OLMEdu

OLMEdu: Open Lab for the up skilling of higher educational staff in on-line Management Education

Learning material for the use of on-line training and ICT technologies in teaching management

Intellectual Output 2

Co-funded by the Erasmus+ Programme of the European Union

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Introduction

Intellectual Output 2 (IO2) provides the learning material for the use of online training and ICT technologies in teaching management, addressing the needs and challenges identified in IO1 in using ICT in Management Education. The learning material is comprised of 8 modules, which have been translated into all partner languages. This report contains the 8 modules in English. The titles of the modules are listed below.

Module 1	Distance learning and pedagogies in online management education
Module 2	Design Thinking Approaches
Module 3	Design and delivery of online training
Module 4	Distance Learning Educational technologies, digital tools, and mobile applications
Module 5	Web conferencing tools and online classroom management
Module 6	Digital content creation and data protection issues
Module 7	Online feedback, assessment and monitoring
Module 8	Digital Reality in Management Education

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Module 1: Distance learning and pedagogies in online management education

Module Number
1
Module Title
Distance learning and pedagogies in online management education
Short Description / Motivation text
In recent years, the **higher education** sector has been subject to profound changes. **Technological advances** and the rising demand in education for more flexible learning have led to the emergence of innovative styles of teaching and learning. Also, the **advent of COVID-19** has highlighted the merits of distance education. Plenty of academic institutions and educators hesitating to amend their traditional pedagogical methods, have eventually given in to **online teaching**. This transition was not an easy task, as the higher education staff does not necessarily have the appropriate ICT knowledge and skills to successfully support online training. Also, the success in online training is not accomplished just by using online educational methods and tools. An appropriate online delivery is also needed to engage students through online learning. Particularly in **Management Education** (ME), this process is even more demanding, as it involves a set of social and economic studies associated with situations of problem-solving and decision-making (Carneiro, 2004). Thus, theory, practice, and reflection should always be connected with the learning process. Educators should integrate technologies and pedagogies to develop and maintain positive learning environments, where the students can actively be engaged, collaborate, analyse situations, think critically, and negotiate for making decisions, facing problems and coming up with solutions. The aim of the current module is to provide learners the knowledge and skills for understanding and applying **learning theories, pedagogies, and principles** appropriate for distance/online learning in ME, with emphasis on **active and collaborative learning**, along with **reflective practices**.
Keywords
● Distance/Online learning ● Management Education ● Active learning pedagogies ● Collaborative learning ● Adult learning
Learning Outcomes
Knowledge After the successful completion of this module learners will: – Be familiar with learning theories, pedagogies, and principles, as applied in distance/online learning contexts. – Be aware of active learning pedagogies and practices applied in teaching management online. – Be familiar with collaborative learning so as to facilitate online teaching of management – Discover adult learning theories and practices and their application in management education.

Skills

After the successful completion of this module learners will:

- Be able to apply active learning pedagogies and collaborative learning practices in distance learning and online learning environments.
- Be able to apply teaching techniