navigation have an enormous impact on the learning experience, and a poorly designed interface detracts from learning.

Some of the **standard practices for designing the interface and navigation elements of an e-course** are:

- Navigation is clear to learners who have limited digital experience;
- Next and back buttons are placed at lower right of the screen;
- Learners can exit the course and resume work at the place where they stopped;
- Feedback is provided within the course;
- The content is indexed so that learners can find the information easily;
- A template has been used to ensure consistency of branding and identity, fonts, colors, layout and other design elements throughout the course;
- Tab labels are short and descriptive.

General principles for writers of e-learning materials:

- organize concepts logically;
- place the most essential, key messages at the beginning of e-learning courses, sections, paragraphs, and sentences;
- keep language simple, concise and consistent;
- write to a reading level that is appropriate for the audience;
- allow learners to “click for more information” in areas that are text-heavy by providing a downloadable additional literature or a link to another site;

- avoid jargon, slang and idiomatic expressions that are not universally understood;
- ensure that meaning, grammar, and spelling are correct.

An e-course using text only is inadequate for learners with diverse learning needs.

Graphics, such as charts and other images, are used to explain or enhance written information, not replace it or detract from it. All graphic elements should increase understanding and accessibility of content for learners. (<https://www.cdc.gov/training-development/media/pdfs/2024/04/CDC-e-learning-essentials.pdf>)

„Narration, video, animation and other multimedia, in combination with text and graphics, can increase understanding and enhance the learning experience. The engagement and repetition offered by using multimedia can help the learner to retain information. A balanced mix of content through a variety of media formats, the learner’s motivation and attention also increase.“ (<https://www.cdc.gov/training-development/media/pdfs/2024/04/CDC-e-learning-essentials.pdf>)

Applying e-learning quality standards in the design of e-learning activities and resources ensures that these activities are impactful, learner-centered, and aligned with educational goals. That is why these standards must lay the foundation of every e-course.

MODULE



Name of the leading partner:

(UNED) National University of Distance Education, Spain
Bulgarian Inclusion Support Team, Bulgaria

DESCRIPTION

1. Title of the module:

Module 4. Smart technologies in the development of learning resources

2. Duration of the module

30 hours

3. ECTS credits / ECVET credits

2 credits / 1 credit

4. Authors

UNED

Prof. Cristina Sánchez Romero, PhD

BIST

Andrean Lazarov

Stanislav Georgiev

5. Learning outcomes for the course – acquired knowledge, skills, competencies (goals)

Those who have successfully completed training in this discipline:

- *Will know:*
 - ✓ Opportunities for learning smart technologies in Higher Education
 - ✓ The characteristics of smart technologies: Efficiency, Fairness, Personalization, Autonomy, Collaboration.

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- ✓ Improving education systems with the introduction of smart technologies
- *Will be able to:*
 - ✓ Analyse the potential of smart technologies
 - ✓ Implement digital education resources
 - ✓ Implement UDL principles in digital instructional design.
-
- *Will be competent to:*
 - ✓ Skills for a digital society
 - ✓ Ability to design curriculum with resources (smart technologies)
 - ✓ Digital teaching capacity

6. Teaching methods

Interactive methods, gamification, MOOC or microlearning course.

7. Prerequisites (knowledge and skills from previous training) and requirements for other (simultaneous) courses

To have basic knowledge on:

- notions about the management of digital platforms,
- digital resources technology
- digital competences for teaching unit design

8. Content of the module

A. Short summary

The emerging impact of advanced and intelligent technologies has an impact on the educational field to improve learning experiences. These technologies allow for more personalized, adaptive, and flexible teaching that favours equity in training processes. The use of these technologies such as augmented reality, artificial intelligence, the Internet of Things, augmented reality, the metaverse, seek to optimize learning using tools that respond to the uniqueness of students and improve the effectiveness of educational processes.

B. Thematical content of the module

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a) lectures

1. Digital transformation of education: opportunities **(3) hours**
2. Digital teaching and learning resources **(3) hours**
3. Smart digital learning resources **(3) hours**
4. Digital education competence and strategies - **(3) hours**
5. Digitally inclusive and accessible learning design: integration and use of digital technology in education - **(3) hours**

b) practical activities

The students will be able to choose one of the following options:

Activity. Design an Activity Using Smart Technology (12) hours, Students will conceptualize and design an activity or product using smart technology that can improve some aspect of education.

1. Case analysis. Students will review various case studies or existing products based on smart technology . They can be divided into small groups to explore different examples.
2. Brainstorming. Generate ideas and select an activity/project that uses smart technology.
3. Project Desing. Develop the design and details of the project. Students will develop a step-by-step plan to carry out the implementation of the project, including phases, necessary resources, and possible challenges.
4. Implementation and Development (Simulation or Model).
5. Present the finished project present the project in digital format and receive co-feedback.

The activity will be carried out in pairs, encouraging collaboration and the exchange of ideas between students as they develop their technological and problem-solving skills. Using techniques such as co-evaluation

C. Equipment required for the delivery of the module

- Personal electronic devices (computer systems and audio-video equipment, smartphone);

- Smart technologies (virtual glasses, 3D printers, 3D scanners, micro modules, microcontrollers, adapters, cameras, smart displays with movement, robots, and others);
- Software;
- Electronic platforms, including adaptive electronic platforms
- and others.

9. References (main bibliography)

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12. **UNESCO.** (2023). *In class: AI must stay in place. The UNESCO Courier*.
<https://courier.unesco.org/es/articles/en-clase-la-ia-debe-quedarse-en-su-sitio>

13. Planned learning activities

Teamwork, problem-solving, digital learning, project-based learning, teaching unit design.

14. Methods and criteria for assessment

Development of instructional design e-learning materials according to all quality standards.

15. Languages

English, Spanish, Bulgarian, Portuguese, Turkish.

16. Internship/ practice

Development of instructional design e-learning materials with implementation of the e-learning standards and smart technology.

Unit 1 Introduction to Smart technologies

Contemporary society is immersed in a digital revolution that is transforming all its areas, especially education, driving the adoption of smart technologies that offer multiple benefits and opportunities. However, these technologies also pose significant challenges in terms of their impact on people, organizations, and society at large, so it is essential to ensure a smooth transition towards their integration into organizations (Katuk et al., 2023).

The term "smart technology" refers to entities in which physical devices or processes are complemented by the smart properties of digital technology (Nasiri et al., 2020). In this sense, smart technologies (Smart-Tech) can be understood as an evolution of smart structures, by integrating sensors, actuators and control systems that allow adaptation to unpredictable conditions. These technologies combine smart materials and advanced software to bring greater autonomy and efficiency to systems (Holnicki-Szulc, Motylewski & Kolakowski, 2008).

The emergence of smart technologies is transforming our ways of life. Technology is changing the way we interact with the world, as well as the way we live, work, and learn. Concepts such as smart grids, connected cities, automated homes, the Internet of Things (IoT), Artificial Intelligence (AI), and cloud computing are advancing rapidly and helping to create a more interconnected future. These technologies work together to offer practical solutions to global problems, such as improving education for all.

Among the most important technologies are Artificial Intelligence, IoT, Blockchain, Virtual and Augmented Reality, 5G technology, Cloud Computing, Robotics, Biotechnology, Quantum Computing and Big Data. Each of these is revolutionizing industries and aspects of our daily lives, making things more innovative, efficient, and connected.

Now, key technologies such as AI, quantum computing, robotics, and the digitization of the physical world are being developed. Among the most important trends are the increase in cybersecurity, the expansion of 5G networks, the integration of augmented and virtual reality, and advances in autonomous vehicles and humanoid robots.

Smart Technologies are advanced tools designed to execute specific tasks, optimize processes, and dynamically adapt to changing conditions (Hildebrandt, 2020). These devices integrate computing and telecommunications with technologies that previously lacked these capabilities, such as home appliances, televisions, semi-autonomous vehicles, and adaptive power grids. An emblematic example is the smartphone, which merges multiple functionalities into a single device, enabling unprecedented connectivity and automation. In addition, these technologies collect and analyse data in real time to improve their performance, such as televisions that learn users' habits or interconnected appliances that optimize energy consumption and operational efficiency.

UNCTAD's Technology and Information Report 2021 highlights several aspects that influence education, especially in developing countries:

- **Leveraging Frontier Technologies:** Technologies such as artificial intelligence, robotics, and biotechnology can be used to improve the quality of education and make it more accessible. These technologies allow learning to be personalized and adapted to the individual needs of students
- **Innovation with Equity:** The report underscores the importance of ensuring that technological innovation benefits everyone, reducing educational gaps and ensuring that advances reach the most disadvantaged communities
- **Training and Adaptation:** In order for developing countries to take advantage of these technologies, it is crucial to invest in the training of teachers and students, as well as in the infrastructure needed to integrate these tools into the education system
- **Sustainable Development:** The integration of advanced technologies in education is also seen as a way to promote sustainable development, preparing future generations to face global challenges with innovative solutions

The *UNESCO Report on Smart Technologies (2023)* analyses the impact of these tools on higher education, highlighting their transformative potential and the challenges associated with their implementation:

- **Transforming Higher Education:** Smart technologies are revolutionizing teaching and learning by enabling greater personalization, adapting to individual student needs, and improving educational efficiency.

- **Access and Equity:** These technologies can reduce educational gaps by providing high-quality resources to students from diverse regions and socioeconomic backgrounds. This is especially relevant in developing countries, where access to higher education remains limited.
- **Innovation in Teaching:** The integration of tools such as project-based learning, distance learning, simulations, and augmented reality enriches the educational experience and prepares students for the challenges of the world of work.
- **Ethical Challenges and Considerations:** The incorporation of smart technologies raises fundamental questions about data privacy, equity in access, and their impact on social interaction and human relationships.
- **Sustainability and Development:** In addition to improving higher education, these technologies can contribute to sustainable development by training professionals prepared to face global challenges and promoting inclusive growth.

Ultimately, the report underlines how smart technologies are redefining higher education, offering significant opportunities to improve its quality and accessibility, but also demanding a critical analysis of its ethical and societal implications.

In this sense, as smart technologies are networked, they can share information with each other and/or work together, this makes them more efficient and effective in the functions they perform. This phenomenon, called the **Internet of Things** or also known as IoT (*Internet of Things*), is present in both everyday devices and industrial applications. The IoT seeks to unify everything in our world under a common infrastructure, giving us not only control over the things around us, but also keeping us informed about their status. (Madakam, 2015). While it offers great benefits in terms of automation, data analytics, and efficiency, it also poses significant challenges related to privacy, security, and potential abuses in data collection and use.

According to Nižetić et al. (2020), the development of smart and IoT-based technologies has transformed multiple aspects of life by simplifying processes, increasing efficiency, and improving quality of life. These technologies are playing a crucial role in sustainability by offering significant benefits, although their rapid expansion requires careful

monitoring to minimize negative environmental impacts and ensure responsible use of global resources.

The applications of smart technologies are multiple and are revolutionizing key sectors such as transport, for traffic management and safety, city infrastructure, energy management, business, education and health, improving efficiency, sustainability and quality of life. These applications not only optimize processes, but also open up new research and development opportunities in multiple fields (Hildebrandt, 2020).

To take full advantage of smart technology applications, institutions need to have a structured digitalization plan in place. This process requires both **centrifugal** (expansive, driving changes throughout the organization) and **centripetal** (cohesive, integrating the different actors involved) transformation. In short, it is a technological reform that involves multiple agents and demands a coordinated strategy for its effective implementation.

This implies a cultural change in organizations, solid technological leadership, adequate training for all actors involved and inclusive digital innovation. Only in this way will it be possible to consolidate the efficiency and sustainability of the digital transformation in institutions, ensuring that the process benefits the entire educational community in a comprehensive way.

Unit 2 Digital transformation of education: opportunities

Digital technologies are profoundly transforming our lives, providing new opportunities and opening doors to an interconnected and globalized world. However, this transformation has also revealed several inequalities, mainly in terms of access to and use of these technologies. The so-called "digital inequality" refers to the gap that exists between different groups of the population in terms of access, use and skills to manage digital tools. This inequality not only affects those who lack access to technological devices or the internet, but also those who, although they do have access, do not have the necessary skills to use these tools effectively.

People from communities with fewer resources, older people and those with a lower level of education are, for the most part, those who face the greatest barriers to fully integrate into the digital world. This not only limits their ability to access information and services, but also deepens other forms of social, economic and educational inequality, contributing to the exclusion of certain groups. The lack of access or digital skills becomes, therefore, a new form of exclusion, which prevents many people from enjoying the advantages that technologies can offer.

In addition, this digital inequality generates a rupture within society, creating what are known as "digital divides". These gaps reflect existing disparities in access to and use of technologies, which affect many aspects of daily life, including education. In education, for example, students who do not have adequate access to the internet or technological devices have fewer opportunities to learn and participate in academic activities, exacerbating pre-existing educational inequalities.

Despite these inequalities, digital technologies and internet connectivity are promoting positive changes in many areas. These tools are transforming lives and fostering global economic development. For households and individuals, access to the internet and digital devices has improved access to information and reduced transaction costs, making it easier to access services, products, and educational resources. It has also made it possible to improve participation in the labor market, providing new opportunities for training,

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employment, and personal development. Digital technologies have also enabled many people to generate additional income through online activities and improved their well-being by providing access to a greater variety of services, such as remote healthcare or online learning.

On the other hand, businesses also benefit greatly from digital technologies. These allow better decision-making thanks to data analysis, improving operational efficiency and favouring innovation. In addition, companies can expand their markets globally, taking advantage of the opportunities offered by digital connectivity. In many cases, small and medium-sized enterprises have managed to access international markets without the need for large investments, something that would be unthinkable without digital technology.

However, while digital technologies can generate significant benefits, their impact depends largely on everyone having the same opportunity to access and use. It is essential, therefore, to promote public policies that reduce digital divides, favoring access to technology and digital training for the most vulnerable groups. In this way, we will be able to ensure that the digital transformation is inclusive and beneficial for all, contributing to a fairer and more equitable economic and social development.

While digital technologies are changing the world in positive ways, they are also revealing and widening existing inequalities. It is essential to address digital inequality urgently and effectively to ensure that everyone, regardless of their background, age or educational level, can enjoy the benefits of the digital age. Only in this way will we be able to close digital divides and move towards a more inclusive and equitable society.

Current digital education landscape

Digital transformation is having a profound impact on all productive sectors and society. This process opens great opportunities in areas such as employment, innovation and entrepreneurship, but it also poses challenges and new risks that must be managed effectively to ensure equitable benefits for all citizens.

This digital transformation is a priority in the leadership of educational institutions, and the university environment cannot be left out of this process. Both face-to-face, blended and

online universities must implement digitalization strategies to optimize management, improve the learning experience and guarantee more equitable access to knowledge.

According to the CYD Foundation report (2021), "85% of universities consider digital transformation as a key process to optimize data management and analysis, simplify administrative tasks, and improve access to information and educational resources."

Benefits of digital transformation in higher education

Among the benefits we highlight:

- Improvement of access and management of information: Implementation of management systems for teaching staff, administration and services staff (PAS), students and the library.
- New learning methodologies: Pedagogical innovations that enrich the student experience and improve their academic results.
- Increased accessibility to higher education: Expansion of online teaching, making it easier to include more students.
- Better access to scientific knowledge: Promotion of open access to research and publications.
- Greater visibility and institutional reputation: Positioning in international rankings and participation in open science initiatives.
- Progress in research: Creation of new networks of international collaboration.
- Increased enrolment: Expansion of student numbers thanks to the flexibility of digital education.
- Use and generation of open educational resources (OER): Promotion of accessible and reusable materials for teaching and learning.

As the report highlights, "most universities agree that the use of new technologies has improved access to and management of information within the educational community, has enriched the learning experience of students and has facilitated accessibility through online teaching".

Challenges in the digital transformation of universities

Despite its benefits, this process faces significant obstacles, such as:

- Cultural change: Need for institutional adaptation to the use of new technologies.
- Economic investment: Financial resources necessary for its implementation.
- Bureaucracy: Complex procedures for the granting and justification of aid.
- Resistance to change: Lack of interest on the part of teachers and administrative and service staff in digital transformation.
- Lack of training: Lack of digital skills training opportunities for teaching and administrative staff.
- Lack of institutional leadership: Absence of digital transformation as a strategic priority in some universities.
- Perception of the absence of barriers: In some cases, it is considered that there are no obstacles to digitalization.
- A comprehensive approach to digital transformation

The digital transformation of education requires a comprehensive, holistic and globalized approach that combines technological, human, organizational and pedagogical drivers. Only through a comprehensive and sustainable strategy will it be possible to make the most of the potential of digitalisation in higher education (Katyendo and Souza, 2022).

Digital maturity is a gradual process that develops throughout the organization over time, no organization can mature digitally overnight. It is never too late to start maturing digitally and the process is never complete as the ultimate goals of digital change are continuously updated at the pace of a very changing environment (md4u-UNIVERSITIC, 2022)

The **MD4U MODEL** includes three key elements: digital maturity grid, framework, and catalogue of good practices. The grid defines the digital maturity of a technological initiative through two characteristics: the value obtained by the incorporation of a technology into a university process, that is, the value of optimizing an existing process or the value of a new process created; and the impact of the digital initiative, which could impact at the operational level or could do so at the strategic level:

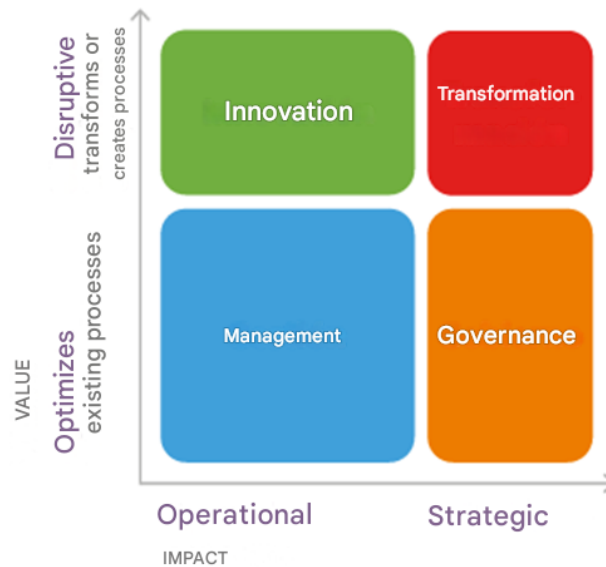


Figure 1. Digital maturity grid of the md4u model

Source: UNIVERSITIC (2022. pp10)

Explanation of Figure 1, according to the aforementioned report, the matrix allows us to analyse the innovation model from the following axes:

- "Management: technologies help to make the existing university process more efficient (optimize), but it has an impact only at the operational level.
- Innovation: technologies make it possible to create a new university process, or transform an existing one, so that new operational value is obtained.
- Governance: the IT governance process is optimized so that the value obtained helps to significantly meet the strategic objectives of the university.
- Digital transformation: the potential of emerging technologies allows the creation of a new disruptive process that provides strategic value for the university".

Therefore, the application of this matrix allows us to develop innovation leadership towards the digital transformation of our organizations.

Opportunities of digitalization

Digital enabling technologies encompass a set of innovations that drive digital transformation in organizations. These tools optimize processes, improve the user experience, and encourage the development of new business models. Its primary purpose is to connect data, people, and systems to improve productivity and competitiveness. As they are cross-cutting solutions, their application covers multiple sectors, such as industry, health, education, transport and entertainment. Their main features include customization, scalability, and the ability to adapt to different environments, making them a fundamental pillar of digitalization. (CEUPE, 2024)

The success of digital transformation depends, to a large extent, on the rapid adoption of Digital Enabling Technologies (RHTs), such as the Internet of Things (IoT), Big Data, Artificial Intelligence, Blockchain, supercomputing and future 5G networks, among others. These technologies not only have a high disruptive potential and impact on various sectors, but they are also enabling, transversal and strategic for the digitalization of any industry. In addition, the availability of a competitive offering of products and services in THD acts as a catalyst to accelerate digital transformation processes. At the same time, it represents a valuable opportunity for the industrial sector of digital technologies, driving innovation and the development of new technological solutions (Avance digital-Ministerio, 2024)

These technologies improve efficiency, connectivity and automation and are also frequent in other sectors such as industry 4.0 such as 5G Technology for greater connectivity, Robotics for the development of tasks, biotechnology for and quantum computing for data. In this sense, we can see that these industry 4.0 technologies are present in the university environment.

Table of Technologies 4.0. Digital Enabling Technologies (RHTs) and their main features:

Technology	Description	Main applications
Internet of Things (IoT)	Connect physical devices to the internet to collect and analyse data in real-time.	Automotive, smart homes, health, agriculture, logistics.
Artificial intelligence (IA)	Analyse large volumes of data, learn from it, and make autonomous decisions.	Virtual assistants, medical diagnostics, industrial automation.
Big Data and Advanced Analytics	It allows you to process and analyse huge amounts of data to identify patterns and trends.	Marketing, research, finance, telecommunications.
Cybersecurity	Protects data and systems from potential attacks or unauthorized access.	Network protection, data privacy, cloud security.
Cloud Computing	Store and process data using remote servers, improving accessibility and reducing costs.	Storage, business applications, remote work.
Additive Manufacturing (3D Printing)	It allows you to create three-dimensional objects quickly and efficiently using successive layers.	Prototyping, manufacturing of custom parts, medicine.

Blockchain	It provides a secure and decentralized infrastructure for recording transactions.	Cryptocurrencies, finance, product traceability.
Virtual Reality (VR) and Augmented Reality (AR)	Create immersive experiences that improve training, design, and interaction with products and services.	Training, entertainment, product design, medicine.
Metaverse	A collective and persistent virtual space, created by the convergence of physical and virtual reality.	Video games, education, virtual meetings, commerce and social networks. Case simulations VR, AR, IA and blockchain.

These technologies are transforming the educational field at all levels, especially in university education. The incorporation of tools such as artificial intelligence, virtual reality, IoT and the metaverse facilitates interactive learning, content personalization and improved accessibility, offering new ways of teaching and assessment. This integration promotes a more inclusive, dynamic, innovative education that is connected to the demands of today's digital world.

Unit 3 Digital teaching and learning resources

These new technologies are transforming education and have great benefits. Smart technologies are redefining education by providing tools to personalize and enhance the learning experience. From smart classrooms to adaptive tutoring systems, these technologies offer new opportunities to improve educational quality and prepare students for an ever-evolving digital environment.

Technologies such as cloud computing enable access to global educational resources, facilitating the creation of virtual classrooms and remote learning.

Advances in IoT make it possible to develop "smart schools", where sensors and devices collect data to optimize the use of resources, ensure safety and improve the learning experience. An example would be a classroom equipped with IoT sensors that automatically adjust lighting and temperature to maximize student concentration (Zhang et al. 2024)

Big Data, enabled by technologies such as the cloud, helps analyse student performance and personalize teaching to their needs. And they allow the creation of educational spaces that individualize learning trajectories (Kamruzzaman et al., 2024)

Virtual reality (VR) and augmented reality (AR) create immersive learning environments, such as virtual tours of smart cities or smart grid simulations.

Artificial intelligence applications, such as smart tutoring systems, help personalize learning and improve access to education (Ahmad et al., 2021).

But we must not only think about the benefits that smart technologies bring to education, but we must also think that students must be trained in technical skills about IoT and cloud computing to encourage critical thinking about how these technologies affect our lives, education is the engine that will guarantee that networks, smart cities and homes are truly sustainable, inclusive and beneficial for all. It is essential to educate students about the ethical and political risks of these technologies, such as data manipulation and surveillance, to form informed citizens capable of managing their interaction with intelligent systems.

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The potential of technologies in the educational field opens up new opportunities to personalise teaching and learning processes, adapting them to the needs of each student. According to the VI Global Study on the Use of Technology in Education, carried out by Blink Learning (2021), 83% of teachers use digital tools on a daily basis in their classes. This frequent use of technology favours a more fluid and direct communication between students and teachers, which contributes to a more personalized education. Although an immediate improvement in grades is not always observed, the use of technological tools has a positive impact on the development of autonomy, motivation and students' understanding of the use of technology.

Teaching methodologies must adopt an approach that integrates key 21st century skills, such as creativity, critical thinking, communication, and teamwork. This transformation aims to prepare students to face the challenges of an ever-evolving world, providing them with the necessary tools to adapt, innovate, and collaborate in a global and digital environment (OECD, 2023).

Table 2. The “new normal” in education OCDE, 2023:14

Features	Traditional education system	An education system embodying the “new normal”
Education system	Education system is an independent entity	Education system is part of a larger eco-system

Responsibility and stakeholders engagement	Decisions made based on a selected group of people and thus, they become held accountable and responsible for the decisions made Division of labour (Principals manage schools, teachers teach, students listen to teachers and learn)	Decision-making and responsibilities shared among stakeholders , including parents, employers, communities, and students Shared responsibility (everyone works together and assumes responsibility for a student's education and students also learn to be responsible for their own learning)
Approach to effectiveness and to quality of school experience	Outcomes most valued (student performance, student achievements are valued as indicators to evaluate systems for accountability and for system improvement) Focus on academic performance	Valuing not only "outcomes" but also "process" (in addition to student performance and student achievements, students' learning experiences are in and of itself recognised as having intrinsic value) Focus on not only academic performance but also on holistic student well-being

Approach to curriculum design and learning progression	Linear and standardized progression (the curriculum is developed based on a standardised, linear learning-progression model)	Non-linear progression (recognising that each student has his/her own learning path and is equipped with different prior knowledge, skills and attitudes when he/she starts school)
Focus of monitoring	Valuing accountability and compliance	System accountability as well as system improvements (e.g. continuous improvement through frequent feedback at all levels)
Student assessment	Standardised testing	Different types of assessments used for different purposes
Role of students	Learning by listening to directions of teachers with emerging student autonomy	Active participant with both student agency and co- agency with teacher agency

Emerging innovations in the education sector

Artificial intelligence (AI) represents an emerging innovation with a great impact on the education sector, offering new possibilities to transform teaching and learning processes. Its most promising application is the personalization of learning, allowing content and pedagogical strategies to be adapted to the needs, rhythms and styles of each student. This capacity, supported by multiple methodologies and tools included in the report *Futures of Digital Learning – Digital Learning and the Transformation of Education* (UNESCO, 2024),

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represents a step towards a more inclusive, equitable and student-centred education. However, to fully exploit its potential, it is essential that its implementation is carried out ethically, critically and responsibly. In this context, higher education institutions must take an active role in teacher training, in the generation of relevant knowledge and in the promotion of a digital culture that favours collaboration, social justice and sustainability. Overcoming disciplinary and institutional barriers will be key to building innovative, flexible educational ecosystems committed to the challenges of the present and the future.

UNESCO (2023) highlights that AI can be a powerful tool to address current educational challenges, innovate teaching and learning practices, and accelerate progress towards Sustainable Development Goal 4 (SDG 4), which seeks to ensure inclusive and equitable quality education.

Among the most promising applications are:

- **Personalization of learning:** Adaptation of content and pedagogical strategies to the individual needs of students.
- **Intelligent tutoring systems:** Personalized assistance that responds in real time to students' doubts and progress.
- **Assessment automation:** Tools that allow immediate and objective feedback.
- **Predictive analytics:** Early identification of students at risk of dropping out of school through data analysis.

A critical aspect for the success of AI in education is the proper training of teachers. UNESCO (2023) emphasizes the need to develop key competencies in educators so that they can effectively integrate AI into their pedagogical practices.

Likewise, this need for training extends to the use of information and communication technologies and the development of educational innovations.

Unit 4 Digital education competence and strategies

Currently, according to the DESI report (2020), there is a "deficit of human capital with digital skills" that limits the development and adoption of advanced technologies in various sectors. This deficit is one of the main challenges for digital transformation and the active participation of citizens in the digital economy.

The report is also part of the Digital Europe programme (2021-2027), which aims to strengthen the European Union's capacities in key areas such as artificial intelligence, high-performance computing, cybersecurity and specialised digital skills. This approach seeks to ensure levels of security and interoperability to promote the adoption of technologies in the economic and social sectors, in order to create an inclusive and sustainable digital economy and society.

Specialised digital competences, defined in Article 2 of the Regulation of the European Parliament and of the Council of the Digital Europe Programme (2021-2027), refer to the skills needed to design, develop, manage, implement and maintain key technologies such as artificial intelligence, cybersecurity, robotics and data analytics. These skills are essential to ensure that Europe has a talent pool capable of meeting the technological challenges of the future, and are sought to be strengthened through training programmes for students, workers and young entrepreneurs.

Digital skills encompass a set of essential skills for both the general public and professionals in different sectors. For the general population, these skills enable them to search for information, communicate effectively online, and actively participate in the digital society. For professionals, they are essential to build a strong digital identity, develop digital content, and create specialized applications, allowing them to position themselves in the market and connect with their consumers.

In addition, digital competence is essential to boost social inclusion, reduce the digital divide and ensure that vulnerable groups also have access to the benefits of technology, contributing to a more equitable and accessible society for all.

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One of the priorities of the Digital Education Action Plan (2021-2027) is to improve digital skills and capabilities to drive digital transformation. This plan sets out common guidelines on digital use and training, with the aim of improving digital literacy and combating disinformation. In addition, it addresses the need to train European citizens in basic, intermediate and advanced digital skills through specific educational and training programmes.

The report carried out by the Vass Foundation (2021) on "Employability and Digital Talent" highlights the urgency of training more professionals specialised in Information and Communication Technologies (ICT), due to the gap between the needs of the workplace and the current training of future professionals at university.

Here is the improved table with a more organized structure, which makes it easier to understand digital technical skills:

Table: Digital technical skills. (VASS Foundation, 2021)

Area of Competence	Description of Technical Competencies
Web Development (Back End)	Development of web applications and services using technologies such as PHP, JSP, ASP, HTML, among others.
Mobile App Development	Creation of mobile applications using languages and platforms such as Kotlin, ObjectiveC, Swift, Xamarin, React Native, Ionic, among others.
Database Design and Implementation	Design and management of databases using technologies such as SQL, MySQL, Oracle, SQL Server, MongoDB, among others.
Front-End Web Development	Development of web interfaces with technologies such as HTML, CSS, Javascript, Typescript, React, Vue.js, Angular, and UX/UI design.
ERP Management and Configuration	Implementation and configuration of ERP systems such as Salesforce, SAP/ABAP, Oracle, among others.

Development on .NET and J2EE Platforms	Programming and development on .NET and J2EE platforms to create robust and scalable applications.
Data Engineering	Creation of platforms to handle large volumes of data using tools such as Spark, Hadoop, Kafka, Scala, among others.
Data Science	Analysis and processing of large volumes of data using tools and languages such as Keras, Tensorflow, R, Python, BigML.
Audit and Security Management	Information security management through tools and regulations such as ISO27K, ISACA (CISA), CEH, and GDPR compliance.
Secure Software Development	Security practices in software development, including static code analysis and injection testing such as XSS, SQL Injection.
Server and Service Management	Management of application servers and Internet services such as Apache, Nginx, mail configuration, among others.
Cloud Deployment and Operation	Use of cloud platforms such as Kubernetes, Docker, AWS, Azure, IaaS, PaaS, for software deployment and operation.
Microservices and Server-less Architectures	Design and development of modern architectures of microservices and server-less applications using REST, Swagger, AWS Lambda, among others.
Internet of Things (IoT)	Creation and management of connected devices and IoT solutions using technologies such as sensors, Edge Computing, Arduino, RaspberryPi.
Testing and Test-Driven Development	Use of testing methodologies such as JUnit, JMeter, Selenium, to guarantee the quality and reliability of the software.
IT Project Management	Planning and management of IT projects using agile or traditional methodologies such as Scrum, Kanban, XP, PMBOK, PRINCE2.

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Virtual and Augmented Reality	Development of virtual and augmented reality solutions, including the use of the Metaverse to create immersive experiences.
Web 3.0	Development and management of applications in Web 3.0, with technologies such as Blockchain, NFTs and cryptocurrencies.

This report also details the **Ranking of weightings in the composition of Digital Talent**, highlighting the soft and hard skills that are part of the digital talent profile (VASS Foundation, 2021)

Technical Competencies (hard skills):

- Development of advanced solutions in **web development** and **mobile applications**, **databases**, and **cloud platforms**.
- **Data engineering** and **data science** to manage large volumes of information.
- **Computer security** and **secure software development** to protect systems and data.
- **Microservices**, **IoT**, and **augmented reality architectures**.

Soft skills:

- Cooperation, **teamwork** and the **ability to learn continuously** (learnability) are essential.
- **Results-orientedness**, **accountability**, **adaptability**, and analytical skills **are key to success in changing professional environments**.
- Effective **communication** and the **pursuit of excellence** are also essential to face challenges and improve in the workplace.

In short, **digital talent** goes beyond specialized technical skills in ICT, and includes soft skills that allow professionals to effectively address the challenges of the digital environment. This talent is key to the adaptation and competitiveness of institutions in the digital age.

Digital Transformation offers many opportunities to improve people's lives and make our economies more productive, competitive and sustainable. To take advantage of these benefits, it is very important that both people and organizations know how to use these

technologies safely and reliably. Therefore, it is essential to develop the digital skills necessary to use digital tools effectively and responsibly. This is especially relevant in the educational field, where the appropriate use of technology can have a great impact on learning.

The OECD's Learning Compass 2030 presents a comprehensive approach to preparing students for the challenges of the future, highlighting three fundamental types of skills. First, cognitive and metacognitive skills, including critical thinking, creative thinking, the ability to learn autonomously, and self-regulation, are essential for developing a flexible and adaptive mind. Second, social and emotional skills, such as empathy, self-efficacy, responsibility, and collaboration, allow students to manage their emotions and work effectively as a team. Finally, practical and physical skills, focused on the use of information and communication technologies, are crucial to function in an increasingly digitized world. These skills are essential for comprehensive learning that prepares new generations for a global and constantly evolving environment.

DIGCOMP Digital Competence Framework [2023]

Within the framework of digital competences, we can analyse the skills and training needs of professionals for the appropriate use of technologies and the creation of digital content.

Table of Competencies- DIGCOMP 2023. Own elaboration. Source: DIGCOMP 2023.

Area of Competence	Description	Core Competencies
1. Information and Data Search and Management	It facilitates the ability to identify information needs, search for reliable data and manage digital content efficiently.	1.1. Navigation and search for information. 1.2. Assessment of data quality. 1.3. Management and organisation of digital content.

2. Communication and Collaboration	It promotes the appropriate use of digital technologies for social participation, collaboration and ethical behaviour in virtual environments.	2.1. Effective digital interaction. 2.2. Sharing of information and resources. 2.3. Promotion of citizen commitment. 2.4. Online Collaboration. 2.5. Ethical and responsible conduct on the network. 2.6. Digital identity management.
3. Digital Content Creation	It trains in the creation and editing of digital content, integrating information, respecting copyrights and developing basic programming skills.	3.1. Design and creation of multimedia content. 3.2. Integration and adaptation of existing content. 3.3. Understanding and Applying Copyright and Licenses. 3.4. Basic programming for the creation of applications and websites.
4. Digital Security	It teaches how to protect devices, personal data, privacy, physical and psychological health, and minimize the environmental impact of the use of digital technologies.	4.1. Protection of digital devices. 4.2. Privacy management and protection of personal data. 4.3. Health care and well-being in digital environments. 4.4. Minimization of the environmental impact of technological use.

5. Problem Solving	It develops the ability to identify technical problems, find innovative solutions and use digital tools to improve processes and products.	5.1. Solving technical and digital problems. 5.2. Identification of technological needs and appropriate solutions. 5.3. Creative and effective use of technology. 5.4. Assessment of gaps in digital skills and proposal of solutions.
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Unit 5 Smart digital learning resources

Digital learning resources are electronic tools, such as apps, software, programs, or websites, that are specifically designed to actively engage students in their learning process, while supporting the achievement of their educational goals. Unlike traditional learning, online learning offers a completely internet-based approach, allowing students to gain knowledge and skills from anywhere. These digital resources are powerful tools that can improve educational quality in ways that traditional resources, such as textbooks, do not, offering greater flexibility and personalization in the learning experience.

Students primarily use digital technologies (TS) to optimize their time both in study and in their free time, being especially concerned about the ethical dilemmas associated with their use, such as privacy and the quality of time they spend with loved ones and friends (Roblek, Mesko, Dimovski, & Peterlin, 2019). In this context, the use of smart teaching techniques has become increasingly prevalent in schools, universities, and colleges, promoting new ways of learning and adapting to an ever-evolving technological environment (Rana & Mishra, 2017). In addition, the emerging educational field seeks to improve the quality of education and ensure its sustainability through the use of smart technologies, which will significantly influence students' self-organization and the way they interact in their educational and social environments (Raut, Deshpande, & Kaul, 2023).

Category	Tools
Tools for creating and/or editing educational images	Pixlr, BeFunky, Canva, Genially, Easel.ly
Tools for creating and/or editing educational videos	Edpuzzle, Vibby, Vyond, PowToon, ShowMe, Educreations, Animaker whiteboard, Loom, Screencast-o-matic, Clideo, Bearaudio
Tools for creating interactive educational resources	Quizlet, Online Exam Builder, Socrative, Kahoot

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Other digital tools for teachers

Google Drive, Office Online, Copyleaks, Paperrater, Plagiarisma, LA Reference, Redalyc, Scielo, Symbolab, Desmos

Source: <https://blog.pearsonlatam.com/educacion-del-futuro/recursos-digitales-educativos-para-tus-clases-universitarias>

Below is a set of accessible tools for **subtitles**, **audio descriptions**, and **transcriptions**, organized according to their functionality and with direct links for easy access.

1. SUBTITLE APPS

These applications from the perspective of inclusion help teachers to generate content in different media for everyone:

Editing and creating subtitles

- **Aegisub** (Windows, macOS, Linux): Advanced and free tool to create and synchronize subtitles.
- **Subtitle Edit** (Windows, Online): Allows you to easily create, synchronize and translate subtitles.
- **Jubler** (Windows, macOS, Linux): Software to edit existing subtitles.
- **Amara** (Online): Collaborative tool to subtitle videos and translate them.
- **Kapwing** (Online): Video editor that includes the option of automatic subtitles.

Automatic subtitles (AI)

- **Otter.ai** (Online, iOS, Android): Generate real-time subtitles powered by AI.
- **Describe** (Windows, macOS): Create automatic captions with high accuracy.
- **Zubtitle** (Online): Automatically add subtitles to videos for social media.
- **VEED.io** (Online): Simple platform for adding automatic subtitles to videos.
- **VLC Media Player** (Windows, macOS, Linux, Android, iOS): This popular video player app now includes an automatic subtitle generation feature using artificial intelligence

2. APPS FOR AUDIO DESCRIPTIONS

Creating Audio Descriptions

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1. **YouDescribe** (Online): Platform for adding custom audio descriptions to YouTube videos.
2. **Adobe Premiere Pro** (Windows, macOS): Professional editor that allows you to add audio description tracks.
3. **Camtasia** (Windows, macOS): Video editor that includes options to add narrations.
3. **TRANSCRIPTION APPS**

Automatic transcription

1. **Otter.ai** (Online, iOS, Android): Transcribe real-time audio with high accuracy.
2. **Rev** (Online): Professional transcription service with automatic and manual options.
3. **Sonix** (Online): Automatic transcriptions with integrated editing.
4. **Trint** (Online): Converts audio and video recordings into editable text.

Recording and transcription

1. **Temi** (iOS, Android): Mobile app that automatically records and transcribes.
2. **Descript** (Windows, macOS): Record, edit, and transcribe audio and video.
3. **Speechnotes** (Android): Simple application for dictations and transcriptions.

Combined subtitles and transcripts

1. **Kapwing** and **VEED.io** (Online): Generate subtitles and transcripts from video.
4. **TOOLS FOR BLENDED ACCESSIBILITY**
1. **YouTube**: Offers automatic subtitles and the option to add audio descriptions to uploaded videos.
2. **Zoom**: Includes real-time transcription and automatic captioning during meetings.
3. **Microsoft Teams**: It has real-time transcription and captioning features.
4. **Google Meet**: Offers automatic subtitles in multiple languages.

More information you can find in Module 3 and 6.

Unit 6 Digitally inclusive and accessible learning design: integration and use of digital technology in education

In the digital age, education has overcome traditional borders, providing students around the world with unprecedented access to knowledge, with the situation experienced by the pandemic caused by COVID-19 being a precedent. However, this progress can only be considered transformative if it is accompanied by a firm commitment to accessibility and inclusion for all. These two concepts are fundamental pillars to guarantee equal opportunities in the digital educational environment. Accessibility ensures that all students, regardless of abilities or contexts, can fully participate in learning experiences. Inclusion, on the other hand, focuses on creating environments that value diversity and promote the active participation of each individual, cultivating a sense of belonging. In this context, inclusive design in e-learning is based on developing teaching materials and resources that remove barriers and respond to the varied needs of students that break the inclusion gap. The application of the principles of Universal Design for Learning (UDL) is essential to ensure accessible, adaptable and equitable educational experiences for all in the digital environment.

Digital technologies can offer many benefits by diversifying not just what is learned but where, when and how it is learned. However, technology is not a magic wand or cure-all. It cannot replace low quality teaching and without proper planning and precautions can amplify existing exclusions and inequities. Some challenges include integrating digital tools with pedagogy and cultural sensitivity for inclusivity, while safeguarding children's safety and privacy. There are also some concerns about the potential effects of digital technologies on children's health and well-being.

The **European Accessibility Act** is a directive adopted by the European Union (EU) in April 2019, with the purpose of facilitating the trade of accessible products and services between Member States. Its main objective is to harmonize national regulations, eliminating country-specific regulatory differences and promoting accessibility throughout the region. In line with the principles of "**Design for All**", applied to digital technology, this directive prompted the creation of the **Harmonized European Standard for Accessibility**

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EN 301 549. This standard establishes accessibility **requirements for public procurement** of ICT products and services in Europe, ensuring that technology is inclusive and accessible to all people (ETSI, 2021).

Therefore, we must consider the fundamental web standards indicated by the **World Wide Web Consortium (W3C)** responsible for the development of fundamental web standards such as **HTML** and **CSS**, which guarantees an accessible and functional website for everyone. Within the W3C, the **Web Accessibility Initiative (WAI)** leads the creation of accessibility-related standards, following the consortium's structured process. The W3C Recommendations, as these standards are known, include several developed by the WAI to address different aspects of accessibility. These include: the **Web Content Accessibility Guidelines (WCAG)**, which ensure the accessibility of digital content; the **Authoring Tools Accessibility Guidelines (ATAG)**, aimed at designers and developers; the **User Agent Accessibility Guidelines (UAAG)**, which optimize interaction with browsers and media players; and the **Rich and Accessible Internet Applications (WAI-ARIA)**, which promote accessibility in dynamic web applications (W3C, 2025).

Digital equity and inclusion matters at every level of education, from early childhood, primary, and secondary to higher education. It is also vital for adult education and lifelong learning as society becomes more digitalised. While considering diversity and inclusion is essential at each stage, this paper focuses on the evidence and policies most relevant to compulsory education at the primary and secondary levels. It highlights how different digital tools, ranging from computers, tablets and mobile phones to more innovative and emerging technologies can be used to promote and support learning outcomes for all students.

Looking forward, technological advancements have the potential to improve educational and well-being outcomes. When designed and implemented in education with diversity, equity and inclusion in mind, digital technologies can be used to support students from diverse backgrounds, and help enable all students in reaching their potential.

	<i>In education</i>	<i>For equity/inclusion in education</i>
Equity	Digital equity in education: Promoting fairness and equity in access to digital technologies (including hardware, software, high-quality broadband etc.), digital skills, uses and attitudes for all students.	Digital technologies for equity in education: Using digital technologies to promote equity in education, such as providing additional learning resources for students in need to promote equitable outcomes to help them participate fully in (digital) education.
Inclusion	Digital inclusion in education: Overcoming barriers to participation in digital education based on student differences. This would also involve ensuring digital tools in education are designed and used in a way that promotes participation and inclusion of all learners.	Digital technologies for inclusion in education: Adapting digital technologies and learning environments to promote inclusion in education, acknowledging, accepting and respecting student differences. Using digital technologies to promote inclusion in education should aim to ensure students feel included, promote belonging and a sense of well-being, while ensuring non-discrimination.

On the one hand, digital technologies can be used to promote inclusion in education, when they are used in an inclusive way that does not exclude particular student groups and when needs relating to access, skills and use are met. On the other hand, digital technologies can be used to promote inclusive education, for example by incorporating design features or functions that are specifically intended to support students with different educational needs. This subtle, but important difference will be expanded upon in the following sub-sections.

A key challenge in achieving digital equity and inclusion in education is that digital infrastructure can vary across schools. Digital inclusion in schools relies on alleviating a number of the above challenges, including adequate infrastructure and resourcing, teacher preparedness and self-efficacy, and strong leadership. Resourcing digital technologies in education requires financial resources, personnel resources and material resources (OECD, 2021), and in general socio-economically advantaged schools are more likely to fulfil the resourcing requirements of being “digitally inclusive” than socio-economically disadvantaged schools (Kim, Yi and Hong, 2021). Evidence from PISA 2018 suggests that socio-economically advantaged schools tend to have a larger share of devices such as portable computers and computers connected to the Internet than socio-economically disadvantaged schools. This is the case on average across OECD countries (OECD, 2020). Rural schools are also more likely to have inadequate digital infrastructure than schools in cities (OECD, 2022).

Digital technology has the ability to support all students as they move through education, and can help promote equity and inclusion within systems. However, without support for equity and inclusion, technology can also be yet another barrier if factors such as digital inequalities and inclusive design are not addressed. Policy makers can consider whether the policies they develop and implement aim to promote digital equity in education, digital inclusion in education, use digital technologies to promote equity in education or use digital technologies to promote inclusion in education. In some cases, policy goals will specifically target one of these four categories, whereas in other instances policies will aim to target a combination.

Designing technology for inclusive education includes flexibility and personalisation, if based on sound pedagogy. Many research studies show evidence of how the diverse needs of students can be met with inclusive digital technology. The benefits have exciting potential to support academic and well-being outcomes for students, but many challenges must be addressed. Policy and practices address some of these challenges through governance, resourcing, developing capacity, school-level interventions and monitoring and evaluation. However, many policies are fragmented and not comprehensive.

Despite the rapidly emerging literature on these topics, there remain a number of research gaps that need to be addressed moving forward. These include **Exploring the potential opportunities and risks of digital technologies for diverse student groups**. Currently, there is an abundance of literature on how digital tools can support students with SEN for example, while for other diverse student groups the literature base is lacking. Focusing specifically on how digital technologies can support equity and inclusion for students from other backgrounds is essential, as well as how systems can promote digital equity and inclusion for all students.

More research is needed to see how digital tools, especially innovative and emerging technologies, can be incorporated into inclusive and effective pedagogical practices. Simply replacing in-person teaching using digital tools is not the best way forward, and exploring how digital tools can be capitalised upon for their inherent flexibility and accessibility features will be essential when conceptualising inclusive in-person or virtual classrooms. The same is true of assessment, and many systems have struggled with how to appropriately implement digital forms of assessment, especially during and after the COVID-19 pandemic.

Key issues include:

- **Addressing digital inequalities.** Investing in digital infrastructure and ensuring adequate access to digital tools and broadband at home and in schools is important to ensure digital equity, and that all students can engage with increasingly digital curricula. This is especially important post COVID-19 as many education systems are incorporating elements of distance learning. In addressing digital inequalities, parents are also key stakeholders. Supporting parents in upskilling their own digital competences will empower them to support

and guide their children effectively in the digital environment and can help minimise inequalities in this sense.

- **Investing in developing and adopting digital tools designed with inclusive principles, such as UDL.** Investing in digital development that is truly inclusive from the start is important. Building inclusion into already developed products is more complicated than if principles such as UDL are incorporated from the beginning. Policy makers can invest in the development of inclusive tools to improve equity among different student groups, which is a step towards more inclusive education systems. These tools and applications that are inclusive by design should also be prioritised when incorporating digital technologies in education systems.
- **Investing in teacher professional learning for in-service and pre-service teachers.** Teachers consistently report a high level of need for professional learning regarding incorporating digital tools into their practice. Incorporating elements of equity and inclusion into professional learning opportunities about digital technologies will be important, and ensuring adequate training in terms of quality and quantity is essential. Teachers who have high self-efficacy and are comfortable with using digital technologies are more likely to incorporate them into their teaching practice.
- **Addressing digital risks.** Students who are most vulnerable offline tend to also be the most vulnerable online. Addressing digital risks should therefore be high on the policy agenda as education systems move towards inclusivity. Support for students from diverse backgrounds, especially those who may not have access to support from digitally skilled adults at home, is important to provide in the school environment. Positioning schools as hubs for addressing digital risks and harm, and teachers as trusted and digitally competent adults can create an environment where students, especially the most vulnerable, can seek support and recourse when facing digital risks. Co-ordinated regulatory responses to child protection are also important.
- **There is a clear need for stronger monitoring and evaluation.** Integrating national data from varying platforms and sources can be difficult (Chang, 2021[262]). Data for inclusive digital technology can be difficult to define, and

can be sensitive and politicised for diverse groups. Indicators can be sensitive, intrusive, or put the respondent at risk. The COVID-19 pandemic meant that implementation of ambitious digital agendas came first, and research regarding effectiveness is slowly emerging. As schools move to keep an increased role of digital technology in education, data collection and measuring effectiveness along the way can help inform future evidence-based policy.

- **Forging strategic partnerships with other public sector actors and private sector actors with the goal of promoting equity and inclusion.** Policy making often happens in silos, and it can be a challenge to coordinate services across different ministries and levels of government (i.e., local to national). Effective digital strategies require the coordination of policies and practices across domains and between levels of government. Establishing strategic partnerships with private sector actors is also important not only to equip classrooms with specific tools that can promote equity and inclusion, but also to stay up to date with the newest innovations in educational technology and how these can be incorporated into the teaching and learning process. Regulating partnerships between public and private sector actors to ensure that education systems do not end up with expensive or lengthy agreements to technological tools they neither use nor need is also important. Strong regulatory policies are also important to ensure that the involvement of private sector actors does not undermine efforts to advance equity and inclusion in education.
- **Paying close attention to implementation.** In some cases policy makers do not give enough thought to the implementation process, and it is at this stage that policies can fail. Thinking carefully about implementation, and how specific programmes can benefit diverse students through their conceptualisation and implementation will be important as systems strive for equity and inclusion.

In conclusion, going forward, how can education be future-ready? Digital technology is evolving quickly, and the COVID-19 pandemic has shown that students, schools and systems require adaptability. The possibilities for digital tools to be used effectively and innovatively to support student outcomes is promising. So too is the growing understanding

of the need for equitable and inclusive education so that all students have the ability to reach their full potential.

The **National Center for Accessible Educational Materials (AEM Center)**, which is part of the **Center for Special Applied Technology (CAST)**, provides a clear and detailed explanation of the **POUR principles** from an educational perspective (AEM Center at CAST, n.d.):

- **Perceivable content:** All students should be able to see and hear the information presented, regardless of their specific needs.
- **Operable Content:** All students should be able to navigate information independently using their preferred tools.
- **Understandable content:** The information must be presented in a coherent and predictable way, facilitating its understanding.
- **Robust content:** Content must be functional across a variety of current and future technologies, including assistive technologies.

You can learn more about in modules 1, 2 and 3.

MODULE



Name of main partners:

Eyupsultan MEM and WINSS

DESCRIPTION

1. Module Title:

Module 5: Legal and ethical aspects of e-Learning design

2. Duration of the module

24 hours

3. ECTS credits / ECVET credits

2 credits / 1 credit

4. Authors

Abdullah Murat UĞUR,

Zübeyde KÖKSOY ALİ

Figen SEKİN

5. Course learning outcomes: knowledge, skills and competencies acquired (objectives)

Those who have successfully completed training in this discipline:

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- You will know:
 - Understand copyright laws and fair use principles.
 - Recognize privacy concerns related to student data.
 - Meet accessibility guidelines for e-learning content.
- You will be able to:
 - Apply ethical decision making in e-learning design.
 - Addressing privacy and data protection issues.
 - Create accessible e-learning materials.
 - Explaining intellectual property rights
- It will be competent to:
 - Develop e-learning courses that meet legal standards.
 - Addressing ethical challenges in online education.
 - Advocate for inclusive and responsible e-learning practices.

6. Teaching methods

Lectures and presentations, case-based learning, group debates and discussions, practical activities, role-plays and simulations

7. Prerequisites (knowledge and skills from previous training) and requirements for other courses (simultaneous)

Prerequisites:

Basic knowledge of e-learning design principles. Familiarity with educational technology and digital content creation.

Requirements for other courses:

There are no specific concurrent course requirements, but knowledge of previous modules will enhance understanding.

8. Module content

A. Brief summary

This module aims to improve the digital skills of teachers, focusing on the legal and ethical aspects of e-Learning design.

The module covers topics, such as copyright and intellectual property, privacy and data protection, accessibility and inclusion, ethical considerations and social and cultural sensitivity.

Activities include designing e-learning resources, privacy impact assessments, and discussions on how to balance privacy with innovation. The module also explores the use of AI in education, addressing inclusion and potential biases.

The main themes of the abstracts focus on ethical practices in e-learning design, with an emphasising on transparency, honesty and academic integrity. The use of AI tools in education is examined, weighing the benefits against ethical considerations and the

potential for misuse. Strategies to promote integrity and address challenges such as plagiarism and contract fraud are also discussed.

B. Thematic content of the module

a) conferences

This module includes 5 units that cover the following thematic contents:

- **Legal and ethical aspects:** The module emphasizes understanding copyright laws, intellectual property rights, privacy, data protection regulations such as GDPR, and ensuring accessibility and inclusion in e-learning design. - (3) hours
- **Ethical considerations:** Addresses ethical considerations in course design, including transparency, avoiding deceptive practices, promoting academic integrity, and social and cultural sensitivity. - (3) hours
- **Cultural sensitivity:** The importance of recognizing and respecting cultural differences is highlighted, with special attention to promoting inclusion, avoiding stereotypes and prejudices, and encouraging respectful interactions. - (3) hours
- **Legal aspects:** Legal aspects are discussed, with an emphasis on fair use, intellectual property rights, protection of student data, and compliance with regulations such as the GDPR. - (3) hours
- **Accessibility:** Accessibility is addressed through WCAG guidelines, emphasizing the importance of creating a positive, effective, and inclusive e-learning environment. - (3) hours

These topics underline the importance of creating a positive, effective and inclusive e-learning environment. The module aims to equip educators with the knowledge to comply with relevant laws and guidelines and create an inclusive and respectful learning environment.

b) practical activities

1. Creating Accessible eLearning Content (Hands-on practice in designing content that adheres to accessibility guidelines: adding alt text for images, ensuring keyboard navigation, etc.) - (4) hours
2. Ethical decision-making scenarios (role-playing exercises to address ethical dilemmas. Discussion on transparency, bias and academic integrity). (3) hours
3. Case Studies and Discussions (Analysis of real cases related to legal and ethical challenges in e-learning). - (2) hours

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c) Equipment required for teaching the module

- Computers or tablets for participants.
- Projector or screen for presentations.
- Access to legal resources and e-learning platforms.

9. References (main bibliography)

1. **European Commission. (2024). *Regulatory framework for artificial intelligence*.**

This document establishes the EU's first comprehensive legal framework for AI, promoting trustworthy, human-centric systems while ensuring ethical innovation through a risk-based approach. It highlights the importance of transparency, accountability, and inclusivity in AI applications.

2. **Kuner, C., Bygrave, L. A., Docksey, C., & Drechsler, L. (Eds.). (2020). *The EU General Data Protection Regulation (GDPR): A Commentary*. Oxford University Press.**

This book provides a detailed commentary on the GDPR, explaining the principles of lawful data processing, individual rights, and accountability. It is essential for understanding how data privacy laws impact educational practices.

3. **UNESCO. (2022). *Minding the data: Protecting learners' privacy and security*.**

This publication discusses global efforts to safeguard learners' data and privacy in education, emphasizing secure and ethical use of digital tools to build trust and enhance educational development.

4. **Britannica. (n.d.). Copyright | Definition, Examples, & Facts.**

This article provides an overview of copyright laws and their role in protecting creators' rights. It explores the historical evolution of copyright and its application in various intellectual works.

5. **Editage Insights. (2023). *A quick guide to copyright law for research and academic writing*.**

This guide explains fundamental copyright concepts and fair use practices, helping educators navigate copyright issues in creating and using academic materials.

6. **Fikir ve Sanat Eserleri Kanunu [Law on Intellectual and Artistic Works] (Law No. 5846) (1951).**

This Turkish law protects authors' moral and economic rights, offering guidelines on intellectual property across literature, arts, and sciences. It supports creators by defining fair use and mechanisms for enforcement.

7. **Personal Data Protection Law [Kişisel Verilerin Korunması Kanunu-KVKK] (Law No: 6698) (2016).**

The KVKK provides a legal framework for protecting personal data in Türkiye, emphasizing informed consent and transparency. It outlines ethical responsibilities for data controllers, making it highly relevant for educators.

8. **American Psychological Association (APA). (2021). *Inclusive Language Guide*.**

This guide promotes respectful and inclusive language, helping educators foster equity and diversity in academic and professional environments.

9. **W3C Web Accessibility Initiative (WAI). (n.d.). *Web Content Accessibility Guidelines (WCAG) Overview*.**

The WCAG provides standards to make web content accessible to people with disabilities. It is critical for designing inclusive e-learning platforms that meet diverse learners' needs.

10. **Lee, L. S. G. (2022). *Integrating Design Features for E-Learning Platforms*. *Proceedings of International Academic Symposium of Social Science 2022*, 82(1), 23.**

This paper discusses innovative design features for e-learning platforms, emphasizing accessibility, user engagement, and adaptability to enhance online education.

11. **Smith, J., & Johnson, K. (2023). *The Ethics of Data Privacy in Education*. *Journal of Educational Ethics*, 12(3), 45-60.**

This article explores ethical challenges in handling student data and privacy in educational settings, offering insights into secure and responsible practices.

12. **Saif, S. (2023, July 10). *Cultural Sensitivity: A Guide to Navigating Diverse Environments*.**

This guide provides practical strategies for educators to navigate cultural differences in diverse learning environments while fostering inclusivity and mutual respect.

13. **Paul, A. (2023, August 26). *Global Leadership: Navigating Cultural Differences in a Connected World*. *Open Growth***

This resource highlights the importance of cultural sensitivity and leadership in global education, focusing on collaboration and understanding across diverse backgrounds.

14. **Moscon, V. (2014). *Academic Freedom, Copyright, and Access to Scholarly Works: A Comparative Perspective*. In *Balancing Copyright Law in the Digital Age*.**

This book chapter examines the interplay between copyright law, academic freedom, and access to knowledge, providing a comparative perspective that is valuable for educators in the digital age.

15. Planned learning activities
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Teamwork, discussion activities, tasks.

16. Evaluation methods and criteria

- **Questionnaires or exams:** Assess students' understanding of legal frameworks, privacy protection, and accessibility guidelines.
- **Scenario-based questions:** Assess students' ability to apply legal and ethical principles to real-world situations.
- **Case studies and portfolios:** Review students' solutions to ethical dilemmas and their application of legal guidelines.
- **Content creation tasks:** Evaluate student-created e-learning materials for compliance with legal standards.
- **Peer review:** Have students evaluate the work of others based on legal and ethical considerations.
- **Class participation and debates:** Evaluate student participation in ethical debates.

17. Language

English, Spanish, Bulgarian, Portuguese, Turkish

18. Internship/practice

Creating Accessible eLearning Content (Hands-on practice in designing content that adheres to accessibility guidelines: adding alt text for images, ensuring keyboard navigation, etc.)

THEMATICAL CONTENT OF THE MODULE

Learning Objectives

- Understand the legal framework governing e-Learning content and activities.
- Explore ethical considerations in designing and delivering e-courses.
- Apply best practices to ensure compliance with relevant laws and guidelines.

Topics Covered

1. Copyright and Intellectual Property
 - Overview of copyright laws and fair use.
 - Strategies for using third-party content legally.
 - Creating original content while respecting intellectual property rights.
2. Privacy and Data Protection
 - Importance of safeguarding learner data.
 - Compliance with data protection regulations (e.g., GDPR).
 - Designing secure e-Learning platforms.
3. Accessibility and Inclusivity
 - Ensuring equal access for all learners.
 - Designing for diverse needs (e.g., visual impairments, mobility challenges).
 - Addressing accessibility standards (e.g., WCAG).
4. Ethical Considerations
 - Transparency in course design and communication.
 - Avoiding deceptive practices.
 - Upholding academic integrity.
5. Social and Cultural Sensitivity
 - Recognizing cultural differences.
 - Avoiding stereotypes and biases.
 - Promoting respectful interactions.

INTRODUCTION

Welcome to Module 5, where we delve into the legal and ethical aspects of e-Learning design. This module aims to equip you with a comprehensive understanding of the legal framework governing e-Learning content and activities, and the ethical considerations involved in designing and delivering e-courses.



We will explore the following topics:

- **Copyright and Intellectual Property:** We will provide an overview of copyright laws and fair use, discuss strategies for legally using third-party content, and guide you in creating original content while respecting intellectual property rights.
- **Privacy and Data Protection:** We will emphasize the importance of safeguarding learner data, discuss compliance with data protection regulations such as GDPR, and explore the design of secure e-Learning platforms.
- **Accessibility and Inclusivity:** We will discuss the importance of ensuring equal access for all learners, designing for diverse needs such as visual impairments and mobility challenges, and addressing accessibility standards like WCAG.
- **Ethical Considerations:** We will explore the importance of transparency in course design and communication, discuss how to avoid deceptive practices, and emphasize the importance of upholding academic integrity.
- **Social and Cultural Sensitivity:** We will discuss recognizing cultural differences, avoiding stereotypes and biases, and promoting respectful interactions.

By the end of this module, you will be able to apply best practices to ensure compliance with relevant laws and guidelines in your e-Learning design.

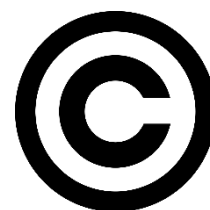
Unit 1: Copyright and Intellectual Property

1.1. Overview of Copyright Laws and Fair Use

Understanding Copyright

Copyright is a legal concept that grants creators exclusive rights to their original work. This encompasses a wide range of creations, including literary, dramatic, musical, artistic, and certain other intellectual works. The purpose of copyright is to protect the rights of creators, allowing them to control how their work is used and to receive compensation for its use. It serves as a critical incentive for the creation of many intellectual works.

Copyright is a form of intellectual property that provides the creator of an original work, or another right holder, with the exclusive and legally protected right to reproduce, distribute, adapt, display, and perform a creative work for a limited period. This legal right is granted to the originator for a fixed number of years, allowing them to print, publish, perform, film, or record literary, artistic, or musical material (Editage Insights, 2023). The creative work may be in a literary, artistic, educational, or musical form (Moscon, V. (2014)). The purpose of copyright is to protect the rights of creators, allowing them to control how their work is used and to receive compensation for its use. It serves as a critical incentive for the creation of many intellectual works.



Understanding copyright is crucial for educators and future educators in the digital age. As they create and utilize various educational materials, awareness of intellectual property rights helps prevent unintentional infringements and promotes respect for the creative works of others. Additionally, educators who develop unique teaching tools or content can benefit from the protection offered by the law, ensuring that their innovations are legally safeguarded. By fostering a culture of respect for intellectual property, educators can set a positive example for their students, highlighting the importance of ethical practices in both academic and professional settings.

The concept of copyright originated in Europe during the 15th and 16th centuries, following the advent of the printing press. Initially, it was associated with a common law and rooted in the civil law system (Wikipedia, n.d.). The world's first copyright law, the Statute of Anne,

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was enacted in England in 1710, primarily to protect authors and publishers against specific unauthorized uses of their work. This law marked a significant milestone in the history of copyright, establishing the idea that copyrights should have only limited duration, after which works would pass into the public domain. Similar laws were enacted in Denmark in 1741, the United States in 1790, and France in 1793 (Britannica, n.d.). Over time, copyright law has evolved to cover a wide range of works and has been standardized to some extent through international and regional agreements such as the Berne Convention and the European copyright directives (Wikipedia, n.d.).

In the European Union, copyright protection is automatically granted to original literary, scientific, and artistic works such as poems, articles, films, songs, or sculptures. This protection extends to 70 years after the author's death or 70 years after the death of the last surviving author in the case of a work of joint authorship. The protection grants the author exclusive economic rights, ensuring control over the work and remuneration for its use through selling or licensing. It also grants moral rights, protecting the author's rights to claim authorship (right of attribution) and to refuse a modification of their work (right of integrity) (European Union Intellectual Property Office, n.d.).

In Türkiye, *Law No. 5846 on Intellectual and Artistic Works* governs copyright protection. This law defines various types of intellectual and artistic works, including literature, science, music, fine arts, and cinema. It clarifies the terms and definitions used within the context of intellectual property rights. The law outlines the moral and economic rights of authors. Authors are granted exclusive rights to their works, including the right to reproduce, distribute, adapt, and publicly display their creations. The protection period for copyrighted works is generally the author's lifetime plus 70 years after their death. For works created by legal entities, the protection period is 70 years from the date of publication (Fikir ve Sanat Eserleri Kanunu, 1951).

Copyright protection in Türkiye arises automatically upon the creation of a work. There is no registration requirement to acquire copyright over a work, and registration is not a prerequisite for enforcement of copyright. However, there is a compulsory registration requirement for cinematographic and musical works for commercial exploitation purposes (Fikir ve Sanat Eserleri Kanunu, 1951).

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The law provides mechanisms for the enforcement of rights and remedies for infringement. The law includes provisions for fair use and other limitations to the exclusive rights of authors. It outlines specific conditions under which copyrighted works may be used without the author's permission (Fikir ve Sanat Eserleri Kanunu, 1951).

In Türkiye, the protection of industrial property rights, including patents, trademarks, designs, and geographical indications, is governed by the Industrial Property Law No. 6769. This legal framework aims to safeguard the intellectual efforts of creators by providing exclusive rights and ensuring compliance with international standards. Under this law, patents and utility models, which grant inventors the right to prevent others from making, using, or selling their inventions without permission, are protected for a defined period. The law also defines the criteria and processes for the registration and protection of trademarks and industrial designs, ensuring that businesses can secure their brand identities and design innovations (Sınai Mülkiyet Kanunu, 2016).

The Connection Between Copyright and Fair Use

Copyright law provides the creator of an original work with exclusive rights to reproduce, distribute, adapt, display, and perform their work for a limited period. This protection is designed to incentivize creativity and innovation by ensuring that creators can benefit from their intellectual labor. However, there is an exception to this rule known as “fair use,” which allows the use of copyrighted material under certain conditions. This principle, commonly referred to as “fair use,” posits that the reproduction of copyrighted works for specific limited, educational purposes does not constitute copyright infringement.

Fair use is particularly significant in the educational context. While educational uses of copyrighted materials are often given favorable consideration under the law, not all educational uses qualify as fair use. The determination of fair use is based on several factors, including the purpose and character of the use, the nature of the copyrighted work, the amount and substantiality of the portion used, and the effect of the use on the potential market for or value of the copyrighted work. Educators must be aware of these factors to ensure they are using copyrighted materials legally and ethically. This knowledge helps

them avoid legal repercussions and upholds the integrity of their teaching practices (Copyrighted.com, 2024).

Moreover, the concept of fair use empowers educators to create a more dynamic and engaging learning environment. By understanding and appropriately applying fair use guidelines, teachers can incorporate a wide range of resources, including multimedia, literature, and scholarly articles, to enhance their instructional materials. This approach not only enriches the learning experience but also models respect for intellectual property among students. As future creators and consumers of content, students benefit from seeing fair use principles applied in practice, thereby fostering a deeper appreciation for the balance between protecting creators' rights and promoting the free flow of information (Copyrighted.com, 2024).

1.2. Strategies for Using Third-Party Content Legally

In academia, the use of third-party content is prevalent, but it must be managed legally and ethically to avoid copyright infringement. Third-party content includes any material that belongs to someone other than yourself, such as your previous work, the work of co-authors, other authors' works, or data sources. Before using any third-party content in your research or teaching materials, you must fully understand the potential copyright considerations and conditions for reuse. This includes obtaining permissions from the rightsholder, which may require payment, and providing proper attribution (Taylor & Francis Author Services. (n.d.))

Strategies for Legal Use of Third-Party Content

- **Seeking Permissions:**

Before incorporating any third-party content into educational materials, it is essential to secure the necessary reproduction rights from the rights holder (Cambridge University Press, 2023). This process involves several steps, including identifying the content owner, determining the specific rights required for your use, and negotiating the terms of use, which may involve payment. It is also crucial to obtain the agreement in writing to ensure clear documentation of the permissions granted. By meticulously following these

procedures, educators can ensure that they are not only adhering to legal standards but also promoting respect for the intellectual property rights of content creators.

Seeking permissions is not just about adhering to legal requirements but also respecting the intellectual property rights of others. According to Stanford University Libraries (n.d.), this process typically involves understanding the scope of rights needed, such as whether print and online rights are necessary. Ensuring that you have the correct permissions for both formats prevents potential legal issues and ensures that the content can be used as intended across various mediums.

Additionally, having a written agreement serves as a safeguard, providing clear evidence of the rights obtained and the terms agreed upon. By following these strategies, educators can use third-party content legally and ethically, enhancing their teaching materials while respecting the rights of original creators (Oxford Academic, n.d.).



- **Using Licensed Materials:**

Another vital strategy is using licensed materials, which are governed by agreements that restrict their use to certain conditions. Users generally may view, download, and print reasonable portions of licensed materials for their own noncommercial research, education, and scholarship. However, redistributing the materials or using them for commercial purposes is generally prohibited (MIT Libraries, n.d.). Properly understanding and adhering to the terms of these licenses ensures that educators can legally incorporate high-quality resources into their teaching materials, enhancing the educational experience for their students while avoiding potential legal issues (Stanford University Libraries, n.d.).

- **Leveraging Creative Commons Licenses:**

Leveraging Creative Commons (CC) licenses is an effective strategy for using third-party content legally in educational materials. Creative Commons licenses provide a flexible way to share research openly while safeguarding intellectual property (Library Services – MIT Libraries, 2023). These licenses allow researchers and educators to use

material from published articles under specified conditions without the need for obtaining specific permissions from the original authors. This significantly simplifies the process of incorporating high-quality resources into teaching materials while ensuring that the rights of content creators are respected.

Creative Commons licenses offer versatility and can be customized to match various preferences and needs. For example, the CC BY license allows others to distribute, adapt, and build upon a work, provided they give proper attribution to the original creator (Library Services – MIT Libraries, 2023). This particular license is highly beneficial for educational purposes, as it enables educators to modify and tailor resources to better fit their instructional goals. By leveraging Creative Commons licenses, educators can legally access a wealth of resources, enhance their teaching materials, and foster a culture of respect for intellectual property among their students (Creative Commons, n.d.).

Rights Clearance Process

1. Due Diligence: Always consider copyright laws and website terms of use when using third-party content.
2. Public Domain and Free Content: Determine if content is in the public domain or free for use.
3. Rights Clearance Steps:
 - 3.1. Identify copyrightable content.
 - 3.2. Determine copyright owners.
 - 3.3. Obtain licenses and permissions.

1.3. Creating Original Content with Respect to Intellectual Property Rights

Creating original content while respecting intellectual property rights is a critical aspect of academic integrity and legal compliance. This process involves understanding and adhering to the principles of copyright law, fair use, and licensing agreements (Jouglex, 2022).

Understanding Copyright Law: Copyright law protects original works of authorship, including literary, dramatic, musical, and artistic works. It grants the creator exclusive rights to reproduce, distribute, perform, display, or license their work. Therefore, when creating

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original content, it is crucial to ensure that any third-party content used does not infringe upon these rights (Gaffar & Albarashdi, 2024).

Adhering to Fair Use Principles: Fair use is a legal doctrine that promotes freedom of expression by permitting the unlicensed use of copyright-protected works in certain circumstances. It considers factors such as the purpose of use, the nature of the copyrighted work, the amount used, and the effect on the market value of the work. Understanding these principles can guide the incorporation of third-party content into original works (Prasad, 2023)

Complying with Licensing Agreements: Licensing agreements are legal contracts between the copyright owner and the licensee, outlining the terms under which the licensee may use the copyrighted work. When using licensed materials in original content, it is essential to comply with these terms (Jougleux, 2022).

In conclusion, creating original content with respect to intellectual property rights involves a careful balance between innovation and legal compliance. By understanding and adhering to copyright law, fair use principles, and licensing agreements, creators can ensure their work respects the intellectual property rights of others.

Remember, responsible e-Learning design involves both legal compliance and ethical considerations. Let's create engaging and original content while respecting intellectual property!



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ACTIVITY: DESIGN YOUR OWN E-LEARNING RESOURCE

- Topic Selection:
 - Choose a topic related to your teaching area.
 - Ensure it is original and does not infringe on existing copyrights. Conduct a preliminary search to verify the originality of your chosen topic.
- Content Development :
 - Develop an e-Learning resource such as a mini-lesson, infographic, or quiz.
 - Use your own text, images, and multimedia elements. Ensure all components are either original or properly licensed (e.g., Creative Commons).
 - Integrate at least one element that addresses accessibility standards (e.g., alt text for images, captions for videos).
- **Reflection on Copyright and Fair Use:**
 - Reflect on how you have respected intellectual property rights during your content creation. Consider any third-party content used and how you ensured its legal use.
 - Document your process for verifying fair use or obtaining permissions if necessary.
- Peer Feedback and Discussion:
 - Engage in a discussion with your peers. Provide constructive feedback on each other's resources.
 - Reflect on the feedback received and discuss ways to improve and refine your resource.

Unit 2: Privacy And Data Protection

In this unit, we'll cover the importance of safeguarding learner data, compliance with data protection regulations (such as GDPR) and designing secure e-Learning platforms

1.5.2. 2.1. Importance of Safeguarding Learner Data

In the era of digital learning, the importance of safeguarding learner data cannot be overstated. As educators and future educators, we are entrusted with a wealth of sensitive information, from personal details to academic records. This data, if mishandled, can lead to breaches of privacy and trust, legal repercussions, and ethical dilemmas (Smith & Johnson, 2023). Therefore, understanding why data privacy matters and how to protect it is a critical aspect of our roles.



Safeguarding learner data is a critical aspect of educational practice for several reasons:

- **Student Trust:** The relationship between educators and students is built on a foundation of trust. When students are confident that their data is secure, they are more likely to engage actively in learning activities, share their thoughts, and collaborate with peers. Trust fosters a positive learning environment, where students feel safe and supported. Conversely, a data breach can erode student trust, leading to anxiety, reluctance to participate, and concerns about privacy violations (UNESCO, 2022).
- **Legal Obligations:** Educational institutions are required to adhere to legal frameworks related to data protection, such as the General Data Protection Regulation (GDPR) in the European Union or similar laws in other regions. These Legal obligations ensure that students' rights regarding their personal data are respected, including rights to Access, rectification, erasure and and data portability. Failure to comply with these legal requirements can result in fines, reputational damage, and legal repercussions (UNESCO, 2022).
- **Ethical Responsibility:** Beyond legal obligations, educators have an ethical duty to act as responsible stewards of student data. This involves implementing measures to protect data against unauthorized access, misuse, or theft. Ethical practices include transparent communication with students about data collection, purpose, and consent. Students should be fully aware of how their data will be used. Ethical decision-making involves balancing the

benefits of data-driven innovations (such as personalized learning) with privacy considerations(UNESCO, 2022).

In conclusion, safeguarding learner data is not just a matter of legal compliance, but also a matter of trust and ethical responsibility. As educators, we must strive to uphold these principles in our practice to ensure a safe and conducive learning environment for our students.

1.5.3. 2.2. *Compliance with Data Protection Regulations*

The General Data Protection Regulation (GDPR)

The **General Data Protection Regulation (GDPR)** is a comprehensive data privacy law enacted by the European Union (EU). Approved in 2016 and applicable from May 2018, the GDPR establishes a robust framework for the collection, processing, storage, and transfer of personal data. Its primary objective is to enhance individuals' control over their personal information while ensuring transparency, accountability, and security in data handling practices. The GDPR applies to all EU member states and has far-reaching implications for organizations worldwide that process EU citizens' data. As educators, understanding the GDPR is essential, as it impacts how educational institutions handle student data, consent, and privacy rights (Kuner, Bygrave, Docksey & Drechsler, 2020)

The GDPR introduces several critical principles that educators should be aware of (Information Commissioner's Office (ICO):

Lawfulness, Fairness, and Transparency:

Lawfulness: Educators must process personal data in a lawful manner. This means adhering to legal requirements, obtaining valid consent, and ensuring that data processing aligns with the GDPR's provisions.

Fairness: Data processing should be fair and transparent. Educators should inform individuals (students, parents, and staff) about the purpose of data collection, how their data will be used, and their rights.

Transparency: Educators must provide clear and concise information about data processing practices. Transparency builds trust and empowers individuals to make informed decisions regarding their data.

Purpose Limitation: Educators should collect and process personal data only for specific, explicit purposes. Data should not be repurposed for unrelated activities. For example, student data collected for attendance tracking should not be used for marketing purposes.

Purpose limitation ensures that data processing remains focused on educational objectives, preventing misuse or unauthorized access.

Data Minimization: Educators should minimize the amount of personal data collected. Only essential information necessary for educational purposes should be processed.

Data minimization reduces the risk of data breaches and protects individuals' privacy. For instance, collecting only necessary student information (such as grades and attendance) rather than excessive details helps maintain privacy.

Individual Rights:

The GDPR grants individuals specific rights regarding their personal data. Educators must be aware of these rights and facilitate their exercise:

Right to Access: Individuals can request access to their data held by educational institutions.

Right to Rectification: Individuals can correct inaccuracies in their data.

Right to Erasure (Right to Be Forgotten): Individuals can request the deletion of their data under certain conditions.

Right to Restriction of Processing: Individuals can limit how their data is processed.

Right to Data Portability: Individuals can obtain their data in a structured, machine-readable format.

Educators should respond promptly to such requests and ensure compliance with these rights.

Security and Accountability: Educators are responsible for securing personal data. Measures include encryption, access controls, regular security assessments, and staff training.

Accountability involves documenting data processing activities, maintaining records, and demonstrating compliance with the GDPR.

Educators should have a Data Protection Officer (DPO) who oversees compliance and educates staff on data protection practices.

The Personal Data Protection Law (KVKK)

In Türkiye, the Personal Data Protection Law (KVKK) sets forth the legal framework for the processing and protection of personal data. This law aims to safeguard personal data and protect individuals' privacy rights. The primary objective of KVKK is to ensure that personal data is processed in accordance with the law and that the rights of data subjects are protected. Educators must understand and comply with KVKK requirements to protect their students' personal data effectively (KVKK, 2022).

KVKK imposes several obligations on data controllers, i.e., individuals or institutions that process personal data. These obligations include informing data subjects, obtaining explicit consent, ensuring data security, and reporting data breaches. Educators, as data controllers, must fulfill these obligations when processing student data. Compliance with KVKK not only meets legal requirements but also helps build trust with students by demonstrating a commitment to protecting their personal information (KVKK, 2022).

Moreover, educators must adhere to ethical responsibilities in addition to the legal requirements set forth by KVKK. This involves transparent communication with students about data collection and processing, explaining the purpose of data use, and obtaining informed consent. Educators should implement data security measures to prevent unauthorized access and protect student data. By adopting an ethical approach, educators respect students' privacy rights and create a secure learning environment (KVKK, 2022)

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The EU Artificial Intelligence Act (AI Act)

The European Union's regulatory framework for artificial intelligence (AI) is designed to ensure the development and deployment of trustworthy AI systems that prioritize human-centric values, safety, and fundamental rights. This framework includes the EU Artificial Intelligence Act (AI Act), which is the first comprehensive legal framework for AI worldwide. The AI Act adopts a risk-based approach, categorizing AI systems into four levels of risk: minimal, limited, high, and unacceptable. It aims to address the challenges posed by AI systems while fostering innovation and investment in AI technologies across the EU. The framework also emphasizes collaboration among member states and stakeholders to maximize resources and align priorities for AI development (European Commission, 2024).

Educators can benefit from understanding this regulatory framework, as AI technologies are increasingly integrated into educational practices. The AI Act provides guidelines for ensuring transparency, accountability, and ethical use of AI systems in education. For example, AI-driven tools used for adaptive learning or administrative tasks must comply with the Act's requirements to mitigate risks and uphold learners' rights. Additionally, the framework encourages the development of AI systems that are inclusive and accessible, aligning with the principles of equity and diversity in education. By incorporating these guidelines, educators can create a safe and innovative learning environment that respects the rights and dignity of all learners.

1.5.4. 2.3. Designing Secure e-Learning Platforms



The rapid adoption of e-learning platforms has become increasingly vital, particularly in the context of the COVID-19 pandemic. As educational institutions transitioned from face-to-face to online learning, the need for robust and secure e-learning platforms has intensified. These platforms now serve as the primary means of delivering quality education to students. However, the increasing reliance on these platforms has underscored the importance of security in their design and implementation.

Ensuring the security of e-learning platforms is crucial to protect sensitive data, maintain privacy, and create a safe learning environment. Here are some key security measures:

Authentication and Authorization:

- Implement robust authentication mechanisms to verify user identities during login. This includes using strong passwords and, where possible, biometric verification.
- Use multi-factor authentication (MFA) to add an extra layer of security, thereby reducing the risk of unauthorized access.
- Authorization controls should limit access based on roles (e.g., student, teacher, administrator). This ensures that users have access only to the information and functionalities pertinent to their roles.

Data Encryption:

- Encrypt data both in transit (using protocols such as HTTPS) and at rest (storing data securely using encryption algorithms). This protects data from interception and unauthorized access.
- Protect user credentials, personal information, and communication channels through encryption to ensure the confidentiality and integrity of the data.

Secure APIs and Integrations:

- If the platform integrates with external services or APIs, ensure they follow secure practices. This includes using secure protocols and regularly updating API keys.
- Validate input data to prevent injection attacks (e.g., SQL injection) and ensure that all interactions with the platform are secure.

Regular Security Audits and Penetration Testing:

- Conduct periodic security audits to identify vulnerabilities in the e-learning platform. These audits should be thorough and cover all aspects of the platform's security.
- Perform penetration testing to simulate attacks and assess the platform's resilience. This helps in identifying and addressing potential security weaknesses.

User Privacy and Consent:

- Clearly communicate privacy policies to users, detailing how their data will be collected, used, and protected.
- Obtain explicit consent for data collection and processing, ensuring that users are aware of and agree to the terms of data usage.

Monitoring and Logging:

- Monitor platform activity for suspicious behavior, such as unusual login patterns or access attempts. This can help in early detection of potential security threats.
- Maintain logs to track user actions and system events, which can be crucial for forensic analysis in case of security incidents.

Secure Coding Practices:

- Developers should follow secure coding guidelines (e.g., OWASP Top Ten) to prevent common vulnerabilities in the platform's codebase.
- Regularly update libraries and dependencies to patch security flaws and protect the platform from known exploits
- **Secure File Uploads:**
 - Validate file uploads to prevent malicious files from being introduced into the platform. This includes checking file types and scanning for malware.
 - Store uploaded files securely and restrict access to authorized users to prevent unauthorized use or distribution.

Network Security:

- Use firewalls, intrusion detection systems, and network segmentation to protect the e-learning platform from external threats.
- Implement measures to protect against Distributed Denial of Service (DDoS) attacks, ensuring the platform remains accessible during peak usage times.

Incident Response Plan:

- Prepare for security incidents by having a well-defined response plan that includes steps for detection, containment, eradication, and recovery.

- Educate staff on incident handling procedures to ensure a coordinated and effective response to security breaches.

Security is an ongoing process, and e-learning platforms must continually adapt to emerging threats. Regular updates, user education, and collaboration with security experts are essential for maintaining a secure environment. By implementing these measures, educational institutions can safeguard sensitive data and provide a safe and secure learning experience for their students.

Remember, responsible data handling is crucial for creating a safe and effective e-Learning environment!

ACTIVITY: PRIVACY IMPACT ASSESSMENT

- Scenario:
 1. Imagine you're designing an e-Learning platform for a school.
 2. How will you ensure data privacy for students and teachers?
- Task:
 1. Conduct a privacy impact assessment.
 2. Identify potential risks and mitigation strategies.

DISCUSSION: BALANCING PRIVACY AND INNOVATION

How can we balance data privacy with innovative e-Learning technologies?

Share your thoughts and engage in a discussion with peers.

Unit 3: Accessibility and Inclusivity

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In this unit, we delve into strategies that ensure equal access for all learners, address diverse needs (such as visual impairments and mobility challenges), and adhere to accessibility standards like the Web Content Accessibility Guidelines (WCAG). As educators, understanding these principles is crucial for creating an inclusive and equitable learning environment (American Psychological Association (APA), 2021)

1.5.5. 3.1. *Ensuring Equal Access for All Learners*

In the realm of e-learning, equal access is not merely a goal; it is a fundamental right. Every learner, regardless of their abilities, should have equitable access to educational content and resources. This principle extends beyond physical accessibility to encompass digital spaces. By considering diverse learning styles, cognitive differences, and physical impairments, educators can design e-learning platforms that accommodate everyone. For instance, providing alternative formats (such as audio descriptions or transcripts) ensures that learners with visual impairments can engage effectively. Moreover, captioning videos benefits not only deaf or hard-of-hearing students but also those who learn better through visual reinforcement. By prioritizing equal access, educators foster an inclusive learning environment that celebrates diversity and promotes academic success (APA, 2021).

Understanding Accessibility

Accessibility focuses on creating an environment—both digital and physical—where all individuals, regardless of their abilities, can access information and services without encountering unnecessary barriers (Mariger, 2020). In educational contexts, accessibility means designing learning materials, platforms, and physical spaces to accommodate diverse needs. Here are the key points:

- **Equal Opportunity:** Accessibility ensures that every learner has an equal opportunity to succeed. It goes beyond mere compliance with legal requirements; it aims to create an inclusive learning environment where no one is left behind.
- **Flexible Formats:** Educational content should be presented in multiple formats (text, audio, visual) to cater to different learning styles. For instance, providing captions for videos benefits not only students with hearing impairments but also those who learn better through visual reinforcement.

- **Adaptive Technologies:** Leveraging adaptive technologies (such as screen readers, braille displays, or voice recognition software) allows students with disabilities to engage effectively with digital content.
- **Universal Design:** The principles of universal design emphasize proactive planning to remove barriers. Rather than retrofitting accommodations, educators should design learning experiences that consider diverse strengths and needs from the outset.

Universal Design for Learning (UDL): A Framework for Inclusive Teaching

Universal Design for Learning (UDL) is a powerful framework developed by CAST (Center for Applied Special Technology) that guides the design of learning experiences to proactively meet the needs of all learners (Posey). This framework emphasizes the importance of designing flexible learning environments that can accommodate diverse learners, thus promoting inclusivity and academic success.

- **Engagement:** UDL encourages varied ways for students to engage and persist in learning. Recognizing that motivation and interest differ among learners, UDL advocates for providing choices, ensuring relevance, and incorporating authentic tasks. These strategies help sustain student engagement and foster a deeper connection to the material.
- **Representation:** UDL focuses on how instructors communicate course concepts. It suggests presenting information in multiple formats (text, images, videos) to accommodate diverse learning preferences. Clear organization and visual clarity are paramount, ensuring that all students can access and comprehend the instructional material effectively.
- **Action and Expression:** UDL provides options for students to demonstrate what they have learned. This includes offering varied assessment formats (written, oral, visual), flexible response modes, and opportunities for creativity. By allowing multiple means of action and expression, educators can better assess student understanding and support diverse learning styles.
- **Environment, Not Student-Centered:** UDL posits that barriers to learning exist within the design of the learning environment, rather than within the student. By creating flexible learning environments, educators can address individual differences and

promote success for all learners. This proactive approach ensures that educational experiences are accessible and inclusive from the outset.

By embracing the principles of UDL, educators can create inclusive learning environments where every student has the opportunity to thrive. UDL not only enhances accessibility but also fosters a more equitable educational landscape. Teachers who adopt UDL principles contribute to a culture of inclusivity, where diversity is celebrated, and all students are supported in their learning journeys (Mariger, 2020).

In summary, Universal Design for Learning empowers educators to design instruction that meets the diverse needs of all students. By proactively addressing barriers within the learning environment and offering flexible engagement, representation, and expression options, UDL helps create a more inclusive and equitable educational experience for every learner.

1.5.6. 3.2. Designing for Diverse Needs:

3.2.1. Addressing Visual Impairments

- Learners with visual impairments may utilize screen readers or braille displays to access digital content. Consequently, e-learning materials should be structured with semantic HTML, clear headings, and descriptive alt text for images to enhance accessibility.
- Color contrast is critical; educators should select color combinations that are legible for individuals with color blindness or low vision. Ensuring adequate contrast ratios can significantly improve readability and user experience.
- Providing resizable fonts and avoiding text embedded in images ensures readability for all learners. It is essential to offer scalable text options that can be adjusted according to individual preferences, thus accommodating varying degrees of visual impairment.

3.2.2. Addressing Mobility Challenges

- Some learners may have mobility impairments that affect their ability to use a mouse or keyboard. Therefore, designing e-learning interfaces with comprehensive keyboard

navigation in mind is essential. This includes ensuring that all interactive elements can be accessed and operated using keyboard shortcuts.

- Avoid relying solely on hover interactions or small clickable areas. Instead, provide large, touch-friendly buttons and ensure that all interactive elements are accessible via keyboard navigation. This approach minimizes the need for precise pointer movements, which can be challenging for individuals with mobility impairments.

The Web Content Accessibility Guidelines (WCAG) specifically address keyboard accessibility and provide detailed recommendations for creating an inclusive user experience. Adhering to these guidelines ensures that e-learning platforms are accessible to users with various mobility challenges, thereby promoting an equitable learning environment.



ACTIVITY: ACCESSIBLE CONTENT REVIEW

- Gather Materials: Collect all relevant course materials, including documents, presentations, and e-learning modules, to be evaluated for accessibility.
- Initial Assessment: Conduct an initial review of the materials, paying close attention to the following elements:
 - Text: Ensure that fonts are readable, and there is sufficient contrast between text and background.
 - Images: Check for the presence of descriptive alt text for images.
 - Multimedia: Verify that videos are captioned and audio content is transcribed.
 - Navigation: Assess the ease of navigation within the materials, ensuring that headings are clear and logical, and interactive elements are accessible via keyboard.
- Identification of Areas for Improvement:
 - Use accessibility evaluation tools (e.g., WAVE, AXE) to conduct a detailed analysis of the course materials. These tools can help identify specific accessibility issues that may not be immediately apparent.
- Document Findings:
 - Record your observations, noting any areas where the materials do not meet accessibility standards. This includes identifying missing alt text, insufficient color contrast, lack of captions or transcripts, and unclear navigation structures.
 - Use a checklist of accessibility criteria based on the Web Content Accessibility Guidelines (WCAG) to ensure a comprehensive evaluation.

1.5.7. 3.3. Addressing Accessibility Standards (e.g., WCAG)

As educators, understanding Web Content Accessibility Guidelines WCAG is essential for creating inclusive online learning environments that cater to diverse needs.



Web Content Accessibility Guidelines (WCAG)

The WCAG, developed by the World Wide Web Consortium (W3C), provides a comprehensive set of guidelines for making web content more accessible to people with a wide variety of disabilities (Understanding WCAG 2.0). These guidelines address various aspects of digital content, including websites, applications, documents, and multimedia. Here are key points

regarding WCAG:

1. Levels of Conformance:

- WCAG defines three levels of conformance: A (basic), AA (intermediate), and AAA (advanced). Each level corresponds to a set of success criteria that outline specific requirements for accessibility.
- Conformance at any level requires meeting all Level A success criteria. Beyond Level A, additional success criteria from Levels AA and AAA may be included based on the desired level of accessibility.

2. Success Criteria:

- WCAG success criteria cover a wide range of topics, including text alternatives for non-text content (such as images), keyboard navigation, color contrast, and adaptability for assistive technologies.
- For example, providing descriptive alt text for images ensures that screen readers convey relevant information to users with visual impairments. Similarly, ensuring proper semantic structure in HTML benefits all users, including those using screen readers or voice commands.

3. Universal Design Principles:

- WCAG aligns with universal design principles, emphasizing proactive planning to remove barriers rather than retrofitting accommodations.

- By adhering to WCAG, educators can create digital content that is usable by everyone, regardless of their abilities.

In summary, WCAG serves as a vital resource for educators, guiding the design and development of accessible online materials. By implementing WCAG principles, teachers contribute to a more equitable and inclusive educational experience for all learners.

Remember, creating an inclusive learning environment benefits everyone. Let's make education accessible for all learners!

DISCUSSION: AI AND INCLUSIVITY

- How can AI be leveraged to enhance inclusivity in education while addressing the unique needs of each student? Identify strategies to ensure that AI tools are accessible to all students, including those with disabilities. Discuss the role of inclusive design principles and adherence to accessibility standards in achieving this goal.
- What measures can be taken to ensure that AI tools do not perpetuate existing biases or create new forms of inequity? Discuss potential biases in AI algorithms and their impact on educational equity. Consider how biases can arise from the data used to train AI systems and the implications for underrepresented or marginalized groups.
- How can educators, policymakers, and technology developers collaborate to create ethical and inclusive AI solutions for education?

Unit 4: Ethical Practices

In this unit, we delve into transparency, honesty, and academic integrity—essential principles for educators committed to maintaining ethical standards in their teaching practices.

1.5.8. 4.1. Transparency in e-Learning Design

Transparency is a cornerstone of ethical e-learning design. As educators, it is imperative to be forthright and clear about our intentions, processes, and expectations. Ensuring transparency not only fosters trust and engagement but also enhances the overall learning experience for students. Here are key points related to transparency (American Association of Colleges and Universities, 2018):



- **Course Expectations:** Clearly communicate course objectives, assessment criteria, and learning outcomes to students. Transparency in course expectations ensures that learners understand what is expected of them and how their performance will be evaluated. Providing detailed syllabi, assessment rubrics, and clear grading policies enables students to have a comprehensive understanding of the course structure and requirements. This clarity helps to set realistic expectations and reduces potential misunderstandings or confusion..
- **Disclosure of Information:** Be transparent about data collection, privacy policies, and any third-party tools used in the e-learning environment. Students have a right to know how their data will be handled, including the purposes for which it is collected and the measures taken to protect their privacy. Clearly articulated privacy policies and terms of service should be easily accessible to all users. Additionally, informing students about the use of any external tools or platforms, and how their data may be shared or utilized, is essential for maintaining trust and ensuring informed consent.

- **Communication Channels:** Provide accessible channels for students to seek clarification, ask questions, and express concerns. Transparent communication fosters trust and engagement by ensuring that students feel supported and heard. This can include offering multiple modes of communication, such as email, discussion forums, virtual office hours, and chat functions. Establishing clear guidelines for communication, including expected response times and preferred methods of contact,

ACTIVITY: DESIGN A TRANSPARENT COURSE SYLLABUS

Create a sample course syllabus that emphasizes transparency.

Begin by providing a detailed overview of the course. This should include the course title, instructor information, contact details, and office hours. Clearly state the course description, including the main topics that will be covered and the overall goals of the course.

Include sections on learning outcomes (clear, measurable and aligned with the course objectives), assessment methods (exams, quizzes, assignments, projects and participation), technology usage (technology tools, platforms, online resources and learning management systems to be used throughout the course), course policies (attendances, participation, late submissions, academic integrity, etc) and communication channels (email, discussion forums, virtual Office hours, etc.).

How does clear communication of course expectations and assessment methods influence student motivation and performance?

In what ways does transparency in technology usage support students in navigating the e-learning environment?

further enhances the effectiveness of these channels. By being readily available and responsive, educators can build a positive and open learning environment.

1.5.9. 4.2. Honesty and Academic Integrity

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Upholding Honesty

Upholding honesty entails avoiding deception, misrepresentation, or plagiarism in all academic endeavors. Educators should model integrity by citing sources accurately, acknowledging contributions, and providing original content. By doing so, they set a standard for their students to follow, emphasizing the importance of honesty in academic work.

Encourage students to maintain honesty in their academic efforts, underscoring the value of academic integrity. Discuss the potential consequences of dishonest practices, including academic penalties, loss of trust, and damage to one's reputation (Council of Writing Program Administrators, 2015).

Modeling Integrity:

Educators play a pivotal role in fostering a culture of academic integrity. It is essential to clearly define expectations regarding original work, proper citation, and collaboration. This clarity helps students understand the standards they are expected to meet.

Address issues such as plagiarism, unauthorized collaboration, and contract cheating (e.g., using essay mills). Educate students on the ethical implications of these actions, highlighting the importance of producing authentic work.

1.5.10. 4.3. Addressing Academic Integrity Challenges

Plagiarism Detection:

- Employ plagiarism detection tools to identify instances of copied content in student submissions. These tools can help educators detect and address academic dishonesty effectively, ensuring the originality of student work.
- Educate students on proper citation practices, emphasizing the importance of acknowledging sources and adhering to academic standards. Providing clear



guidelines on how to cite sources correctly fosters a culture of honesty and respect for intellectual property

Contract Cheating:

- Be vigilant about the existence of essay mills and contract cheating services that offer to complete assignments on behalf of students for a fee. These services undermine academic integrity and devalue the educational experience.
- Promote originality and critical thinking by encouraging students to engage deeply with course material and produce their own work. Provide support and resources to help students develop their writing and research skills, thereby reducing the temptation to resort to dishonest practices.

As educators, we hold the responsibility to model ethical behavior, instill integrity in our students, and create learning environments where trust and fairness prevail. By embracing these principles, we empower ourselves as ethical educators, ensuring that our instructional practices align with the highest standards of professionalism and respect for all learners.

Remember, transparency, honesty, and academic integrity contribute to a positive and effective e-Learning environment. Let's empower future educators to uphold these principles!

DISCUSSION: BALANCING TECHNOLOGY AND INTEGRITY

AI Tools and Academic Integrity

Pros of AI:

Enhancement of Personalized Learning Experiences: AI has the potential to tailor educational content to the unique needs and learning styles of individual students, thereby enhancing their engagement and academic performance.

Efficiency in Automated Grading: AI-driven automated grading systems can save valuable time for educators by quickly and accurately assessing student work, allowing teachers to focus more on instructional activities and student support.

Cons and Ethical Considerations:

Prevention of Misuse: There are concerns about the misuse of AI tools, such as essay generators, which can facilitate academic dishonesty. Discuss strategies to mitigate these risks and ensure the responsible use of AI technologies.

Assessment of Creativity and Critical Thinking: AI's ability to assess creativity and critical thinking remains limited. Explore whether AI can truly evaluate these complex cognitive skills and how it might complement human judgment in the assessment process.

Discussion Questions:

1. How can educators strike a balance between leveraging AI tools and maintaining academic integrity? Engage in a discussion on the ways educators can utilize AI to enhance learning while upholding the principles of academic integrity. Consider the roles of transparency, clear guidelines, and continuous monitoring in achieving this balance.
2. What ethical guidelines should be in place when using AI-driven writing tools? Discuss the ethical considerations that should guide the use of AI-driven writing tools in education. This includes ensuring fairness, preventing bias, safeguarding student privacy, and promoting honest academic practices

Unit 5: Social and Cultural Sensitivity:

As educators, we bear the responsibility of fostering an inclusive and culturally aware learning environment. Recognizing and appreciating cultural differences is not only essential but also enriches the educational experience for both teachers and students. In this unit, we explore strategies to promote cultural sensitivity, avoid biases, and create respectful interactions. From celebrating diversity to challenging assumptions, our goal is to cultivate cultural competence that transcends the classroom and prepares future educators to lead by example.

1.5.11. 5.1. *Recognizing Cultural Differences*

Cultural diversity is a hallmark of our interconnected world, where individuals from various backgrounds converge in educational settings. Recognizing and respecting the diverse values, beliefs, rituals, and practices of different cultures is fundamental to cultural sensitivity. It inspires us to approach others with an open mind, devoid of prejudice and stereotypes, and to engage in meaningful cross-cultural encounters. The following points highlight the importance of recognizing cultural differences:



- **Embracing Diversity:**

- **Appreciating Worldviews:** Cultural diversity extends beyond surface-level differences. It involves understanding varying worldviews, historical contexts, and socio-cultural norms that shape individuals and communities. This deeper comprehension fosters an appreciation for the rich tapestry of human experience.
- **Challenging Assumptions:** Educators must actively challenge assumptions and stereotypes. By doing so, they create an environment where students feel valued and understood, regardless of their cultural backgrounds. Encouraging critical thinking and open dialogue helps dismantle preconceived notions.

- **Promoting Inclusion:** Embracing diversity means intentionally including diverse perspectives in curriculum design, classroom discussions, and teaching materials. This approach enriches the learning experience for all students, broadening their understanding and appreciation of different cultures.
- **Avoiding Stereotypes and Biases:**
 - **Stereotypes:** Stereotypes oversimplify cultural groups, perpetuating harmful narratives. Educators should avoid reinforcing stereotypes and instead encourage critical thinking about cultural representations.
 - **Implicit Biases:** Everyone carries implicit biases based on cultural conditioning. Acknowledging these biases and actively seeking to counteract them is essential. Educators can engage in self-reflection and participate in bias-awareness training to mitigate the impact of unconscious biases on their teaching practices.
 - **Promoting Fairness:** Fair assessment practices involve considering cultural differences. Evaluating students' work based on culturally neutral criteria ensures equitable treatment. This approach recognizes the diverse backgrounds of students and strives to create an inclusive and fair academic environment.
- **Promoting Respectful Interactions:**
 - **Active Listening:** Culturally sensitive educators actively listen to students' stories, experiences, and perspectives. They validate and honor diverse voices, fostering a sense of belonging and respect within the classroom.
 - **Cultural Humility:** Rather than assuming expertise, educators practice cultural humility—acknowledging their own limitations and continuously learning from their students.
 - **Conflict Resolution:** When cultural differences lead to misunderstandings or conflicts, educators facilitate respectful dialogue. They model conflict

resolution strategies that promote understanding and empathy, helping students navigate and resolve cultural tensions constructively.

ACTIVITY: CULTURAL EXCHANGE DAY

Organize a “Cultural Exchange Day” where students present aspects of their culture. Include food, music, traditional clothing, and artifacts.

1.5.12. 5.2. Incorporating Cultural Sensitivity into the Curriculum



Incorporating cultural sensitivity into the curriculum is essential for creating an inclusive and respectful learning environment. As educators, it is our responsibility to take meaningful steps to recognize and respect the diverse backgrounds of our students. The following guidelines will help in fostering a culturally sensitive educational setting (Understanding the Importance of

Cultural Sensitivity in Classroom):

1. Educate Oneself About Students' Cultures:

Understanding Traditions and Values - Take the time to learn about the cultural backgrounds of your students. Understand their traditions, customs, and values. This knowledge will enable you to appreciate their perspectives and tailor your teaching approach accordingly.

Incorporate this understanding into your lesson plans and classroom interactions to create a more inclusive and supportive environment.

2. Foster Open Dialogue:

Promoting Open Conversations- Create a classroom atmosphere where students feel comfortable discussing cultural differences. Encourage open conversations about cultural practices, celebrations, and experiences.

Active dialogue promotes mutual understanding and breaks down stereotypes, fostering a sense of community and respect among students.

3. **Incorporate Cultural Diversity in Teaching Materials:**

Diversifying Educational Content- Diversify your teaching materials, including textbooks, videos, and readings, to include content from various cultural perspectives. Showcase authors, artists, and historical figures from different backgrounds.

Use examples and case studies that reflect cultural diversity. Highlight contributions from different cultures in fields such as science, literature, art, and history.

4. **Avoid Stereotypes:**

Challenging Cultural Stereotypes - Be mindful of cultural stereotypes and biases. Avoid making assumptions based on ethnicity, race, or nationality. Treat each student as an individual with unique experiences.

Challenge stereotypes by presenting a balanced view of different cultures. Emphasize their richness, complexity, and contributions to global knowledge.

5. **Practice Active Listening:**

Empathy and Understanding- Listen attentively to your students. Understand their perspectives, concerns, and needs. Show empathy and respect for their cultural backgrounds.

Active listening fosters trust and helps you adapt your teaching methods to meet diverse learning styles and preferences.

6. **Collaborate with Local Teachers:**

Learning from Local Expertise- If you are teaching in a multicultural setting, collaborate with local teachers or educators who have firsthand knowledge of the cultural context. They can provide valuable insights and guidance.

Learn from their experiences and adapt your curriculum to align with cultural norms and sensitivities. This collaboration enriches the educational experience for both educators and students.

In summary, cultural sensitivity enriches the educational experience, promotes empathy, and prepares students to thrive in a diverse world. By incorporating these practices, educators contribute to a more inclusive and respectful classroom environment, fostering a

DISCUSSION: NAVIGATING CULTURAL MISUNDERSTANDINGS

Share personal experiences of cultural misunderstandings.

Discuss strategies for resolving conflicts arising from cultural differences.

culture of understanding and mutual respect.

Remember, social and cultural sensitivity enhances the educational experience for all learners. Let's create inclusive classrooms together!

Module 5 Quiz: Legal and Ethical Aspects of e-Learning Design

UNIT 1

1. What is the primary purpose of copyright protection?
 - A. To prevent the creation of derivative works.
 - B. To grant creators exclusive rights to their original works and provide incentives for creativity.
 - C. To restrict access to educational materials.
 - D. To promote the distribution of counterfeit works.

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- E. To limit the usage of artistic works to non-commercial purposes.
- 2. Which law marked a significant milestone in the history of copyright by establishing the idea that copyrights should have only limited duration?
 - A. The Berne Convention
 - B. The Statute of Anne
 - C. The European Copyright Directive
 - D. The Universal Copyright Convention
 - E. The Copyright Act of 1790
- 3. In the European Union, how long does copyright protection typically last after the author's death?
 - A. 50 years
 - B. 60 years
 - C. 70 years
 - D. 80 years
 - E. 90 years
- 4. What is one of the moral rights granted to authors under copyright law in the European Union?
 - A. The right to sell their work
 - B. The right to refuse a modification of their work (right of integrity)
 - C. The right to reproduce their work indefinitely
 - D. The right to distribute counterfeit works
 - E. The right to create derivative works
- 5. What is the term used for the exception to copyright that allows the use of copyrighted material under certain conditions, particularly for educational purposes?
 - A. Fair use
 - B. Public domain
 - C. Creative Commons
 - D. Licensing
 - E. Digital rights management
- 6. What is one of the key strategies for using third-party content legally in educational materials?
 - A. Ignoring copyright considerations.

- B. Securing necessary reproduction rights from the rights holder.
 - C. Distributing materials without permission.
 - D. Using content exclusively for commercial purposes.
 - E. Avoiding any form of attribution.
7. Which type of license provides a flexible way to share research openly while safeguarding intellectual property?
- A. Public domain licenses
 - B. Creative Commons licenses
 - C. Proprietary licenses
 - D. Exclusive licenses
 - E. Restricted licenses
8. When using licensed materials, what is generally prohibited?
- A. Viewing the materials.
 - B. Downloading the materials for noncommercial research.
 - C. Printing reasonable portions for educational purposes.
 - D. Redistributing the materials or using them for commercial purposes.
 - E. Citing the materials in scholarly articles.
9. What does fair use consider when determining the unlicensed use of copyright-protected works?
- A. The commercial value of the work.
 - B. The purpose and character of the use.
 - C. The popularity of the work.
 - D. The author's personal preferences.
 - E. The medium through which the work is used.
10. What is one of the critical aspects of creating original content with respect to intellectual property rights?
- A. Ignoring fair use principles.
 - B. Adhering to copyright law.
 - C. Using third-party content without proper attribution.
 - D. Creating content solely for commercial gain.
 - E. Disregarding licensing agreements.

UNIT 2

1. What is one of the key reasons for safeguarding learner data in educational practice?
 - A. To increase data breaches.
 - B. To build student trust and ensure a positive learning environment.
 - C. To promote the unauthorized use of data.
 - D. To disregard legal obligations.
 - E. To enhance commercial exploitation of student data.
2. Which legal framework establishes a robust data privacy law in the European Union?
 - A. Personal Data Protection Law (KVKK)
 - B. General Data Protection Regulation (GDPR)
 - C. Health Insurance Portability and Accountability Act (HIPAA)
 - D. Children's Online Privacy Protection Act (COPPA)
 - E. Family Educational Rights and Privacy Act (FERPA)
3. Under the GDPR, what does the principle of data minimization entail?
 - A. Collecting excessive personal data for various purposes.
 - B. Minimizing the amount of personal data collected to what is necessary.
 - C. Sharing personal data with third parties without consent.
 - D. Ignoring the purpose limitation principle.
 - E. Repurposing data for unrelated activities.
4. What rights does the GDPR grant individuals regarding their personal data?
 - A. Right to exploit personal data commercially.
 - B. Right to restrict access to their data permanently.
 - C. Right to ignore data protection principles.
 - D. Right to request access, rectification, erasure, restriction of processing, and data portability.
 - E. Right to share personal data without any limitations.
5. What is one of the ethical responsibilities of educators concerning student data under the Personal Data Protection Law (KVKK) in Türkiye?
 - A. Ignoring data security

- B. Implementing transparent communication about data collection and processing.
 - C. Disregarding informed consent from students.
 - D. Promoting unauthorized access to student data.
 - E. Using student data for unrelated marketing purposes.
6. What is one of the key measures to ensure secure authentication and authorization in e-learning platforms?
- A. Using simple passwords and no verification.
 - B. Implementing robust authentication mechanisms and multi-factor authentication (MFA).
 - C. Allowing unrestricted access to all users.
 - D. Disabling user authentication altogether.
 - E. Sharing passwords among multiple users.
7. Why is data encryption important for e-learning platforms?
- A. To increase the speed of data transmission.
 - B. To protect data from interception and unauthorized access.
 - C. To make data publicly available.
 - D. To reduce the need for authentication.
 - E. To simplify data storage procedures.
8. What is the purpose of conducting regular security audits and penetration testing on e-learning platforms?
- A. To increase the user interface complexity.
 - B. To identify vulnerabilities and assess the platform's resilience to attacks.
 - C. To reduce system performance.
 - D. To allow unrestricted access to all data.
 - E. To collect user activity data without consent.
9. What should be included in a privacy policy communicated to users of e-learning platforms?
- A. Detailed instructions for sharing data with third parties.
 - B. Information about how data will be collected, used, and protected.
 - C. Methods for bypassing security measures.
 - D. Procedures for unauthorized access to user data.

- E. Strategies for disabling data encryption.
- 10.** What is a key aspect of secure coding practices for e-learning platform developers?
- A. Ignoring common vulnerabilities.
 - B. Regularly updating libraries and dependencies to patch security flaws.
 - C. Avoiding the use of encryption algorithms.
 - D. Allowing unrestricted file uploads.
 - E. Disregarding input validation.

UNIT 3

- 1.** What is the fundamental principle of ensuring equal access in e-learning?
 - A. Providing access exclusively to students with disabilities.
 - B. Ensuring that all learners, regardless of their abilities, have equitable access to educational content.
 - C. Designing content for only one learning style.
 - D. Limiting access to digital spaces.
 - E. Ignoring physical impairments in design.
- 2.** What does accessibility in educational contexts focus on?
 - A. Creating barriers to access
 - B. Designing materials and platforms to accommodate diverse needs.
 - C. Providing content in a single format.
 - D. Ignoring adaptive technologies.
 - E. Limiting access to non-disabled individuals.
- 3.** What is one of the key principles of Universal Design for Learning (UDL)?
 - A. Designing learning experiences only for gifted students.
 - B. Proactively creating flexible learning environments to meet the needs of all learners.
 - C. Retrofitting accommodations after barriers are identified.
 - D. Restricting engagement to a single method.
 - E. Ignoring individual differences.
- 4.** How can e-learning platforms address the needs of learners with visual impairments?

- A. Using low contrast color combinations.
 - B. Embedding text in images without alternative text.
 - C. Providing resizable fonts and descriptive alt text for images.
 - D. Relying solely on hover interactions.
 - E. Avoiding the use of screen readers.
5. What is the benefit of providing captions for videos in educational content?
- A. Reducing the accessibility of the content.
 - B. Supporting only students with visual impairments.
 - C. Enhancing the learning experience for deaf or hard-of-hearing students and those who learn better through visual reinforcement.
 - D. Limiting engagement for students.
 - E. Ignoring the needs of visual learners.
6. What does the principle of "Action and Expression" in UDL emphasize?
- A. Providing a single format for student assessment.
 - B. Offering varied assessment formats and flexible response modes.
 - C. Ignoring creative expression.
 - D. Restricting students to written assessments only.
 - E. Avoiding multiple means of demonstrating learning.
7. How should e-learning interfaces be designed to address mobility challenges?
- A. Relying solely on mouse-based interactions
 - B. Providing large, touch-friendly buttons and comprehensive keyboard navigation.
 - C. Using small clickable areas for all interactive elements.
 - D. Ignoring the Web Content Accessibility Guidelines (WCAG).
 - E. Designing without considering users with mobility impairments.
8. What are the Web Content Accessibility Guidelines (WCAG) designed to address?
- A. Restricting web content access.
 - B. Making digital content more accessible to people with a variety of disabilities.
 - C. Limiting the use of adaptive technologies.
 - D. Ignoring universal design principles.
 - E. Reducing the usability of online materials.
9. What is one of the levels of conformance defined by WCAG?

- A. Level D
- B. Level C
- C. Level AAA (advanced)
- D. Level B
- E. Level AA (basic)

10. How can educators ensure their digital content adheres to WCAG principles?

- A. Creating content without regard to accessibility guidelines.
- B. Providing text alternatives for non-text content, ensuring keyboard navigation, and maintaining color contrast.
- C. Ignoring the need for descriptive alt text.
- D. Limiting the use of semantic HTML.
- E. Designing for only one type of assistive technology.

UNIT 4

1. What is a fundamental aspect of transparency in e-learning design?

- A. Hiding course objectives and learning outcomes.
- B. Clearly communicating course objectives, assessment criteria, and learning outcomes to students. C
- C. Limiting students' access to course information.
- D. Providing vague grading policies.
- E. Keeping assessment criteria confidential.

2. Why is it important to disclose information about data collection and privacy policies in e-learning environments?

- A. To confuse students about data handling.
- B. To keep students unaware of data usage.
- C. To ensure students know how their data will be handled and to maintain trust.
- D. To share students' data with third parties without consent.
- E. To avoid transparency in data collection.

3. What is the benefit of providing multiple communication channels for students in e-learning environments?

- A. Limiting student engagement.

- B. Ensuring students feel supported and heard.
 - C. Reducing opportunities for clarification.
 - D. Hiding preferred methods of contact.
 - E. Delaying response times indefinitely.
4. What does upholding honesty in academic endeavors entail for educators?
- A. Encouraging deception and misrepresentation.
 - B. Avoiding proper citation of sources. C
 - C. Setting a standard for students to follow by citing sources accurately and providing original content.
 - D. Promoting plagiarism.
 - E. Ignoring contributions from others.
5. How can educators model integrity in academic work?
- A. Encouraging unauthorized collaboration.
 - B. Using essay mills for assignments.
 - C. Clearly defining expectations regarding original work, proper citation, and collaboration.
 - D. Ignoring ethical implications of dishonest actions.
 - E. Allowing contract cheating.
6. What is the purpose of employing plagiarism detection tools in academic settings?
- A. To increase the likelihood of academic dishonesty.
 - B. To identify instances of copied content in student submissions.
 - C. To discourage originality in student work.
 - D. To promote contract cheating services.
 - E. To ignore proper citation practices.
7. Why is it important to educate students on proper citation practices?
- A. To encourage plagiarism.
 - B. To ignore the importance of acknowledging sources.
 - C. To foster a culture of honesty and respect for intellectual property.
 - D. To reduce academic standards.
 - E. To disregard academic integrity.
8. What is a potential consequence of contract cheating for students?
- A. Enhancing the educational experience.

- B. Promoting originality and critical thinking.
 - C. Undermining academic integrity and devaluing the educational experience.
 - D. Ensuring authentic work.
 - E. Building trust with educators.
9. How can educators promote originality and critical thinking among students?
- A. Encouraging the use of essay mills.
 - B. Discouraging engagement with course material.
 - C. Providing support and resources to develop writing and research skills.
 - D. Allowing dishonest practices.
 - E. Ignoring academic integrity challenges.
10. What role do educators play in fostering a culture of academic integrity?
- A. Modeling unethical behavior.
 - B. Ignoring the importance of academic integrity.
 - C. Creating learning environments where trust and fairness prevail.
 - D. Promoting dishonest practices.
 - E. Disregarding ethical standards.

UNIT 5

1. What is a fundamental aspect of cultural sensitivity in educational settings?
- A. Ignoring cultural backgrounds of students.
 - B. Recognizing and respecting the diverse values, beliefs, rituals, and practices of different cultures.
 - C. Imposing one's cultural norms on others.
 - D. Maintaining cultural stereotypes.
 - E. Avoiding discussions about culture.
2. What does embracing diversity in the classroom involve?
- A. Limiting curriculum to a single cultural perspective.
 - B. Including diverse perspectives in curriculum design, discussions, and teaching materials.
 - C. Discouraging critical thinking about cultural differences.
 - D. Promoting assumptions about cultural groups

- E. Excluding certain cultural practices from classroom activities.
3. How can educators challenge assumptions and stereotypes?
- A. Encouraging students to avoid discussing their cultural backgrounds.
 - B. Reinforcing cultural stereotypes in teaching materials.
 - C. Actively promoting critical thinking and open dialogue about cultural representations.
 - D. Ignoring cultural differences in the classroom.
 - E. Limiting the inclusion of diverse perspectives.
4. Why is it important to avoid implicit biases in education?
- A. To maintain cultural conditioning.
 - B. To perpetuate stereotypes.
 - C. To promote fairness and equitable treatment of all students.
 - D. To ignore self-reflection and bias-awareness.
 - E. To evaluate students based on cultural assumptions.
5. What role does active listening play in promoting respectful interactions?
- A. Ignoring students' stories and experiences.
 - B. Assuming expertise in all cultural matters.
 - C. Validating and honoring diverse voices within the classroom.
 - D. Discouraging open dialogue.
 - E. Overlooking cultural tensions and conflicts.
6. How can educators incorporate cultural sensitivity into their curriculum?
- A. Ignoring students' cultural backgrounds.
 - B. Avoiding discussions about cultural differences.
 - C. Diversifying teaching materials to include content from various cultural perspectives.
 - D. Limiting content to a single cultural narrative.
 - E. Stereotyping cultural contributions.
7. What is the benefit of fostering open dialogue about cultural practices in the classroom?
- A. Reinforcing cultural stereotypes.
 - B. Discouraging mutual understanding.
 - C. Promoting community and respect among students.

- D. Limiting discussions about cultural differences.
 - E. Ignoring students' cultural experiences.
8. Why is it important to practice active listening in culturally sensitive education?
- A. To overlook students' needs and concerns.
 - B. To enforce stereotypes.
 - C. To show empathy and adapt teaching methods to diverse learning styles.
 - D. To avoid cultural diversity in teaching.
 - E. To maintain preconceived notions about cultural groups.
9. How can collaboration with local teachers enhance cultural sensitivity in a multicultural setting?
- A. Ignoring local cultural norms and sensitivities.
 - B. Adapting the curriculum without any guidance.
 - C. Learning from local expertise and aligning the curriculum with cultural norms.
 - D. Imposing one's teaching methods on local contexts.
 - E. Avoiding collaboration with local educators.
10. What is the overall impact of incorporating cultural sensitivity into education?
- A. Limiting students' understanding of diverse cultures.
 - B. Promoting stereotypes and biases.
 - C. Enriching the educational experience and fostering a culture of understanding and mutual respect.
 - D. Excluding certain cultural perspectives.
 - E. Ignoring cultural diversity in teaching practices.

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2. Module 5 Quiz Answers

2.1. UNIT 1 – Legal and Ethical Aspects of Copyright

1. B
2. B
3. C
4. B
5. A
6. B
7. B
8. D
9. B
10. B

10.1. UNIT 2 – Data Protection and Privacy

1. B
2. B
3. B
4. D
5. B
6. B
7. B
8. B
9. B
10. B

10.2. UNIT 3 – Accessibility and Universal Design

1. B
2. B
3. B
4. C
5. C
6. B
7. B
8. B
9. C
10. B

10.3. UNIT 4 – Academic Integrity and Transparency

1. B
2. C
3. B
4. C
5. C
6. B
7. C
8. C
9. C
10. C

10.4. UNIT 5 – Cultural Sensitivity and Inclusion

1. B
2. B
3. C
4. C
5. C
6. C

7. C

8. C

9. C

10.C

MODULE



Name of the leading partner:

Bulgarian Inclusion Support Team, Sofia, Bulgaria

Bulgarian Teachers' Union

DESCRIPTION

1. Title of the module:

Module 6: Leadership and team management of e-learning design

2. Duration of the module

15 hours

3. ECTS credits / ECVET credits

1 ECTS credit / 1 ECVET credit

4. Authors

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- Gergana Arabcheva
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On behalf of BTU:

- Dr. Yanka Takeva
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5. Learning outcomes for the course – acquired knowledge, skills, competencies (goals)

Those who have successfully completed training in this discipline,

- **Will know:**

- *The importance of effective leadership and team management in e-Learning design:* Participants will understand the significance of strong leadership and team management in creating successful e-Learning courses that meet the needs of learners and achieve desired learning outcomes.

- **Will obtain:**

- ✓ *Collaboration and communication skills:* Participants will have enhanced their collaboration and communication skills, including active listening, effective verbal and written communication, and the ability to work in a team environment.
- ✓ *Problem-solving and decision-making skills:* Participants will have improved their problem-solving and decision-making abilities, both individually and as part of a team, and will be better equipped to navigate challenges and make informed decisions in their e-Learning design projects.
- ✓ *Time management and organizational skills:* Participants will have developed better time management and organizational skills, including setting priorities, meeting deadlines, and balancing multiple tasks simultaneously, which will help them manage their e-Learning design projects more efficiently.
- ✓ *Basic project management skills:* Participants will have a stronger foundation in project management concepts, such as project planning, scope, timelines, and risk management, and will be better prepared to apply these skills to their e-Learning design projects.
- ✓ *Strategies for leading and managing e-Learning design teams:* Participants will have gained knowledge of various strategies for leading and managing e-Learning design teams, including effective communication, goal setting, conflict resolution, delegation, and continuous improvement.

-

- **Will be competent to:**

- ✓ manage e-Learning design teams effectively, resulting in higher quality e-Learning courses that better serve the needs of their learners.

-

6. Teaching methods

- **Lectures and presentations:** Deliver informative lectures and presentations that introduce key concepts, principles, and theories related to e-learning design leadership and team management. Use visual aids, such as slides, videos, and infographics, to enhance understanding and engagement.

- **Group discussions:** Facilitate group discussions that allow participants to share their experiences, ask questions, and explore different perspectives on the topic. This can help participants apply the theoretical concepts to their own e-learning design projects and learn from the experiences of their peers.
- **Peer coaching and mentoring:** Facilitate peer coaching and mentoring relationships between participants, where experienced participants provide guidance and support to those who are new to e-Learning design leadership and team management.
- **Reflective practice:** Encourage participants to reflect on their own leadership and team management practices through journaling, self-assessments, or one-on-one consultations with a professional development coach. This reflection can help participants identify areas for improvement and develop personalized action plans for growth.

7. Prerequisites (knowledge and skills from previous training) and requirements for other (simultaneous) courses

Completion of modules:

- *Module 1. Theories and models for instructional design of quality digital learning;*
- *Module 2. Methodology for applying appropriate, contextualized pedagogical design in innovative, engaging and quality e-courses and resources;*
- *Module 3. E-learning quality standards and ability to apply them in e-learning design (courses, learning activities and resources);*
- *Module 4: Smart technologies in the development of e-learning resources;*

Before embarking on the module participants should have a basic understanding of the following concepts and skills:

- **E-learning design principles:** Participants should have a foundational knowledge of e-learning design principles, such as adult learning theories, instructional design models, and multimedia principles.
- **Educational technology tools:** Participants should be familiar with commonly used educational technology tools, such as learning management systems (LMS), authoring software, and multimedia creation tools.
- **Collaboration and communication skills:** Participants should possess strong collaboration and communication skills, including active listening, effective verbal and written communication, and the ability to work in a team environment.
- **Problem-solving and decision-making skills:** Participants should have experience in solving problems and making decisions, both independently and as part of a team.

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- **Time management and organizational skills:** Participants should be able to manage their time effectively and organize their work efficiently, including setting priorities, meeting deadlines, and balancing multiple tasks simultaneously.
- **Basic project management skills:** Participants should have a basic understanding of project management concepts, such as project planning, scope, timelines, and risk management.

8. Content of the module

• A. Short summary

Introduction:

In the field of e-learning, effective leadership and team management are crucial for designing and implementing successful online courses. This module will provide an overview of the key principles and strategies for leading and managing teams in e-learning design.

We will discuss the importance of clear communication, setting goals and expectations, fostering a collaborative environment, and promoting continuous improvement. Additionally, we will explore the role of project management tools and techniques in facilitating efficient team collaboration and ensuring timely delivery of e-learning projects.

Unit 1: Leader. Leadership types and styles through the years

- **What is the role of the leader? What are the existing leadership types and what theories supporting them?:** We will start with the explanation about who is the leader, what are his/her functions, what theories and connected styles exists.

Unit 2 The specifics of the school leaders

- **Importance of strong leadership:** Effective leadership is essential for guiding the development of high-quality e-learning courses. A strong leader can motivate team members, set clear goals, and ensure that everyone stays focused on the project's objectives.

Unit 3 Characteristics of effective leaders and leadership styles to ensure innovations in education

- **Characteristics of effective leaders and leadership styles to ensure innovations in education:** Successful e-learning leaders possess excellent communication skills, be able to delegate tasks effectively, and foster a positive work environment. They also have a deep understanding of the learning needs of their target audience and the latest trends in e-learning technology.

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- **Setting clear expectations:** One of the most important responsibilities of a leader is to set clear expectations for team members. This includes defining roles and responsibilities, establishing deadlines, and outlining performance metrics.

Unit 4 Building and managing high-performing teams

- **Selecting the right team members:** To create a high-performing e-learning design team, it is essential to select individuals with diverse skill sets and experience. This may include subject matter experts, instructional designers, graphic designers, and multimedia developers.
- **Fostering collaboration:** Encourage open communication and collaboration among team members by scheduling regular meetings, using project management tools, and promoting a culture of transparency and trust.
- **Resolving conflicts:** Conflicts are inevitable in any team environment. Effective leaders should be prepared to address and resolve conflicts promptly, maintaining a neutral stance and focusing on finding solutions that benefit all parties involved.

Unit 5 Project management tools and techniques to ensure educational innovations

- **Choosing the right tools:** There are numerous project management tools available to help e-learning teams stay organized and on track. Some popular options include Asana, Trello, and Basecamp.
- **Setting milestones and deadlines:** Establishing clear milestones and deadlines is crucial for keeping the project on schedule. Use these milestones to break down larger tasks into smaller, more manageable components.
- **Monitoring progress:** Regularly monitor team members' progress and adjust plans as needed to ensure that the project remains on track. Use project management tools to track task completion, identify bottlenecks, and communicate updates to stakeholders.

Expected impact:

Effective leadership and team management are critical for the successful design and implementation of e-learning courses. By understanding the importance of clear communication, setting goals and expectations, fostering a collaborative environment, and promoting continuous improvement, e-learning professionals can create high-performing teams that deliver engaging and effective online courses.

B. Thematical content of the module

a) lectures

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- Unit 1: Leader. Leadership types and styles through the years: **(1) hour**
- Unit 2 The specifics of the school leaders: **(1) hour**
- Unit 3 Characteristics of effective leaders and leadership styles to ensure innovations in education: **(2) hours**
- Unit 4 Building and managing high-performing teams: **(1) hours**
- Unit 5 Project management tools and techniques to ensure educational innovations?: **(3) hours**

b) practical activities

- Unit 2 The specifics of the school leaders: **(1) hour**
- Unit 3 Characteristics of effective leaders and leadership styles to ensure innovations in education: **(2) hours**
- Unit 4 Building and managing high-performing teams: **(1) hours**
- Unit 5 Project management tools and techniques to ensure educational innovations?: **(4) hours**

C. Equipment required for the delivery of the module

To deliver the module we will need the following equipment:

- **Computer and projector:** A computer with presentation software (e.g., PowerPoint, Keynote) and a projector will be required for presenting slides, images, and videos during the workshop or seminar.
- **Flipchart and markers:** A flipchart and markers can be used for capturing key points, summarizing discussions, and creating visual aids during the session.
- **Handouts and materials:** Printed handouts, worksheets, and other materials will be needed for participants to follow along and take notes during the workshop or seminar.
- **Internet connection:** A stable internet connection will be required for accessing online resources, such as articles, videos, and websites, during the session.
- **Video conferencing software:** If the workshop or seminar is being delivered remotely, you will need video conferencing software, such as Zoom or Microsoft Teams, to facilitate live interaction and collaboration among participants.

9. References (main bibliography)
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Here are some references that you might find helpful when researching leadership and team management of e-learning design:

- *"Leadership in E-Learning: A Guide to Leading and Directing Online Learning Programs" by John Seeley Brown and Marcia Conner*
- This book provides insights into the challenges and opportunities of leading e-learning programs and offers practical advice for developing effective leadership strategies.
- *"The Science of E-Learning: How to Create Smarter Training Programs That Increase Profits" by Craig Weiss*
- While this book focuses on the science behind e-learning design, it also touches upon the importance of leadership and team management in creating successful online training programs.
- *"Project Management for Trainers: How to Plan, Execute, and Evaluate Training Programs" by Allen Interactions*
- This resource provides guidance on project management techniques for trainers, including tips for leading and managing e-learning design teams.
- *"Building Successful E-Learning Teams: Collaboration, Communication, and Leadership" by Will Thalheimer*
- This article discusses the importance of collaboration, communication, and leadership in building successful e-learning teams and provides practical tips for improving these skills.
- *"E-Learning Leadership: How to Inspire Others to Create Engaging Learning Experiences" by Catherine Lombardozzi*
- This blog post highlights the role of leadership in inspiring e-learning teams to create engaging learning experiences and offers suggestions for effective leadership practices.
- *"The Art and Science of Project Management for L&D" by Cathy Patterson*
- This article explores the art and science of project management for learning and development (L&D) professionals, including tips for leading and managing e-learning design teams.
- *"Leading Virtual Teams: Lessons Learned from Remote Work" by Jennifer Bridges*
- While this resource focuses on leading virtual teams in general, it provides valuable insights into the challenges and opportunities of leading remote e-learning design teams.
- *"The Agile Elephant: Evolving Teams, Organizations, and Leadership Styles" by Lynda Gratton and Nandini Mital*

- This book explores the concept of agile leadership and its application in evolving teams and organizations, which can be useful for e-learning design teams looking to adapt to changing needs and technologies.
- *"The E-Learning Coach: A Blueprint for Successful Learning and Development"* by Elaine Taylor-Hochman
- This book provides guidance for e-learning coaches and managers on how to support and lead their teams to achieve success in designing and delivering effective online learning programs.
- *"The E-Learning Handbook: A Comprehensive Guide to Planning, Creating, and Managing Online Training Programs"* by Michael Allen and Rick O'Shea
- While this book covers the entire process of e-learning design, it also includes chapters on team management and leadership, providing practical advice for leading successful e-learning projects.

10. Planned learning activities

Planned learning activities can help teachers develop their leadership and team management skills in the context of e-learning design. Here are some examples of learning activities that can be incorporated into a professional development program:

- **Workshops and seminars:** Offer workshops and seminars on topics such as effective communication, goal setting, conflict resolution, and delegation. These sessions can provide teachers with practical tips and strategies for leading and managing e-learning design teams.
- **Peer coaching and mentoring:** Facilitate peer coaching and mentoring relationships between teachers, where experienced teachers provide guidance and support to those who are new to e-learning design leadership and team management.
- **Reflective practice:** Encourage teachers to reflect on their own leadership and team management practices through journaling, self-assessments, or one-on-one consultations with a professional development coach. This reflection can help teachers identify areas for improvement and develop personalized action plans for growth.
- **Action research projects:** Support teachers in conducting action research projects that investigate the impact of specific leadership and team management strategies on e-learning design outcomes. This hands-on approach can provide teachers with valuable insights into the effectiveness of different approaches and help them refine their practices over time.

- **Online learning modules:** Provide access to online learning modules or webinars that offer additional resources and tools for developing leadership and team management skills in e-learning design.

By incorporating these learning activities into a professional development program, teachers can develop the knowledge and skills they need to effectively lead and manage e-learning design teams, ultimately enhancing the quality of e-learning courses and supporting the success of their students.

11. Methods and criteria for assessment

Assessing the leadership and team management of e-learning design for teachers involves evaluating various aspects of the team's performance, communication, and decision-making processes.

Here are some methods and criteria for assessing this module specifically for teachers:

Methods:

- **Peer observation:** Observe teacher teams during their planning and design sessions to evaluate their collaboration, communication, and decision-making processes.
- **Focus groups:** Conduct focus groups with teacher teams to discuss their experiences and perceptions of the leadership and team management. Questions could focus on communication, goal setting, conflict resolution, and overall satisfaction with the team's performance.
- **Student focus group feedback:** Gather student feedback on the e-learning courses designed by the teacher teams. This feedback can help identify areas for improvement in the design and delivery of the courses, as well as the team's overall performance.

Criteria:

- **Clear communication:** Assess whether the team leader effectively communicates project goals, expectations, and progress updates to team members. Also, evaluate if team members feel comfortable sharing ideas and concerns with each other and the leader.
- **Goal setting:** Evaluate whether the team leader establishes clear, measurable goals for the project and communicates them to team members. Additionally, assess if team members understand their individual roles and responsibilities in achieving these goals.
- **Collaboration:** Assess whether the team leader fosters a collaborative environment, encouraging team members to share ideas, knowledge, and resources. Also, evaluate if team members feel valued and appreciated for their contributions to the project.

- **Conflict resolution:** Assess how the team leader handles conflicts within the team, ensuring that they are resolved promptly and fairly. Also, evaluate if team members feel comfortable expressing their opinions and concerns without fear of retaliation.
- **Delegation:** Evaluate whether the team leader effectively delegates tasks based on team members' strengths and availability. Additionally, assess if team members feel empowered to make decisions and take ownership of their tasks.
- **Time management:** Assess whether the team leader effectively manages the project timeline, ensuring that tasks are completed on time and within budget. Also, evaluate if team members understand their deadlines and prioritize their work accordingly.
- **Continuous improvement:** Assess whether the team leader encourages a culture of continuous improvement within the team, soliciting feedback and incorporating it into future projects. Additionally, evaluate if team members feel motivated to learn and grow professionally.
- **Student engagement:** Assess whether the e-learning courses designed by the teacher teams engage students and facilitate their learning. This criterion is particularly important for evaluating the impact of the team's leadership and management practices on the quality of the final product.

By using these methods and criteria, you can gain a comprehensive understanding of the leadership and team management of e-learning design for teachers, identifying areas for improvement and celebrating successes.

12. Languages

English, Bulgarian, Spanish, Portuguese, Turkish

13. Internship/ practice

Internships or practicums in e-learning design for teachers provide valuable hands-on experience in applying leadership and team management principles to real-world projects.

Unit 1: Leader. Leadership types and styles through the years



The leader is:

- any person who occupies a primarily informal position of dominance, power, influence and inspiration in the group, realizing these events through logical and psychological influence;
- a person who creates and manages the strategic functional unity of needs, activities, goals and means;
- a person who has established himself and uses his status to successfully function in economic, social or political terms in the micro and macro environment;
- a person in a group who enjoys great and recognized authority and influence, with which he manages the actions and regulates the relationships of the group members;

The **different types of leadership** can be estimated:

- by content of the activity – leader - inspirer and leader - executor;
- according to the specifics of the activity – a permanent and situational leader;
- directionality – emotional and business leader;
- by status – formal (from the position of the position) and informal (influence by abilities, appearance, intellectual resources, etc.) leader.

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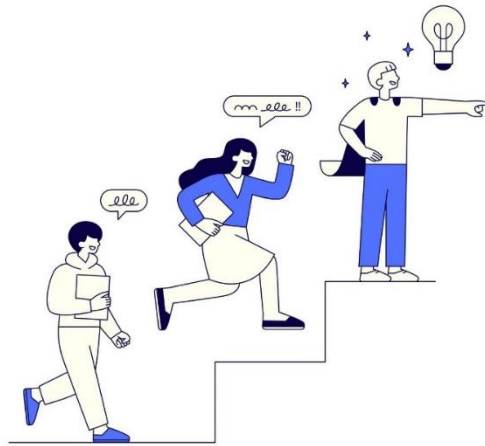
Nowadays, **leadership can be described** as:

- a process and activity for exercising unforced power, leadership and influence in a group, as a result of a set of qualities, abilities and competencies;
- interpersonal interaction with followers, which is actualized in certain situations through interaction and communication;
- motivating and stimulating followers to exchange successful work for various types of rewards;
- a process of unifying the staff, creating a calm atmosphere, businesslike relations and optimal working conditions, using the knowledge, skills and experience of each person to achieve the goals and development of the school;
- a system of relationships within a group through which the leader takes the initiative and responsibility for the consequences of her actions.

In a summary, the **leadership concepts** are a system of views to explain leadership.

They are divided into the following types:

- procedural concept – for decision-making;
- task-oriented or people-oriented;
- situational (contextual);
- synthetic (as an organization of interpersonal relationships, and the leader is the subject of their management)
- cognitive – leadership is the result of some internal mental processes of group members when assessing the consequences of interacting with each other);
- attributive – causal attribution of leadership qualities to certain individuals;
- charismatic;



Frequently, the leaders stand out according to their qualities, displayed in a given situation or manifested independently. Then, the following types of leaders can be described:

- **An Authoritarian leader:** a person with relatively complete power in the organization. The impact of such a leader comes only from status. In this leadership, there are no self-regulating mechanisms of the group, there is a lack of trust, money is considered the only reward, orders are given without clarification, subordinates do not take responsibility and work effectively only in the presence of the leader.
- **An Attentive leader:** Demonstrates care, friendliness, and responsiveness to followers and subordinates.
- **A Democratic leader:** In this type of leader, power is determined by agreements within the group or organization. Actions are taken according to consensus and conviction of the people. Such a leader explains the reasons for his decisions, makes objective assessments, criticizes and encourages according to what has been done and contributions, accepts and demands new ideas and solutions. Followers are productive and responsible in his absence.
- **An Expressive leader** - is one who maintains a good internal climate and group integration.
- **An Instrumental leader** - is one who initiates, shows competence where needed, and makes efforts to achieve goals.
- **A Liberal leader:** Leaves decision-making to the group or staff representatives. Exercises minimal interference, shows little interest in results.
- **A Nominal leader** - is one who is only named and designated, but in fact has no leadership positions or functions.

- **A Structural leader** - is someone who is oriented towards solving problems and has the manner of a business person;
- **A Functional leader** (organizational leader) is one who has the status of both a manager and a recognized leader. He uses the seven possible forms of power and influence: law, reward, coercion, authority, expertise, persuasion, and participation.

Theories for leadership styles are a system of generalized hypothetical statements about its nature (Tzokov, 2022).

The following theories can give you an inside about the core concepts they included:

- **Behavioural theories of leadership style** - The main point of them is that leaders are made, not born. Leadership is seen in what the leader does and how he adapts to change. These theories include:
 - *Kurt Lewin 's theory* (Kurt Lewin co-authored with Ronald Lippitt (1914 – 1986) & Ralph K. White (1907 - ?) for authoritarian , democratic and liberal leader since 1939.
 - Theory of *R. Likert* (1967) - It offers an alternative to the continuum introduced by K. Lewin and his co-authors. It is assumed that there are two types of leaders. The first are oriented towards work (structure and reward), the authors towards people and human relations. Later it turned out that there are leaders who combine the two essential features mentioned. Nevertheless, Likert describes four leadership styles based on his division:
 - dictatorial (exploitative) – authoritarian;
 - benevolently (caringly, benevolently) – authoritarian;
 - advisory;
 - participatory (of complicity).
 - Theory of R. Blake and J. Mouton (1964) for a network model of leadership styles. Five leadership styles are described:
 - **"Improvement style"** – the leader puts in little effort and seeks efficiency just to avoid being fired;
 - **"Country Club"** style, in which the leader focuses on people's needs, on good relationships, without conflicts, but at the expense of results;

- ***“Middle of the Road”*** style, in which there are more politics and compromises, a balance is sought between efficiency and high staff morale;
- ***An authoritarian and submissive style*** that focuses primarily on achieving results. People are seen as 'commodities' that perform a job. Relationships and staff morale are not taken care of.
- ***'Team leader' style*** - In this style, the leader ensures motivation and aspiration of the staff to achieve the set goals. Efficiency is combined with good relationships.

We should be also aware of the existing **Situational theories of leadership**. The main idea in them is that the leader's actions depend on the situation and the factors in it. This makes the leader's styles quite variable.

These include the following theories.

- **Path - Goal Theory** for leadership by R. House & T. Mitchell (1974). Its main focus is a description of the way in which leaders support and encourage their followers to achieve goals, so that the path to them is clear and easy. It also explains the obstacles along the way and how rewards are drawn upon following the route. When clarifying a path, precise directives (powerful approach) or only vague hints (limited approach) hints can be given. The choice of approach depends on the situation, the competencies and motivation of the followers. Thus, the following styles are outlined : supportive; directive; participative; achievement-oriented.
- **Transformational Leadership Theory**. The main idea in this theory is that people follow a person who inspires them with vision and emotions, individual attention, trust and personal integrity. In this way, he “injects” enthusiasm and energy, creates values and positive change in his followers. In addition, this type of leadership style teaches others how to help each other, to care for each other and for the organization as a whole. Leader and followers help each other to move to a higher level of morality and motivation. Transformational leader arouses admiration, loyalty and respect in his followers. The four elements of the influence of a transformational leader are: caring for the needs of each follower (mentoring and coaching), intellectual stimulation, inspiring motivation, idealizing impact (vision and sense of mission, pride, winning behaviour, respect and trust).

The differences between a manager and a leader are as follows:

- the leader is more interested in the future (a seller of hope), and the manager in the present; leaders build long-term plans, and managers trust more in short-term ones; leaders prefer changes, and managers stability;
- leaders are busy with images and vision, and managers are focused on instructions; leaders answer the question "for what", and managers the question "why";
- leaders are able to delegate power, and managers prefer to control;
- leaders use more intuition, and managers rely on logic; leaders have a broad horizon, and managers are more concerned with organizational issues.

The above differences cease to exist if the leader and manager are integrated into an ***organizational leader***.

An organizational leader can be recognized as such if he/she is:

- informally elevated and formally appointed;
- integrating tasks and interpersonal relationships;
- administrator and innovator;
- controlling and inspiring;
- stable manager and open to influence; balancer of formal and informal leadership; coordinator of power distance and equality in dialogue;
- flexible in compromising between status quo and change; appreciative of the merits of others;
- frank about mistakes;
- loyal to those who are below and above him/her in the hierarchy;
- fair and objective;
- learning from subordinates and situations.

Unit 2 The specifics of the school leaders



Based on the above unit, we can estimate the **specifics of the school leader**.

The school principal is a special kind of leader. S/he directly manages his employees and workers from the pedagogical and non-pedagogical staff, and his task is complicated by the indirect management of students and their parents, by issuing orders, organizing and leading, coordinating and controlling activities and processes in the entire school community. Therefore, to fulfil the position, he needs knowledge from pedagogy, psychology, management, sociology, economics, etc.

The school principal is obliged to implement state and regional policy, manage the budget, but also to teach, to teach. The complexity of requirements for the position of school principal stems from the economic, labour law, management and pedagogical competencies that the principal must possess.

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In a school, a leader and a manager should be two sides of the same coin. If a leader and a manager match in status and function, the so-called “organizational leader” is created – the person who is both an effective leader and an effective manager.

On the one hand, the school principal plays the role of a formal leader. A formal leader is a member of the organization who has received/acquired authority by virtue of his position to influence other members of the organization through his leadership to achieve organizational goals. He is actually an appointed person who exercises his authority as part of his role in the organization. A formal leader has the functions of a leader/manager, but also those of a formal leader. As a person who performs these two roles, he makes decisions, plans, coordinates, controls and evaluates his employees. The leader implements a policy established by the organization, but has his own management style, which affects the overall functioning of the school, determines the guidelines for its work and development.

The school principal can also be an organizational leader. This means that he was not only appointed but has shown and shows leadership qualities and informal performance of leadership roles, thanks to his qualities, skills and competencies, without using for this the formal power of authority and the powers granted to him, which are necessary in other situations and processes. The ideal organizational leader should not dominate brightly and powerfully over others. He should not only lead people but also give them a sense of direction for the successful achievement of organizational goals and should act responsibly. The organizational leader should be optimistic about the security and trust of his followers and like-minded people and constantly take care of this. He should be empathetic and understand the needs of the members of the organization not only in words, but also in deeds.

The important factors for effective leadership in education are:

- purposeful leadership of the director towards the staff;
- focusing on the goals of the entire work environment;
- visible complicity of assistant principals and head teachers;
- structured and targeted pedagogical advice;
- involving teachers and all staff in work tasks;
- stimulating and innovative training;
- maximum communication between teachers and students, parents and management;
- positive climate in the school .



Leadership skills are highly relevant in the design and implementation of e-learning. Effective leaders set clear goals and objectives for the e-learning programme. They develop a strategic vision that aligns with the overall educational or organizational goals, ensuring that the e-learning content is both engaging and effective.

Effective leadership is essential for guiding the development of high-quality e-learning courses. A strong leader can motivate team members at the school setting to set clear goals and ensure that everyone stays focused on the project's objectives.

Leaders drive innovation by encouraging the use of new technologies and methodologies in e-learning. They must be adaptable to changes in technology and pedagogical approaches, ensuring that the e-learning platform remains current and effective.



The growing presence of online education all over Europe can become a challenge for educational leaders and institutions to lead, manage, and explore in higher education. Online education can be complex when considering the social presence (Keast, 2022; Quayson, 2022), course development (Martin et al., 2019; Orlando, 2019), and economic outcomes (Burnett & Conley, 2013; Rubin, 2013; Seaman et al., 2019).

However, unravelling the fundamentals of practical leadership can help educational leaders to facilitate, maintain, and implement online education programmes. When creating online education programs, educational leaders in school settings should place a strong emphasis on practical leadership with clarity of focus in student learning, the development of curriculum, and the delivery of online teaching (Levine, 2011). Naylor and Nyanjom (2020) believed that school educators can significantly impact online education. Likewise, Keast (2020) suggested educational leaders should ensure that they have the technology management to implement online education programs. Similarly, Young (2013) suggested the successes and failures of online education and distance education programs are in the delivery method of curriculum and instruction to students and the faculty teaching the course. Subsequently, Keast (2022) recommended educational leaders should focus on course redesign when considering implementing online education programs.

To implement online education programs, Quayson (2022, 2017) revealed focusing on: (a) the structure of courses and programs with teaching and learning outcomes, (b) administrative planning with management, (c) convenience with time management, (d) communication and interaction with interesting discussions, and (e) technological support and social networking with delivery method. Likewise, Dunlap et al. (2016) explained that educational leaders should focus on purposeful design of presence and experience in online courses. Educational leaders should make it a priority to effectively train technology managers, coordinators, and administrators to ensure that they support faculty members and students on productivity, planning, coordination, and cooperation of online teaching and learning in online education programs (Bates & Sangra, 2011; Levine, 2011; Simpson, 2009). On the training of staff, Altinpulluk et al. (2020) explained that educational leaders should train staff to understand the influence of segmented educational videos to help students achieve cognitive load, satisfaction, and engagement. In addition, Choe et al. (2019) described that educational leaders and faculty members can use lecture videos to gauge student satisfaction and learning outcomes in asynchronous online courses.

Ensuring the quality of e-learning materials requires oversight and continuous improvement. Leaders establish standards and processes for reviewing and updating content, ensuring that it meets the needs of learners and stakeholders. Usually, leaders facilitate open dialogue and feedback loops to ensure that the e-learning program addresses diverse perspectives and needs. Leaders also make informed decisions about resource distribution to maximize impact and minimize waste.

Challenges are inevitable in any project. Strong leadership involves identifying problems early, analysing their root causes, and implementing effective solutions. This includes addressing technical issues, learner engagement challenges, and curriculum gaps. E-learning is not static; it evolves over time. Leaders foster a culture of continuous improvement by regularly evaluating the effectiveness of the e-learning program and making necessary adjustments based on data and feedback.

Motivating and supporting the e-learning team and learners is vital. Leaders create a positive and supportive environment that encourages creativity, professional development, and personal growth. Effective leadership and team management are critical for the successful design and implementation of e-learning courses. By understanding the importance of clear communication, setting goals and expectations, fostering a collaborative environment, and promoting continuous improvement, e-learning professionals can create high-performing teams that deliver engaging and effective online courses.



Seaman et al. (2019) instructed educational leaders to take a careful look into coursework and course design. Educational leaders should look at course design as an

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iterative process with feedforward cycle such as course reviews, peer observations, course grades, and self-reflection (Keast, 2022). Educational leaders should also include the perspectives of students, faculty members, and administrators when assessing the pedagogical purpose, theory, and reflective practice of curriculum and instructional design of online education programs including looking at connectivity of access to online learning for students (Boston & Ice, 2011).

The aim of curriculum and instructional design in online education is to transform and probe transformational teaching and learning (Burns, 2011). Indeed, Seaman et al. (2019) defined an online education course as a course in which the instructional content is delivered exclusively online. Curricular design in online education should place a strong emphasis on teaching and learning, performance, program transition, program translation, and students and faculty satisfaction (Dunlap & May, 2011). Educational leaders should focus on ongoing evaluation and revision of online course design including learning outcomes, procedures, and best practices that lead to engaged learning materials of online course life cycle (Martin et al., p. 35, 2019).



Tamir and Taylor (2019) articulated that educational leaders should understand and meet nontraditional students' needs with curricular design. Curriculum and instructional design should support the fundamental elements of online facilitation, academic community culture, accessibility, and faculty instructional concerns to overcome the barriers of online education programs (Owusu-Ansah et al., 2011). Whereas Hirsch (2017) explained that educational leaders can focus on six characteristics for effectiveness which are: regenerate, expand, particular, authentic, impact, and refine. On the other hand, educational leaders need

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to look at academic climate and know how to manage instructional design to support practical improvements for faculty and student participation in online education programs (Huang et al., 2011). Curriculum and instructional design should include lifelong learning and interactions (Masalela, 2011). Likewise, Yu et al. (2020) suggested curriculum design should place emphasis on interaction, emotional engagement, and learning persistence in online education. Educational leaders should ensure curricular design includes a checklist of websites links, videos, assignments, and due dates (Keast, 2022). Educational leaders should identify the challenges of course design, preparedness of curricular design, student demographics, and meaningful discussions to improve online curriculum and instructional design (Boston et al., 2011). Quality assurance and accountability are practical indicators to review curriculum and instructional design of online education programs (Shelton, 2011). However, Yu et al. (2020) advised educational leaders to explore the relationship between perspectives and interactions in curricular design.

Meanwhile, Quayson (2022) challenged educational leaders to investigate accountability, feedback, and obstacles of curricular design to help faculty members manage the online course. Curriculum and instructional design should be strategic, planned, have continuity during educational emergencies, and be student driven in online education (Meyer & Wilson, 2011; Meyer & Jones, 2011). In addition, Rapchak (2018) found collaborative learning to be informative in curriculum and instructional design in online education. Educational leaders should ensure that there are educational values, quality perceptions, and subjective reasoning included in curriculum and instructional design (McFarlane, 2011). Tamir and Taylor (2019) highlighted that a curriculum without an understanding of perceptions and learning is problematic for nontraditional students as well as online students. Perceived attributes such as innovators, relative advantage, compatibility, complexity, early adopters, susceptibility, absorbability, and observables are tools to promote effective curriculum and instructional design practices in online education (Keese & Shepard, 2011). Although Bigatel and Edel-Malizia (2018) suggested educational leaders adopt indicators of engaged online learning to evaluate online courses and programs.

Educational leaders should consider including administrative leadership knowledge to fundamentally design, develop, implement, access, promote, foster quality, and criticisms of online curriculum and instructional design (McFarlane, 2011). The study of Mays and Ross (2022) found that flexibility of online learning and student satisfaction can serve as indicators

of success in online education curricular. Still, Graham and Thomas (2011) claimed that educational leaders should provide certificate of completion to faculty members who participate in curriculum and instructional design sessions. Educational leaders should ensure that faculty members are recognized as course curators because they produce content that helps students to understand (Orlando, 2019). In fact, Cengage (2021) described that faculty members become optimistic to take part in online education during educational emergencies. For the same reason, Owusu-Ansah et al. (2011) explained that it is significant for educational leaders to base decisions on the structures of programs and activities when designing curriculum and instruction in online education. In designing online curriculum, students should be invited to serve as content reviewers (Keast, 2022).

Designing an effective curriculum and instruction in online education can help with practical solutions to close the achievement gap among minoritized students (Boston et al., 2011). Faculty members perspectives and expert subject knowledge about course design should be acknowledged (Valenti et al., 2019). Quality evaluation of courses should not be undermined in online education curricular design (Shelton, 2011). Administrative planning with effective management can be instrumental in evaluating online course curricular design (Quayson, 2022).

Unit 3 Characteristics of effective leaders and leadership styles to ensure innovations in education



Successful e-learning leaders possess excellent communication skills, be able to delegate tasks effectively, and foster a positive work environment. They also have a deep understanding of the learning needs of their target audience and the latest trends in e-learning technology.

One of the most important responsibilities of a leader is to set clear expectations for team members. This includes defining roles and responsibilities, establishing deadlines, and outlining performance metrics.

If you would like to become an effective educational leader, you need to think about the following:

1. Visionary Thinking:

- Ability to envision future possibilities and articulate a compelling vision for the institution or educational program.
- Setting long-term goals that inspire and motivate others.

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2. Strategic Planning:

- Developing and executing comprehensive plans to achieve the vision.
- Aligning resources, policies, and practices with strategic goals.

3. Communication Skills:

- Clear and effective communication with staff, students, parents, and community members.
- Active listening and responsiveness to feedback.

4. Emotional Intelligence:

- Understanding and managing one's own emotions and those of others.
- Empathy, social awareness, and relationship management.

5. Adaptability and Flexibility:

- Openness to change and willingness to adapt strategies as needed.
- Embracing new ideas and innovative practices.

6. Decision-Making Skills:

- Making informed and timely decisions based on data and evidence.
- Balancing risk and opportunity when considering new initiatives.

7. Integrity and Ethics:

- Acting ethically and maintaining high standards of integrity.
- Promoting fairness, transparency, and accountability.

8. Resilience:

- Persistence in the face of challenges and setbacks.
- Maintaining optimism and motivation even during difficult times.

9. Collaborative Leadership:

- Encouraging teamwork and collaboration among staff.
- Valuing diverse perspectives and fostering inclusive decision-making.

10. Professional Development:

- Commitment to ongoing learning and professional growth.
- Supporting and encouraging the professional development of staff.

Nowadays, the leader should combine various aspects and characteristics from different leadership styles. We would like to suggest those that already has been confirmed as workable and important for the educational leaders.

1. Transformational Leadership:

- Inspiring and motivating followers through a shared vision.
- Empowering and developing individuals to reach their full potential.
- Examples include [Steve Jobs](#) and [Nelson Mandela](#).

2. Servant Leadership:

- Prioritizing the needs of others and serving them first.
- Focusing on building trust and strong relationships within the organization.
- Example: [Ken Blanchard](#).

3. Distributed Leadership:

- Sharing leadership responsibilities across multiple individuals or teams.
- Encouraging collective decision-making and ownership of outcomes.
- Example: [Michael Fullan](#).

4. Instructional Leadership:

- Directly influencing teaching and learning practices.
- Providing guidance and support to improve instructional methods.
- Example: [Marzano's Framework for Instructional Leadership](#).

5. Adaptive Leadership:

- Addressing complex challenges and adapting to changing environments.
- Encouraging experimentation and learning from failures.
- Example: [Heifetz's Adaptive Leadership framework](#).

6. Innovative Leadership:

- Fostering a culture of innovation and creativity.
- Encouraging risk-taking and experimentation.
- Example: [Clayton Christensen](#).

7. Participative Leadership:

- Involving employees in decision-making processes.
- Creating a sense of ownership and commitment among staff.
- Example: [Google's "20% Time" policy](#).

By embodying these characteristics and employing these leadership styles, educational leaders can effectively drive innovation, enhance teaching and learning experiences, and create more dynamic and responsive educational institutions.

Unit 4 Building and managing high-performing teams



To create a high-performing e-learning design team, it is essential to select individuals with diverse skill sets and experience. This may include subject matter experts, instructional designers, graphic designers, and multimedia developers.

Encourage open communication and collaboration among team members by scheduling regular meetings, using project management tools, and promoting a culture of transparency and trust.

Conflicts are inevitable in any team environment. Effective leaders should be prepared to address and resolve conflicts promptly, maintaining a neutral stance and focusing on finding solutions that benefit all parties involved.

Building and managing high-performing teams is a critical aspect of leadership in any organization, including educational institutions. High-performing teams are characterized by their ability to consistently deliver exceptional results, innovate, and adapt to changing circumstances.

Here are **key steps and strategies to build and manage such teams**:

1. Define Clear Goals and Roles

- **Set SMART Goals:** Ensure that team goals are Specific, Measurable, Achievable, Relevant, and Time-bound (SMART).
- **Define Roles and Responsibilities:** Clearly outline each team member's roles and responsibilities to avoid confusion and overlap.

2. Select the Right Team Members

- **Skills and Competencies:** Choose team members with the right mix of skills and competencies required for the tasks at hand.

- **Diversity:** Promote diversity in terms of skills, experiences, and perspectives to encourage creativity and problem-solving.

3. Foster a Positive Team Culture

- **Trust and Respect:** Build a foundation of trust and mutual respect among team members.
- **Open Communication:** Encourage open and honest communication to address issues promptly and collaboratively.
- **Psychological Safety:** Create an environment where team members feel safe to take risks, express ideas, and learn from mistakes.

4. Provide Training and Development

- **Skill Enhancement:** Offer training programs to enhance team members' skills and knowledge.
- **Continuous Learning:** Encourage a culture of continuous learning and professional development.

5. Set Up Effective Processes

- **Workflow Optimization:** Establish efficient workflows and processes to streamline operations.
- **Tools and Technology:** Utilize appropriate tools and technology to support team collaboration and productivity.

6. Monitor and Evaluate Performance

- **Regular Check-ins:** Conduct regular check-ins to review progress, discuss challenges, and provide feedback.
- **Performance Metrics:** Use performance metrics to track team progress and identify areas for improvement.

7. Recognize and Reward Achievements

- **Recognition Programs:** Implement recognition programs to acknowledge individual and team achievements.
- **Rewards and Incentives:** Offer rewards and incentives to motivate team members and reinforce desired behaviors.

8. Resolve Conflicts Effectively

- **Conflict Resolution Strategies:** Develop and implement conflict resolution strategies to address disagreements constructively.

- **Mediation:** Facilitate mediation sessions if conflicts escalate beyond manageable levels.

9. Encourage Collaboration and Innovation

- **Brainstorming Sessions:** Organize regular brainstorming sessions to generate new ideas and solutions.
- **Cross-Functional Collaboration:** Encourage collaboration across different departments or teams to leverage diverse expertise.

10. Lead by Example

- **Role Modeling:** Demonstrate the behaviors and attitudes you expect from your team members.
- **Empowerment:** Empower team members to take ownership of their work and make decisions autonomously.

11. Continuous Improvement

- **Feedback Loops:** Establish feedback loops to gather input from team members and make improvements.
- **Adapt and Evolve:** Be willing to adapt and evolve team structures, processes, and strategies based on feedback and changing circumstances.

12. Celebrate Successes

- **Milestone Celebrations:** Celebrate milestones and successes to boost morale and maintain motivation.
- **Team Bonding Activities:** Organize team bonding activities to strengthen relationships and camaraderie.

By following these steps and strategies, leaders can build and manage high-performing teams that are capable of achieving outstanding results, innovating, and thriving in dynamic environments.



Selecting the right team members at school, whether for a classroom, a project, or a committee, is crucial for creating a cohesive and productive group.

Here are some strategies to help you choose the right team members:

1. Identify the Required Skills and Competencies

- **Task Analysis:** Analyze the specific tasks and responsibilities of the team. Determine what skills, knowledge, and abilities are needed to complete these tasks successfully.
- **Core Competencies:** Identify core competencies such as communication, problem-solving, leadership, and adaptability that are essential for team success.

2. Assess Individual Strengths and Interests

- **Self-Assessment Tools:** Use self-assessment tools or questionnaires to understand each student's strengths, interests, and preferred working styles.
- **Observations:** Observe students in class or extracurricular activities to gauge their natural talents and how they interact with others.

3. Consider Diversity

- **Diverse Perspectives:** Aim for a diverse team in terms of academic backgrounds, cultural perspectives, and personality types. Diversity can lead to richer discussions and more creative solutions.
- **Balanced Skill Sets:** Balance the team with a mix of analytical thinkers, creative minds, and practical doers to cover a wide range of skills.

4. Look for Compatibility and Teamwork

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- **Interpersonal Skills:** Seek out students who demonstrate good interpersonal skills, such as empathy, active listening, and the ability to collaborate effectively.
- **Team Players:** Identify students who have shown themselves to be reliable, supportive, and willing to contribute positively to a team environment.

5. Assess Motivation and Commitment

- **Interest Level:** Gauge each student's level of interest and enthusiasm for the project or task. Highly motivated students are more likely to invest time and effort into the team's success.
- **Commitment:** Look for students who show a willingness to commit to the team's goals and deadlines.

6. Conduct Interviews or Group Discussions

- **Structured Interviews:** Conduct structured interviews to ask targeted questions about students' experiences, skills, and motivations.
- **Group Discussions:** Engage students in group discussions or simulations to observe their communication skills, problem-solving abilities, and how they handle group dynamics.

7. Review Past Performance

- **Academic Records:** Review past academic records and participation in previous projects or extracurricular activities to assess performance and reliability.
- **References:** If possible, seek references from teachers or mentors who have worked closely with the students.

8. Trust Your Instincts

- **Intuition:** While data and assessments are important, don't underestimate your intuition. Sometimes, a gut feeling about a student's suitability can be valuable.
- **Trial Periods:** Consider using trial periods or short-term assignments to evaluate how well potential team members fit into the group before committing to a longer-term arrangement.

9. Communicate Expectations Clearly

- **Roles and Responsibilities:** Clearly communicate the roles, responsibilities, and expectations for each team member. Ensure that everyone understands what is expected of them.
- **Support System:** Provide support and resources to help team members succeed, such as mentorship, training, or additional guidance.

10. Foster a Growth Mindset

- **Encourage Development:** Cultivate a growth mindset by encouraging team members to view challenges as opportunities for learning and development.
- **Provide Feedback:** Regularly provide constructive feedback to help team members grow and improve their skills.

By carefully selecting team members based on their skills, compatibility, and motivation, you can create a high-performing team that is well-equipped to tackle challenges and achieve its goals.

Fostering collaboration among team members is essential for creating a cohesive and productive group. Here are some strategies to promote effective collaboration:

1. Establish Clear Goals and Objectives

- **Shared Vision:** Ensure that all team members understand and share the same vision and goals. This provides a common purpose and direction.
- **Specific Objectives:** Break down larger goals into specific, measurable objectives that each team member can contribute to.

2. Encourage Open Communication

- **Regular Meetings:** Schedule regular team meetings to discuss progress, challenges, and ideas. These meetings should be structured but also allow for open discussion.
- **Communication Channels:** Use various communication channels such as email, chat platforms, and project management tools to keep everyone informed and connected.

3. Promote Trust and Respect

- **Build Relationships:** Encourage team members to get to know each other personally. Social events, team-building activities, and informal gatherings can help build rapport.
- **Respectful Environment:** Foster a respectful environment where everyone feels valued and heard. Address conflicts promptly and fairly.

4. Assign Clear Roles and Responsibilities

- **Defined Roles:** Clearly define each team member's roles and responsibilities to avoid confusion and duplication of efforts.

- **Accountability:** Hold team members accountable for their assigned tasks while providing support and resources to help them succeed.

5. Facilitate Collaborative Decision-Making

- **Inclusive Process:** Involve all team members in the decision-making process. This fosters a sense of ownership and commitment to the outcome.
- **Consensus-Building:** Use consensus-building techniques to reach agreements that satisfy the majority while addressing concerns.

6. Provide Opportunities for Collaboration

- **Joint Projects:** Assign joint projects or tasks that require collaboration between team members. This helps them learn to work together effectively.
- **Cross-Training:** Encourage cross-training so that team members understand each other's roles and can step in to help when needed.

7. Use Collaborative Tools and Technologies

- **Project Management Software:** Utilize project management software like [Trello](#), [Asana](#), or [Microsoft Teams](#) to coordinate tasks, track progress, and share documents.
- **Cloud-Based Platforms:** Employ cloud-based platforms like Google Drive or Dropbox for easy file sharing and real-time collaboration.

8. Recognize and Reward Collaboration

- **Acknowledge Contributions:** Publicly recognize and reward team members for their collaborative efforts. This reinforces positive behavior and motivates continued cooperation.
- **Incentives:** Consider offering incentives or rewards for successful collaborative projects or initiatives.

9. Encourage a Growth Mindset

- **Embrace Mistakes:** Foster a culture where mistakes are seen as learning opportunities rather than failures. This reduces fear of failure and encourages risk-taking.
- **Continuous Improvement:** Promote continuous improvement by regularly reflecting on team processes and seeking ways to enhance collaboration.

10. Provide Training and Development

- **Collaboration Skills:** Offer training sessions on effective collaboration skills, such as active listening, conflict resolution, and negotiation.

- **Team Dynamics Workshops:** Conduct workshops on team dynamics to help team members understand how to work effectively together.

11. Lead by Example

- **Model Collaboration:** As a leader, model collaborative behavior by actively participating in team discussions, seeking input, and valuing diverse opinions.
- **Facilitate Cooperation:** Facilitate cooperation by mediating conflicts, providing guidance, and ensuring that all voices are heard.

By implementing these strategies, you can create a collaborative team environment where members work together effectively, share ideas freely, and achieve common goals.

Unit 5 Project management tools and techniques to ensure educational innovations



There are numerous project management tools available to help e-learning teams stay organized and on track. Some popular options include Asana, Trello, and Basecamp.

Establishing clear milestones and deadlines is crucial for keeping the project on schedule. Use these milestones to break down larger tasks into smaller, more manageable components.

Regularly monitor team members' progress and adjust plans as needed to ensure that the project remains on track. Use project management tools to track task completion, identify bottlenecks, and communicate updates to stakeholders.

Project management tools and techniques are essential for planning, organizing, and executing educational innovations effectively.

Here are some key tools and techniques that can help ensure successful implementation:

1. Project Management Software

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- [Trello](#): A visual project management tool that uses boards, lists, and cards to organize tasks. It's great for tracking progress and assigning tasks.
- [Asana](#): Offers features for task management, project timelines, and team collaboration. It allows for easy assignment of tasks and monitoring of progress.
- [Microsoft Project](#): A robust tool for detailed project planning, scheduling, and resource allocation. It provides Gantt charts and other visualization tools.
- [Basecamp](#): Combines project management, team communication, and file sharing in one platform. It simplifies project coordination and communication.

2. Mind Mapping Tools

- [MindMeister](#): Helps visualize ideas and concepts through mind maps. Useful for brainstorming and planning stages.
- [XMind](#): Another powerful mind mapping tool that supports hierarchical structuring and integration with other project management tools.

3. Time Tracking Tools

- [Toggl Track](#): Tracks time spent on tasks and projects. Useful for understanding how much time is allocated to different parts of the project.
- [Clockify](#): Free time tracking software that integrates with various project management tools. Provides reports and insights on time usage.

4. Document Management Systems

- [Google Drive](#): Allows for easy document creation, sharing, and collaboration. Integrates well with other Google tools.
- [Dropbox](#): A collaborative workspace for notes, docs, and wikis. Simplifies document sharing and version control.

5. Communication Tools

- [Slack](#): A popular team communication tool that offers channels for different topics and direct messaging. Integrates with many project management tools.
- [Microsoft Teams](#): Combines chat, video calls, and file sharing. Integrates seamlessly with Office 365 applications.

6. Gantt Charts

- Visual representation of project schedules. Shows start and end dates for tasks and dependencies between them. Useful for planning and tracking progress.

7. Critical Path Method (CPM)

- Identifies the sequence of tasks that must be completed on time for the entire project to finish on schedule. Helps prioritize tasks and allocate resources efficiently.

8. Work Breakdown Structure (WBS)

- Breaks down the project into smaller, manageable components. Each component represents a deliverable or sub-project. Helps in defining scope and estimating effort.

9. Risk Management

- **Risk Identification:** Identifying potential risks that could affect the project.
- **Risk Assessment:** Evaluating the likelihood and impact of identified risks.
- **Risk Response Planning:** Developing strategies to mitigate or manage risks.
- **Monitoring and Control:** Continuously monitoring risks and adjusting plans as needed.

10. Change Management

- **Change Request Process:** Establishing a formal process for handling change requests. Includes evaluation, approval, and documentation of changes.
- **Impact Analysis:** Assessing the effects of proposed changes on the project timeline, budget, and resources.

11. Stakeholder Management

- **Stakeholder Identification:** Identifying all stakeholders who have an interest in the project.
- **Stakeholder Analysis:** Understanding stakeholders' needs, expectations, and influence.
- **Communication Plan:** Developing a plan to keep stakeholders informed and engaged throughout the project.

12. Quality Management

- **Quality Planning:** Defining quality standards and metrics for the project.
- **Quality Assurance:** Implementing processes to ensure that the project meets defined quality standards.
- **Quality Control:** Monitoring and testing outputs to verify that they meet quality requirements.

13. Resource Management

- **Resource Allocation:** Assigning resources (people, equipment, materials) to tasks based on availability and skill sets.
- **Resource Leveling:** Adjusting resource allocations to balance workloads and avoid overallocation.

14. Documentation and Reporting

- **Project Charter:** A formal document outlining the project's objectives, scope, stakeholders, and initial plan.
- **Status Reports:** Regular updates on project progress, highlighting accomplishments, challenges, and next steps.
- **Lessons Learned Document:** Capturing insights and lessons learned during the project to inform future projects.

By leveraging these tools and techniques, educational innovators can effectively plan, execute, and monitor projects, ensuring that innovations are implemented smoothly and successfully.

MODULE



Name of the partner:

Polytechnic Institute of Bragança (IPB)

DESCRIPTION

1. Title of the module:

Module 7: New (self)-assessment opportunities.

2. Duration of the module

1 semester (18 contact hours and 54 total working hours)

3. ECTS credits / ECVET credits
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2 ECTS credits / 1 ECVET credit

4. Authors

Vitor Gonçalves

Elza Mesquita

Paula Vaz

Ilda Ribeiro

Learning outcomes for the course – acquired knowledge, skills, competencies (goals)

Those who have successfully completed training in this discipline:

- Will know to:

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- ✓ Understand the difference between assessment and self-assessment opportunities.
 - ✓ Identify the main (self)-assessment types and digital tools.
 - ✓ Promote the skills of reflective practice and self-monitoring.
 - ✓ Develop self-directed learning.
 - ✓ Foster academic integrity through student self-reporting of learning progress.
 - ✓ Increase student motivation.
 - ✓ Help students develop a range of personal and transferable skills.
- Will be able to:
 - ✓ Select the adequate (self)-assessment method to evaluate learners.
 - ✓ Use appropriately digital tools to create assessment opportunities.
 - ✓ Motivate students to engage with the material more deeply and incorporate self-assessment strategies.
 - ✓ Have the knowledge and prerequisites to learn more contents.
 - Will be competent to:
 - ✓ assess or (self)-assess students, according to the type of learning methodologies and contributing to higher quality e-Learning courses that better evaluate the trajectory of their learners.

5. Teaching methods

Lectures and presentations will be used toward concepts presentation to integrate new knowledge or to understand the contents sequence. Subject discussion, in person or distance, to introduce new concepts and/or deeper knowledge. Practice sessions for each tool to implement (self-)assessment strategies. Workgroup with some collaborative tools.

6. Prerequisites (knowledge and skills from previous training) and requirements for other (simultaneous) courses

- Basic understanding of e-learning design principles and the knowledge from previous modules will enhance understanding.
- Familiarity with the main types of assessment, mainly diagnostic assessment, formative assessment, summative assessment and self-assessment.

7. Content of the module

A. Short Summary

Mainly, assessing students in meaningful ways can help motivate and empower them to grow as they become agents of their own learning. In this context, teachers should use different types of assessment and self-assessment tools to promote the skills of reflective practice and self-monitoring, to acquire self-directed learning, to promote academic integrity through student self-reporting of learning progress, and to increase student motivation.

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B. Thematic content of the module

a) Lectures (6 hours)

This module includes 3 units including the following thematic content:

- 1- Assessment concepts and types – (2) hours -
- 2- (Self)-Assessment tools – (2) hours
- 3- Creation of active learning moments for (self)-assessment – (2) hours

b) Practical activities (12 hours)

This module includes 4 units, including the following oriented activities:

1. Apps or educational web applications for: (2) hours
 - creating video presentations (ScreenPal or similar)
 - transforming a video into interactive content (edpuzzle or similar)
2. Apps or educational web applications for: (4) hours
 - creating assessment activities based on questionnaires (Ms Forms or Google Forms or similar)
 - creating assessment activities based on games or gamification (Kahoot, Socrative, Quizlet, Quizizz, Nearpod, Genially or similar)
3. Apps or educational web applications for:(4) hours
 - co-creation of interactive stories (Bookcreator, StoryJumper or similar)
 - co-creation of online collaborative boards (Padlet, Lino, Wakelet or similar)
 - co-creation and collaboration through online platforms (Miro, Mural or similar)
4. Web platforms for: (2) hours
 - Creating assessment opportunities with e/b-learning platforms (Ms Teams, Google Classroom, Moodle or similar)
 - Creating assessment opportunities with MOOC platforms (Udemy, Coursera and similar)

Equipment required for the delivery of the module

To deliver the module we will need the following equipment:

- Computer and projector: A computer with presentation software (eg, PowerPoint, Keynote) and a projector will be required for presenting slides, images, and videos during the workshop or seminar.
- Whiteboard and markers: A whiteboard and markers will be useful for brainstorming, note-taking, and visualizing concepts during group discussions and activities.
- Flipchart and markers: A flipchart and markers can be used for capturing key points, summarizing discussions, and creating visual aids during the session.
- Handouts and materials: Printed handouts, worksheets, and other materials will be needed for participants to follow along and take notes during the workshop or seminar.
- Internet connection: A stable internet connection will be required for accessing online tools, apps and resources, such as articles, videos, and websites, during the session.
- Audio-visual equipment: Depending on the size of the room and the number of participants, you may need additional audio-visual equipment, such as microphones, speakers, and headsets, to ensure clear communication during the session.
- Video conferencing software: If the workshop or seminar is being delivered remotely, you will need video conferencing software, such as Zoom or Microsoft Teams, to facilitate live interaction and collaboration among participants.

8. References (main bibliography)

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9. Planned learning activities
Discussion activities, tasks to create several types of (self-)assessment, and teamwork.
10. Methods and criteria for assessment
After acquiring the basic concepts of (self)-assessment strategies, practice sessions will be promoted for each tool to implement (self)-assessment materials.
11. Language
English, Spanish, Portuguese, Bulgarian, Turkish
12. Internship/ practice
Internships or practicums in (self)-assessment opportunities provide valuable hands-on experience in the use of tools to create (self)-assessment materials.

THEMATIC CONTENT OF THE MODULE

Lectures

1- Assessment concepts and types (2 hours)

Assessment is a complex concept whose definition is polysemic, given its multifaceted nature and the diversity of interpretations it allows. Its complexity arises, in part, from the multiple dimensions involved in the assessment process, which encompass not only the measurement of performance but also the analysis of attitudes, knowledge, and contexts. The pedagogical decisions that derive from assessment, such as the choice of instruments, the definition of criteria, and the weighting of results, add a layer of complexity to its understanding.

The various conceptions of assessment, influenced by different educational paradigms, and the multiplicity of objectives that assessment can pursue, make the task of formulating a single and universally accepted definition a herculean one. Thus, assessment encompasses a wide range of practices and purposes, which leads to varied interpretations depending on the context and the purposes for which it is intended.

The democratization of educational systems and the evolution of learning theories and curricula have contributed to the evolution of the concept of assessment, its theorization, (re)conceptualization, and integration into the teaching-learning process. Assessment, as a central concept in various educational contexts, has evolved significantly over time, reflecting paradigmatic changes in the conceptions of teaching and learning.

Initially, assessment was predominantly associated with a summative perspective, being used to classify and hierarchize students based on results. This approach, defended by authors such as Tyler (1949), was aligned with a positivist view of education, oriented towards verifying the achievement of previously defined objectives. However, this view began to be questioned as criticism emerged about the inability to capture the complexity of the educational process and to consider the sociocultural contexts of students in assessment (Scriven, 1967).

With the advancement of constructivist and socio-constructivist theories, the concept of assessment began to integrate formative dimensions, prioritizing the continuous monitoring of learning and the integral development of students. Scriven (1967) pioneered in highlighting formative assessment as an essential instrument for promoting self-regulation and student involvement in their learning process. This approach proposes a more inclusive and dialogical assessment, which values the results and the processes and interactions that support them, emphasizing feedback as a tool for continuous improvement.

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Assessment plays a critical role in promoting equity and inclusion within an ecological and holistic perspective of teaching and learning (Lima, Ferreira & Cosme, 2022; Fernandes, 2012, 2021). Assessment is understood not only as a technical instrument but also as a social and ethical practice in which the diversity of students and the specificities of their contexts must be respected. This understanding reflects a transition towards a more democratic and emancipatory vision of assessment, in which students become active participants in constructing knowledge and interpreting assessment criteria, contributing to fairer and more meaningful educational practices.

1.1 Evaluation: around a concept

Guba and Lincoln (1989) introduce an innovative perspective on assessment by framing it within the paradigm of naturalist and constructivist research, breaking with traditional positivist approaches. For these authors, assessment should be understood as a process that goes beyond the mere measurement of results, assuming itself as a means of constructing meanings in specific contexts. In this sense, assessment should consider the multiple interests and values of those involved, thus recognizing the subjectivity and complexity of educational phenomena. This view contrasts with traditional models, focused on objectivity and standardization, proposing instead an approach focused on dialogue and negotiation between stakeholders.

One of the main contributions of these authors is the fourth-generation evaluation model, which is based on the active participation of different stakeholders in the evaluation process. In this model, evaluation is conceived as an interactive and collaborative process in which the perspectives of all those involved – students, teachers, managers, and other agents – are considered in the construction of value judgments. This approach values the plurality of voices, rejects the idea that evaluators hold the absolute truth and emphasizes the importance of the context and experiences lived by participants in the evaluation process.

Furthermore, Guba and Lincoln (1989) argue that evaluation should be guided by ethical and democratic principles, promoting transformation and continuous improvement. According to the authors, evaluation should not be just a technical or administrative practice but also an instrument of social change, capable of revealing and challenging inequalities and promoting inclusive practices. This understanding reinforces the need for an evaluation process that is rigorous, responsible, and committed to human and educational values.

Fernandes (2012, 2019, 2021) addresses assessment in the educational context, highlighting its essential role in students' learning and development process. For the author, assessment should be seen as a

reflective and continuous practice that goes beyond the simple assignment of “grades” and should be organically integrated into pedagogical dynamics.

In this sense, assessment should be understood as a dynamic and dialogical process that involves negotiating criteria and objectives with students, in addition to being sensitive to the context and needs of everyone. Thus, assessment should not be an end but a means to ensure effective learning and student growth. Thus, assessment should be inclusive and adapted to the diversity of students, recognizing the different ways of learning and respecting individual rhythms and characteristics. In other words, assessment should be based on ethical practice, which promotes justice and equity, avoiding discrimination or punishment.

In this sense, assessment plays a fundamental role in creating a more democratic and accessible educational environment in which all students, regardless of their particularities, can have the opportunity to demonstrate their potential and achieve their learning objectives.

In summary, we can say that originally conceived as an instrument aimed at informing various administrative processes of organization and management of educational systems, such as class formation, retention, or transition between years and study cycles, assessment is currently understood as an integrated and contextualized decision-making process. It is also assumed as a socially constructed practice and oriented towards pedagogical purposes, promoting a regulatory and formative intervention in learning.

1.2. Functions of assessment: measuring or guiding?

Corroborating Fernandes' (2021) idea, “the most fundamental purpose of assessment is to help students learn.” (p.6) and therefore, we can say that assessment is internal by nature, and this means that it is the sole responsibility of teachers and schools, that is, of the subjects who directly participate in the assessment process.

Assessment can take on several functions: i) guiding, with functions of diagnostic and prognostic didactic or other curricular function, with a view to planning and constructing a school path, which is the responsibility of the teacher; ii) regulatory, with the purpose of improving learning, using evidence-gathering strategies, by the teacher, and self- and hetero-assessment strategies that can and should be guided by the teacher, but for which the responsibility lies with the students; and iii) summative, with the purpose of a final assessment, envisaging its achievement through knowledge of the assessment object and the references associated with it.

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According to Fernandes (2021), pedagogical assessment can be conceived as a process through which teachers and students collect, analyze, interpret, discuss and use information regarding student learning (evidence of learning) with a view to a variety of purposes such as: a) identifying students' most and least successful aspects of their learning; b) monitoring students' progress in learning towards desirable levels of performance; c) distributing quality feedback to support students in their learning efforts; d) assigning grades; and e) distributing feedback to parents and guardians (p. 6).

Assessment, however, has been taking on different functions, resulting from the new demands and roles attributed to it by society. In this context, we can take into consideration the four functions proposed by Pacheco (1994): the pedagogical function, the social function, the control function and the critical function. According to the author, the most visible in educational practice is the pedagogical function since it is through this that students are ranked according to their merit and that decisions are made about whether or not to certify them. Highlighting this function, the author points out four dimensions: i) personal dimension - aims to provide information on learning paths, creating conditions for the success of most students through the process of regulating learning; ii) didactic dimension - contributing to the creation of a learning environment, through the diagnosis, improvement and verification of student results, according to the diagnostic, formative and summative nature of the assessment; iii) curricular dimension – which translates into curricular adaptations in response to the real needs of students and iv) educational dimension – functioning as a barometer of the quality of the educational system, even though educational success or failure is not the only factor that contributes to or explains the quality of that same system.

Perrenoud (1998) states that the assessment is at the center of an octagon of forces (see Figure 1).

Figure 1

Assessment - octagon of forces (Source: Perrenoud, 1998)



When analyzing Figure 1, we can see the central role of assessment, which regulates the relationship between teachers, schools, and families and is often held hostage by prejudices and desires generated during school socialization, which makes assessment an exercise in measurement, classification, and sanctioning, and written tests its main operating instrument.

Let us focus our attention on the 3 types of assessment most commonly used in an educational context:

i) diagnostic assessment, ii) formative assessment, and iii) summative assessment.

1.2.1 diagnostic evaluation

Diagnostic assessment is an essential component of the educational process, designed to identify students' starting point in terms of their learning. The main objective of this type of assessment is to gather information, mainly about students' knowledge and needs, before the start of a new cycle, unit or learning experience. It assumes a predictive and guiding function, allowing the teacher to adapt teaching and learning strategies according to the data obtained.

Fernandes (2012, 2019) highlights that diagnostic assessment should not be seen as a formal and bureaucratic process but as a dynamic and intentional practice which may use a variety of methods and instruments. These may include informal activities, such as exploratory conversations, or more structured activities, such as diagnostic tests. What is important is to understand the potentialities and difficulties of everyone, in order to plan diversified and more meaningful pedagogical interventions.

The diagnostic assessment will be a starting point for further learning and further development.

Diagnostic assessment is often discussed as a dimension that can be integrated into the broader scope of formative assessment. However, it maintains specific characteristics that justify its identification as a particular moment or approach in the assessment process.

Lima, Ferreira and Cosme (2022) reinforce the idea that diagnostic assessment plays a relevant role but emphasize that it should be considered an integral part of a broader assessment process. According to the authors, assessment cannot be compartmentalized into separate stages but should be understood as a pedagogical practice that always aims to improve learning. In this sense, diagnostic assessment constitutes an initial and essential stage of formative assessment, functioning as a basis for planning teaching strategies and promoting educational success.

1.2.1. Formative assessment

Formative assessment, also known as assessment for learning, provides for the continuous improvement of students' learning through the way it allows strategies and tasks to be adjusted to each student and therefore allows the regulation of learning (Perrenoud, 1998; Fernandes, 2008; 2019, 2021).

Fernandes (2021) argues that assessment should be formative in nature, focused on improving learning and offering opportunities for feedback and self-assessment. This type of assessment allows students to reflect on their progress and identify areas that need improvement, promoting self-regulation and autonomy in learning.

Black and Wiliam (1998) define formative assessment as that which includes all activities concurrent to the collection of information that can be used to improve teaching and learning and to adapt teaching and learning to the actual needs of students.

According to article 22 of Decree-Law no. 55/2018, of July 6, which establishes the curriculum for basic and secondary education and the guiding principles for the assessment of learning, we can read that

Assessment, supported by a formative dimension, is an integral part of teaching and learning, with the central objective of improving it based on a continuous process of pedagogical intervention, in which learning, expected performances and assessment procedures are explained as references.

Formative assessment is an essential component of the teaching and learning process and should be used exclusively to gather information that enables the provision of constructive and high-quality feedback. This feedback aims to support students in improving their learning, guiding them towards continuous development. In simple terms, formative assessment provides information about what and how students learn.

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For Gouveia and Cosme (2021), “formative assessment plays a fundamental role, as it aims to help teachers and students understand what can be done to help them teach and learn better, in a continuous and transparent process” (pp. 24-25), which is why it is so important to carry out this assessment. In this way, they warn of a regular practice of formative assessment to substantially influence students' academic path, since it allows them to understand what they should learn at a given moment, assess their progress in relation to the learning objectives and identify the efforts necessary to successfully achieve them. It will therefore be an assessment for learning, the characteristics of which can be seen in figure 2, which presents Harlen's proposal (2006).

Figure 2

Assessment for learning (Harlen, 2006, adapted by Araújo, 2015)



According to Figure 2, students are at the center of the assessment, showing that the assessment process is focused on their performance and the development of their learning, reflecting the centrality principle in the learner. The objectives are also present and give the idea that they are the starting point and serve as a central reference to guide the entire assessment process. These objectives guide both the definition of activities and the assessment criteria. The process also includes the collection of evidence of learning, carried out based on the established objectives, followed by interpreting this evidence. This interpretation allows us to understand the progress of students in relation to the previously defined criteria. Based on this evidence, decisions are made about the next steps, such as adjusting teaching strategies or providing targeted feedback. These decisions aim to support student progress and promote more meaningful learning. Finally, the scheme presents assessment as a cyclical and dynamic process,

where decisions lead to new stages of learning, generating a continuous cycle of improvement and success.

1.2.2. Summative assessment

Summative assessment, also known as learning assessment, is the time in which teachers summarize the data collected throughout the teaching-learning process (Fernandes, 2008, 2019). It usually occurs at the end of a thematic and curricular unit; summative assessment takes stock of “what students know and are capable of doing at a given moment” (Fernandes, 2008, p. 358).

In general, summative assessment informs about what students have learned, that is, it is the result of the teaching and learning process. Essentially, it is what we call a learning assessment (Figure 3).

Figure 3

Assessment of learning (Harlen, 2006, adapted by Araújo, 2015)



Figure 3 presents a diagram related to the assessment of learning, highlighting its summative nature. The process begins with the completion of regular tasks or activities, which serve as a starting point for collecting evidence of student learning. This evidence is collected based on previously defined objectives, ensuring its relevance and alignment with the established criteria. The evidence collected then goes through an interpretation phase, in which it is analyzed to assess student performance in relation to the defined criteria. This stage culminates in a value judgment on performance, which is explicitly referenced in the criteria, giving rigor and objectivity to the evaluation process.

Finally, summative assessment generates information about student performance, which can be used to document the results obtained and support certification or decision-making processes. This model is

characterized by being linear and aimed at obtaining a final judgment about learning, distinguished by its focus on measuring results at specific moments, such as the end of a cycle or teaching unit.

In short, it emphasizes and corroborates the idea of Fernandes (2012) that a balance between formative and summative assessment is necessary. While formative assessment highlights the continuous monitoring and promotion of development throughout the educational process, summative assessment is relevant for certification and verification of compliance with learning objectives. Now, following this premise, we can state that summative assessment should be carried out in conjunction with formative assessment, being developed at times when students are expected to have consolidated their learning. Its main purpose will be to take stock of students' progress, which may or may not result in a classification, depending on the objectives of the assessment process.

Thematic content of the module

Lectures

2- (Self)-Assessment tools (2 hours)

Assessment is a crucial component of the educational process, as it not only measures student performance, but also guides pedagogical practice and learning management.

When we talk about assessment, we find references to different types of assessment: diagnostic; formative; summative; criterion-referenced; normative; reflective; prognostic; and holistic. Recently, and considering the advances in Artificial Intelligence, we have also started to talk about automatic (or automated) assessment, which is more focused on self-assessment tests.

The diagnostic evaluation – is used to identify needs, gaps or initial conditions prior to a plan or intervention.

Tool examples:

- *PHQ-9*(Diagnosis of depression

<https://multiculturalmentalhealth.ca/wp-content/uploads/2019/07/PHQ-9-Portuguese.pdf>).

- *Holland Code Career Test*(Exploration of professional interests

<https://www.mycit.ie/contentfiles/Careers/Self%20Assessment%20Files/Self-assessment%20Holland-Code.pdf>).

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- Learning Styles Tests

(e.g. VARK -<https://vark-learn.com/questionario-vark-2/>).<https://vark-learn.com/>

- CliftonStrengths Test (Talent Identification)

<https://www.earthgifts.com.au/ebook/StrengthsFinder.pdf?srsId=AfmBOoqo1wW0dbJie0J5Atw5rRAuQRxqB6S9aIzIeY5uftCh2aM2Xftd>).

- *SkillScan*– Assesses transferable skills for professions.
- Self-assessment tests (e.g. OnlineExamMaker).

Formative assessment- is highlighted as an essential approach, characterized by being contextualized, flexible and interactive, occurring throughout the teaching-learning process. For Black and Wiliam (1998), formative assessment is fundamental to promote learning, as it allows students to identify progress and identify their difficulties, adjusting study strategies according to the feedback received. It thus focuses on monitoring and continuous improvement during a process or project.

Tool examples:

- Digital portfolios (e.g. Padlet -<https://padlet.com/>; Mahara -<https://mahara.org/>) – Allow for continuous reflection on learning).
- Time management apps (RescueTime -<https://www.rescuetime.com/>, Trello -<https://trello.com/>).
- *Kahoot* Quizlet to check learning progress.
- Self-assessment rubrics for assignments or presentations.
- 360-degree feedback (self-assessment + peer assessment).

Feedback is a central element in formative assessment. The effectiveness of feedback depends on its speed and consistency, and students need to receive clear information about their performance. Feedback should be specific and geared towards improving learning, allowing students to understand not only what they did wrong but also how they can correct their mistakes. This concept was later reinforced by Hattie and Timperley (2007), who stated that feedback should be directed at the content, process, and self-regulation of learning.

Summative assessment– makes a final or conclusive judgment on results or performances.

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Tool examples:

- Self-assessment rubrics (e.g. for academic work or projects).
- Performance evaluation tools in companies (OKRs, KPIs).
- Tests like MBTI or Big Five for ultimate personality reports.

Criterion-referenced assessment –compares an individual's performance against a set of predefined criteria or standards.

Tool Examples:

- Common European Framework of Reference for Languages (CEFR) – Language skills

(<https://www.cambridgeenglish.org/br/exams-and-tests/cefr/>).

- Apps like Duolingo and Babbel.
- EQ (Emotional Intelligence) tests with clear standards.

Normative assessment– compares the results of an individual or group with a statistical standard or with other participants.

Tool examples:

- *DISC Assessment*(compare behaviors with general patterns).
- *CareerExplorer*(maps skills and interests against a database).
- Normative tests to understand productivity (Toggl Track, Clockify).

Reflective assessment– focuses on self-knowledge, being an individual practice to promote introspection.

Tool examples:

- Reflective journals or apps like Daylio.
- Self-awareness tests (e.g. Mindfulness Questionnaires).
- Assessment of values and priorities with tools such as Personal Values Assessment.

Prognostic evaluation– is intended to predict future potentials based on the current state.

Tool examples:

- *CliftonStrengths*– Talent-based success prediction.
- Cognitive aptitude tests for specific professions.
- Physical health assessments based on indicators such as VO2 Max (wearables).

Holistic assessment –addresses multiple aspects of the individual (physical, emotional, intellectual, etc.).

Tool examples:

- *Emotional Intelligence Appraisal*– Combines emotions and performance.
- Integrated wellness tools like Wellness360.
- Quality of life questionnaires such as WHOQOL.

In addition to the types of assessment indicated, we highlight the importance of oral and written assessment methods and techniques.

Oral assessment, for example, should consider technological mediation, especially in the context of distance learning. It is essential that the questions are clear and representative of the content to be assessed to avoid demotivating students by delving into areas they do not master.

On the other hand, written assessment can include papers such as essays, reports, and text analyses, allowing students to demonstrate the knowledge they have acquired. Using rubrics for assessing papers is a recommended practice, as it provides clear and objective criteria, facilitating transparency in the assessment process.

Self-assessment and peer assessment are also valuable tools in the learning process. When we talk about self-assessment tools, they can be useful in a variety of contexts, such as personal development, education, health, career or professional performance. Self-assessment thus allows students to reflect on their own performance and identify areas for improvement, promoting self-regulation and autonomy in learning.

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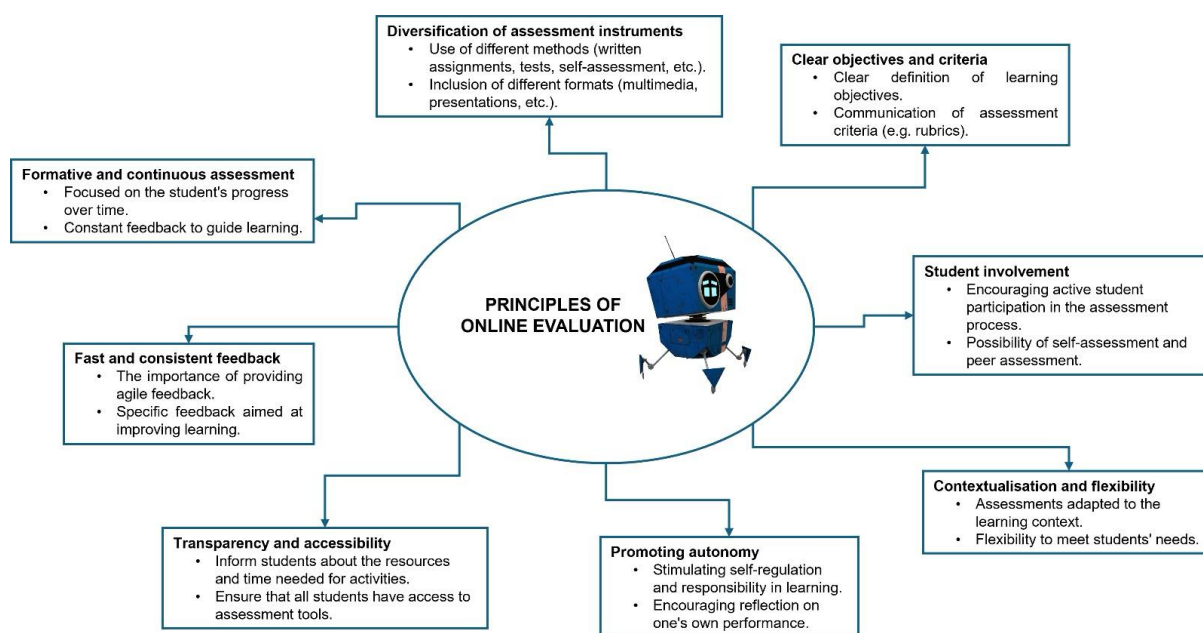
Peer assessment, in turn, involves students in peer assessment, which can enrich the learning experience and foster a collaborative environment. According to Topping (1998), peer assessment improves understanding of the content but also enables the development of social and communication skills; that is, it contributes to developing essential interpersonal skills.

When we talk about assessment in the online environment, we must consider that it goes beyond the simple transposition of more traditional methods to the virtual environment. It requires an approach that takes into account the particularities of this context, guided by principles that guarantee the quality and effectiveness of the process.

Figure 4 presents a set of principles that underpin online assessment.

Figure 4

Principles of online assessment.



Source: Own elaboration (2025)

When analyzing these principles, we realize that assessment in the online context requires a careful approach supported by specific principles that guarantee the effectiveness and fairness of the process, also serving as a basis for the implementation of various assessment strategies, including oral assessment, written assessment, self-assessment and peer assessment.

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Module 7 of the training course emphasizes the need to prioritize formative and continuous assessment, diversifying the assessment tools that allow for rapid and constant feedback. It is essential that students are informed about the assessment criteria and tools, as well as the specific objectives of each activity. Transparency in the assessment process makes students feel confident and motivated to actively participate in their learning. In this sense, we argue that assessment should be understood as a dynamic and interactive process that goes beyond the simple measurement of results.

Thematic content of the module

Lectures

3- Creation of active learning moments for (self)-assessment (2 hours)

Below are presented different active methodologies, a brief description of each one and reading suggestions for further study.

3.1 Flipped classroom

In the flipped classroom, the teacher prepares a set of materials in advance, such as short videos, PowerPoint presentations, text selections, articles, and chapters, which are made available online before the classes, in good time, so that students can view, read, and study them in advance. The time when teachers and students meet will be dedicated to going over more complex content in more depth, clarifying doubts, carrying out practical activities, and providing worksheets that can play a dual role in determining whether students are actually doing their homework and whether they are actually acquiring knowledge and skills. The teacher can also provide worksheets, checklists, and guided questions that students can use to self-assess their knowledge.

The flipped classroom assumes that the work that the student carries out independently at home corresponds to the lowest levels of Bloom's Taxonomy (watching videos and presentations; reading texts; researching other materials), progressing, level by level, to the highest level, planned for a given learning unit (Schneiders, 2018) and, as already understood, there will always be a moment of interaction to clarify doubts or content that the student did not understand. In addition, the teacher has the autonomy to select which content he/she wants to teach using this methodology.

Nunes and Bessa (2017) and Schneiders (2018) present several steps to consider in the context of the flipped classroom and for it to be successful. Based on these authors, a summary of the main steps to be carried out is presented below, adding considerations in order to clarify each step further.

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Firstly, the teacher must plan in advance the set of contents that he intends to teach in the flipped classroom mode (it does not have to be all the contents of a learning unit, just those that he considers).

The teacher prepares short videos (5 to 8 minutes) and explanatory presentations, selects written information (texts, articles, chapters, books) that may complement the information that he/she intends to present in the videos and presentations, choose other videos, links of interest or online resources that may be important, highlights content that may be more difficult to understand and that, therefore, should be the subject of practical work in class and, also, decides on the most appropriate way(s) to assess whether that content has been assimilated, understood and learned by the students (Bergman & Sams, 2012).

ScreenPal or LOOM stand out as video recording tools (screen recorder and video editor), which allow teachers to record short videos illustrated with electronic presentations or other materials or computer applications that they have on their computers (Gonçalves, 2020).

Once prepared, it is up to the teacher to make the different materials available. Microsoft Teams and Google Classroom are two free-to-use platforms that have become increasingly popular. Microsoft Teams, used as part of Office 365, provides opportunities for interaction between teachers and students that go beyond providing resources (creation of teams, video conference meetings, chats, completion of online tasks proposed by teachers, scheduling of activities) (Gonçalves, 2020).

Also, in Google Classroom, it is possible to provide...anything related to gamification, a reward, such as a medal or gift..., or anything related to making different resources available, such as files, links, videos, activities, assignments, and questionnaires.

When watching the videos, students can stop, watch again, rewind, watch again later, record their questions, and summarize the content (Bergman & Sams, 2012). Thus, with organization, it will be easier to interact with the teacher in the classroom (physical or virtual).

The teacher's involvement does not end with preparing materials to be made available to students. After students have completed their work at home, once they are in the classroom (physical or virtual), the teacher is responsible for: going into more complex content, clarifying doubts, encouraging reflection, and carrying out different practical activities under their guidance, in which students use the knowledge they have previously acquired. These activities should allow for the verification of whether tasks have been effectively completed at home and for monitoring the student's learning and progress. Although assessment begins in class, through the aforementioned monitoring, it may take on a more formal

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character afterward. Technology has also been playing a prominent role in the context of assessment, preferably when it is formative. There are several examples, including Goggle forms, Microsoft forms, nearpod, Kahoot!, Socrative, Quizlet and Quizizz, which are the most widely used and free to use. They allow students to ask different types of questions, including multiple choice and true/false, and which allow students to respond and obtain a result in a timely manner, giving them information about the knowledge they are acquiring and the knowledge they should invest more in.

Once the previous steps have been completed, students are asked to develop a digital production, which can take the form of a short video about the content studied, worked on and learned, using, for example, the same video recording tools with screen recording, as mentioned above. This production should be considered in the student's assessment. Making the video itself can be a moment of self-assessment of their own learning and acquired knowledge.

3.2 Gamification

Gamification consists of using game elements and mechanics, such as rules, increasing difficulty levels, competition/cooperation, scoring, rewards and feedback (Alves, 2015), with the aim of making the class more attractive, motivating students and, thus, increasing their involvement, autonomy and responsibility for their own learning (Filatro & Cavalcanti, 2018). Elements characteristic of games are used in other contexts, in this case, learning (Filatro & Cavalcanti, 2018). In this way, students are expected to “feel challenged to learn in the same way they feel challenged when playing their favorite games” (Tavares, 2019, p.5). Activities can be carried out by students individually or in small teams (Camargo & Daros, 2018). Thus, it is also intended to promote creative thinking, innovation, leadership skills, and collaboration on the part of students (Filatro & Cavalcanti, 2018).

This strategy can be used when the teacher considers that it is appropriate for certain content. If used in moderation, it can promote student and teacher involvement, interaction, and motivate students to learn, especially since the feeling of protagonism experienced by them can also contribute to their motivation (Filatro & Cavalcanti, 2018) and be a way for students to self-evaluate the knowledge acquired.

The use of technologies to implement this methodology can involve the use of different online tools that suit their potential, such as Kahoot!, Socrative, Quizizz, Microsoft Forms, Google Forms, and Gennialy (Gonçalves, 2020). In Kahoot!, teachers can suggest multiple-choice and true/false exercises. In addition to this type of exercise, Socrative also allows short-answer exercises. In addition to all the types of

exercises mentioned for the two previous tools, Quizizz allows open-ended questions and surveys. In Microsoft Forms and Google Forms, teachers can, for example, propose questionnaires with multiple-choice, true/false questions, and different linear scales (Gonçalves, 2020). The Gennialy tool also allows the creation of gamified interactive content.

3.3 Problem-based learning

In this methodology, problem situations are used to construct new knowledge (Filatro & Cavalcanti, 2018). Thus, preferably in groups or individually, students are called upon to find solutions to a problem that is presented to them.

This is a methodology that can be used in the classroom, or using online communication strategies, between teacher and students, available on the platforms that schools have to interact with their students (see examples mentioned above) and where it is possible to communicate through discussion forums, private messages, chats, videoconferencing, consult and make documents available, among others (Filatro & Cavalcanti, 2018).

The problem to be solved can be proposed by either the teacher or the students, and it is important that it is simple and objective and that it promotes the students' motivation to get involved in the process that will lead them to its resolution (Filatro & Cavalcanti, 2018).

Santos et al. (2007) and the University of Maastricht (nd) present a sequence of steps to consider for the successful implementation of this active methodology: Presentation/discussion of the problem, brainstorming, analysis and systematization of its results, Formulation of learning objectives for the missing knowledge, Independent study, individually or in small groups, identification of aspects that may be hindering the resolution of the problem, presentation and discussion of the findings

During the implementation of this methodology, the teacher must assume the role of facilitator of the process, ensure that all students are progressing, and give them regular feedback on their work (Boronat, 2008).

Thematic content of the module

Practical activities

1. Apps or educational web applications for: (2) hours

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- creating video presentations (ScreenPal or similar)
- transforming a video into interactive content (edpuzzle or similar)

<https://screenpal.com/tutorials>

<https://edpuzzle.com/getting-started>

2. Apps or educational web applications for: (4) hours

- creating assessment activities based on questionnaires (Ms Forms or Google Forms or similar)
- creating assessment activities based on games or gamification (Kahoot, Socrative, Quizlet, Quizizz, Nearpod, Genially or similar)

<https://support.microsoft.com/en-us/forms>

<https://www.google.com/intl/en-GB/forms/about/>

<https://support.kahoot.com/hc/en-us>

<https://help.socrative.com/en/>

<https://help.quizlet.com/hc/>

<https://quizizz.com/home/resources?lng=en>

<https://nearpod.zendesk.com/hc/en-us>

https://help.genially.com/lang/en_us/

3. Apps or educational web applications for:(4) hours

- co-creation of interactive stories (Bookcreator, StoryJumper or similar)
- co-creation of online collaborative boards (Padlet, Lino, Wakelet or similar)
- co-creation and collaboration through online platforms (Miro, Mural or similar)

<https://bookcreator.com/resources/>

<https://www.storyjumper.com/main/classroom>

<https://padlet.help/>

<https://help.wakelet.com>

<https://help.miro.com>

<https://support.mural.co/>

4. Web platforms for: (2) hours

- Creating assessment opportunities with e/b-learning platforms (Ms Teams, Google Classroom, Moodle or similar)
- Creating assessment opportunities with MOOC platforms (Udemy, Coursera and similar)

<https://support.microsoft.com/en-us/office/microsoft-teams-video-training-4f108e54-240b-4351-8084-b1089f0d21d7>

https://edu.google.com/for-educators/product-guides/classroom/?modal_active=none

Microsoft Teams

The teaching-learning process can use e-learning platforms and other digital technologies to support online communication and interaction, such as Microsoft Teams, Google Classroom, Moodle, Zoom, Webex, Google Meet, Skype, TeamSpeak, Jitsi, Open Meetings, among others.

Obviously, the need for teacher training for online teaching cannot be restricted to the acquisition of digital skills, but also to pedagogical training and the level of educational content and corresponding intersections between these dimensions, as described in the TPACK (Technological Pedagogical Content Knowledge) model as a theoretical model formulated to understand and describe the types of knowledge needed by an educator or teacher for effective pedagogical practice in a learning environment equipped with technology (Mishra & Koehler, 2006; Marcos & Gonçalves, 2022). In this context, the urgency of improving, adapting and/or adapting pedagogies for teaching and using technologies for educational purposes also emerges. This aspect does not seem to be resolved quickly and effectively, as it requires involvement, dedication, commitment and work among peers from all teachers. It is therefore essential to promote, through the implementation of more collective activities, the sharing of experiences, reflection and debate among peers, the involvement and participation of teachers so that their training is more inclusive and participatory.

In addition to the technical-digital and pedagogical aspects, there is also the need to design and produce quality content so that students can understand and learn more easily about subjects in other subject areas. Thus, improving the quality of content, creating more pedagogical activities that provide teachers with greater participation and involvement in learning, adapting the language of the content, facilitating its understanding and promoting everyone's involvement in the activities, improving the way it is explained and implementing more technical activities (instead of theoretical ones) that motivate teachers to learn seem to be absolutely essential aspects for improving the quality of teacher training and, consequently, for improving the quality of the online teaching-learning process.

Educational Potential of Microsoft Teams

Teams, together with other Office 365 applications and services, is a relatively recent example of the integration of technologies in educational institutions, particularly in the teaching-learning process. As an application that can be used on the desktop (Windows and Macintosh), on the web or on mobile devices (Android, iOS, Windows Phone), it is one of the most interesting tools in Office 365, as it provides its users, particularly educational agents (students, teachers, staff, principals and guardians), with a range of advantages in its use, from the possibility of synchronous communication, via videoconferencing and chat, between the various actors to collaboration between peers through the tools it offers.

Naturally, communication and interaction between peers, online socialization, engagement, collaborative and cooperative work, sharing of documents, presentations and files, creating virtual rooms, channels and work teams, direct access to other Office 365 tools, assigning tasks to team members, among other features, are absolutely fundamental to achieving a closer, more current and efficient teaching-learning process. In addition to these features, it is worth highlighting the fact that the environment in general and the tools, in particular, are quite intuitive and easy to access and use for any educational agent.

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To understand, in detail and in-depth, the educational potential of Teams, this application's main tools and functionalities that are absolutely essential to its operation are identified and characterized below.

Profile configuration

Activity

Conversation

Teams

Works

Calendar

Calls

Videoconference

Files

OneNote

All the tools and features that Teams offers are essential for interaction and collaboration between other stakeholders in the teaching-learning process. These tools enable everyone to acquire or improve their digital skills and, at the same time, contribute to improving the quality of the teaching-learning process in its various dimensions. It is, of course, up to all educational agents to be willing to try out and use these tools, which can greatly contribute to more dynamic, motivating and interesting teaching sessions.

Google Suite for Education

As a result of the technological evolution that is taking place, Google for Education has been offering services that are increasingly suited to the needs of schools. With Google Workspace for Education applications, teachers and students can have options to facilitate collaboration, simplify teaching and maintain a safe learning environment, meeting the needs of each institution. The applications and services provided by this tool allow: i) continuous collaboration in real-time (Google Docs, Slides, Sheets, Drive, Forms, etc.); ii) increased productivity, engagement and learning by offering easy-to-use tools to help simplify tasks and save time (Classroom, Groups and Assignments); iii) flexible communication via email, chat and video (Gmail, Chat and Meet); iv) organization of tasks, creating lists and reminders of tasks and meeting agendas (Calendar, Keep and Tasks); in addition to v) protection against digital threats through several layers of security (Admin). These tools enable an inclusive learning environment with individual accessibility settings that adapt to each student's learning style. We highlight just a few of them for their highest level of use and recognition.

Google Docs, Slides and Sheets

Google Forms

Google Drive

Google Classroom

Google Classroom

Classroom allows you to set up a virtual space that can be used in an e-learning context or as a complement to the teaching and learning process in b-learning modalities. This application allows you to create a virtual learning environment and allows integration with other Google for Education tools or

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services, such as: Gmail, Google Calendar, Google Contacts, Google Drive, Google Books, Google Docs, Google Sheets, Google Slides, Google Sites, Google Meet, among others. In this section, we will focus on describing Google Classroom, as a web service that allows users to create and participate in classes. By using Google Classroom, end users can create or participate in training groups. Teachers can distribute and correct assignments and students can view and submit these assignments. This application can also be accessed via smartphone, and all you need to do is install the respective app from the Play Store or Apple Store. Classroom allows you to create classes, publish messages and create various forms of assessment; receiving student work and associating it with other Google tools mentioned above.

The main features are limited to creating classes where we will have access to the environment that involves the teacher and the specific students of that class. The teacher has a menu on the right side with access to the calendar and the classes that he/she teaches or has taught. At the top or main area, there is access to the Stream, Classwork, People and Grades.

Class definitions

The settings apply to invite links and class codes, as well as streaming and creating categories to establish a student's final grade.

Calendar

The calendar, which was initially created, allows you to schedule assessment times and organize the deadlines for assignments, activities and tasks assigned to students, as well as to organize the class schedule internally. This tool allows you to view all scheduled events and create new ones using the “New meeting” button in the top right corner or directly by double-clicking on the day/time on the calendar. The link to the class calendar on Google Calendar is used to record assignment dates and other relevant moments.

Stream

This corresponds to the platform's wall and also serves as a space for communication and debate between teachers and students. The stream has the appearance of a social network. Posting messages is the most common form of communication between students and teachers. In this space, it is possible to publish clarifications or comments on aspects for all students in that class or only for those selected. Notification texts may or may not contain attachments (files, videos, or links) and can be scheduled if immediate publication is not desired.

Classwork

It accommodates the set of contents or tasks (work, work with questionnaires, questions or materials), organized by topics or themes, that the teacher makes available to the class. The process of

submitting the work is also an easy and intuitive process. Students can submit or send the work assigned to them by clicking on one of the icons available on the home interface where they choose the class. After receiving the work from the students, it is possible to encourage reflection with them on it.

People

This is the space where teachers and students are listed, as well as each member's class code and permissions. The teacher can send messages directly via email. As mentioned, the teacher can give students permission to comment or to publish and comment in settings.

Notes

In the classifications, we can check the status of a given piece of work (e.g., who submitted it, which pieces of work were returned, and the assessment of each piece of work).

Class Drive Folder

We must highlight that each class will have a default link to the Google Drive folder where all documents and other educational materials will be stored. The link to the Google Drive application allows for efficient organization of the resources provided by the teacher and the work submitted by students organized into subfolders by work. Access to this folder is available in the initial Classroom class selection interface and in the top right corner of each class interface.

Videoconference

As with other online learning platforms, video conferencing can be a necessary synchronous tool in Google Classroom. Google Meet can be set up for this. Meeting recording and transcription functionality is enabled by default, but users may also need to enable Google Drive and Google Docs.

Files

This tool allows you to store a set of files in different formats that are saved in the cloud, i.e., on Google Drive. There are two ways to store files: the first is through Google Drive, where the user can upload or download them, and the second is through. Whenever a user receives a specific file via chat, they can immediately download it, making it available in the “Downloads” option and also in “Recent”. This tool is very useful as a support for the teaching-learning process, as it allows educational agents to share, in real time, a set of files (educational content) necessary for the development of learning.

All the tools and features that Teams offers are essential for interaction and collaboration between other stakeholders in the teaching-learning process. These tools enable everyone to acquire or improve their digital skills and, at the same time, contribute to improving the quality of the teaching-learning process in its various dimensions. It is, of course, up to all educational agents to be willing to try out and use these tools, which can greatly contribute to more dynamic, motivating and interesting teaching sessions.

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MOOC (Massive Open Online Courses)

In this section, a set of digital platforms that support MOOCs are identified, focusing particularly on Udemy.

Unlike today, the first MOOCs that emerged were not supported by a specific platform. Today, any educational institution can be a MOOC provider if it has a digital platform or uses an existing open-source solution.

Currently, there are for-profit MOOC providers such as Coursera, Udacity and Udemy. EdX is a non-profit, open-source MOOC provider, so it is available to any educational institution that wants to provide its own courses. In addition to these, there are other providers and platforms for creating and distributing MOOCs, such as Canvas Network, CourseSites, P2PU - Peer-to-Peer University, and OpenClass. In addition to these providers, some of the best-known Learning Management Systems (LMS), such as Moodle or Sakai, have also been used to offer MOOCs.

Below, the top 10 digital platforms that offer MOOC courses are identified and characterized. It is important to note that the platforms are ordered alphabetically and Udemy, although already characterized previously, is also included in this group:

- Coursera
- edX
- Future Learn
- Khan Academy
- OpenupEd
- Udacity

In addition to these platforms, some of the best-known LMS platforms also stand out, such as Moodle or Sakai. Google Coursebuilder is also an example of a platform geared towards MOOC development.

Udemy

Founded by Eren Bali and Oktay Caglar, Udemy currently has over 35 million students, 57,000 instructors, 130,000 courses (free and with associated costs), 400 million course enrolments, 110 million minutes of video, over 65 languages, over 7,000 corporate clients and, finally, of the Fortune 100 companies, Udemy seems to trust Udemy for employee training. It is important to note that the over 130,000 courses offered by Udemy cover different areas of knowledge, for example: development, business, finance and accounting, IT and software, office productivity, personal development, design, marketing, lifestyle, photography and video, health and fitness, music and teaching and academic study. Of course, for each of these areas of knowledge, there is a vast set of sub-areas comprising hundreds or even thousands of courses available worldwide.

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Unlike other platforms, Udemy allows you to create courses without any institutional connection (useful for any individual promoter who wants to develop and disseminate their own MOOCs). It is an intuitive platform whose content is in video format and, perhaps for this reason, it is very easy to create a course that, once approved by Udemy, is immediately published and disseminated worldwide.

Below is a list of Udemy's basic features, from registering on the platform to enrolling in a MOOC:

-Registration: the participant (student) and the instructor (teacher) can register on Udemy, namely, through the following address www.udemy.com. To register on the platform, it is mandatory to enter the full name, email address and password for access.

-Login: can be done, using the option available in the top right corner, in four different ways: Facebook, Google, Apple or by directly entering the email address and the respective password created during registration.

- Profile configuration: using the button in the top right corner, the user/instructor can configure their profile (first name, last name, profession or title, biography, language, website address, social media address, profile picture and privacy settings). In addition, the profile can be viewed in "public" mode. The user, whether as a student or instructor, can also configure the notifications to be received by Udemy. Among other additional features, the user can also consult the report on revenue from the publication and delivery of their MOOCs.

-Navigation panel: the navigation panel or menu, located on the left side of the Udemy Home page, includes four options:

- Courses: location where all published courses are available;
- Communication: includes options such as questions and answers, highlighted questions, messages, tasks and announcements;
- Performance: overview, students, assessments, course engagement and traffic and conversion;
- Tools: A place where you can submit test videos to receive free feedback from Udemy experts on audio and video. You can also use the Insights Marketplace to get market data to help you create successful courses.

- Enrolling in a course: there are free and paid courses. In the case of free courses, to enrol, the student simply needs to select the MOOC they want and click on "enrol now". In the case of paid courses, the procedure is slightly different: to enrol, the student must select the MOOC they want and click on "add to cart" or "buy course". The user is then redirected to the checkout page.

Steps to create a MOOC on Udemy

In addition to the features identified in the previous section, the following are the ten steps that allow you to create a MOOC on Udemy, namely:

1. Creating a course: to create a MOOC, you must enter the instructor profile and click on "new course".
2. Select course type: the instructor must choose the course he/she wants to create, namely, course (video classes, tests, exercises, ...) or simulation (preparation for certification exams, ...).
3. Assign a title to the course: phase of assigning a name to the MOOC.
4. Categorize the course: category assignment phase (which is equivalent to the areas of knowledge identified at the beginning of this section).

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5. Establishing course time: the instructor will have to select the weekly time that students should dedicate to the course (0 to 2 hours; 2 to 4 hours; more than 5 hours; “I haven’t decided if I have time yet”).

6. Create course: click on create course and the MOOC is created immediately.

7. Course planning:

7.1. Define the target audience: at this stage it is possible to define the MOOC recipients, describe the course and present the MOOC requirements or prerequisites.

7.2. Course structure: consists of a space for tips on creating a course (MOOC promotion summary, introduction, sections, best practices for classes, use of different visual resources, creation of different typologies, among others). As for prerequisites, the Udemy team suggests that the course have at least five classes, all of which must add up to at least thirty minutes of video in total.

7.3. Configuration and test video: It is important that the audio and video settings are correct from the beginning, because once recorded it becomes much more difficult to correct the audio. There are currently many tools on the market that allow you to produce videos that look professional. It is essential that students can hear what was recorded in the audio and see the captured images with quality. To do this, when recording, it is important to clear the background and organize the decoration, turn off the overhead lights and try to use adequate lighting, reduce noise and echo and, of course, use your creativity. In terms of requirements, videos must be in HD, at least 720p or 1080p. If possible, the audio should come from the left and right channels and be synchronized with the video and should not have echo or background noise that distracts the students.

8. Create the content:

8.1. Filming and editing: this option contains some recommendations related to video capture and editing that seem to be quite useful for improving the quality of this type of content. In terms of requirements, videos must be in HD, at least 720p or 1080p. If possible, audio should come from the left and right channels and be synchronized with the video and should not have echo or background noise that could distract students.

8.2. Curriculum: where all the MOOC content is structured, such as classes, course sections, tasks, practical activities (tests, programming exercises and tasks). Videos, mashups of videos and slides and articles can be added. This is where all the classes and their respective topics are organized in a properly ordered manner.

8.3. Subtitles: allows you to add subtitles to MOOC videos through the curriculum.

9. Publish the course:

9.1. Course home page: the MOOC title (up to 55 characters) can be changed, and a subtitle (up to 120 characters) can be inserted, as well as a description of the course to be published. You can also select the language in which the MOOC will be taught, the level of knowledge required (beginner, intermediate, expert or all levels). The course category and subcategory can also be changed. An image depicting the course (750 x 422 pixels) can be added, which must be in .jpg, .jpeg, .gif or .png format and must not contain any text in the image. Finally, you can add a promotional video for the MOOC, since, according to Udemy, this type of content can increase the number of course registrations by up to 5 times.

9.2. Price: This is an option that allows you to add the MOOC list price that students will have to pay to register and attend the MOOC. If the course is offered free of charge, then the total duration of the videos must be at least 2 hours.

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9.3. Promotions: consists of an option where discount coupons are available that can be applied during the registration process for a specific MOOC.

9.4. Course messages: where you can write messages to students that will be sent automatically when they enroll in or complete the MOOC, encouraging them to interact with the content.

10. Submit for analysis: the course is submitted for analysis at this stage. Udemy, based on the prerequisites and established quality standards, will evaluate all the content of the MOOC designed. This evaluation usually takes between 24 and 72 hours, depending on the amount of content in the MOOC, especially the videos produced. This stage can even be considered the quality control phase of the MOOC.

Having presented the main features of Udemy, it is important to note that creating a MOOC and inserting a set of videos is not enough. It is essential that the course in general and the content that is part of it (videos, images, texts, documents, activities, quizzes, among others) are of the best possible quality and that the quantity is appropriate to the learning context (target audience, course prerequisites, area of knowledge, among others). To ensure the quality of the MOOC, particularly in terms of planning, designing and developing the content and activities, it is essential that the instructors (course promoters) master digital skills, mainly in terms of using the technological tools that enable the design of this content. It is essential to promote training activities aimed at the appropriate use of tools that allow the design and development of educational content. Naturally, some will be from the user's perspective, such as Office applications and services and the use of the Internet, but others will certainly be more advanced, such as, for example, in terms of images (Adobe Photoshop, Adobe Illustrator, Adobe InDesign, GIMP, Paint.NET, PhotoScape X, ...), video production (Adobe Premiere Pro, Adobe After Effects, iMovie, Sony Vegas, HitFilm Express, ...), or sound production (Audacity, Adobe Audition, Online Voice Recorder, Kristal Audio Engine, RecForge Lite, ...), among other software useful for developing content for the MOOC.

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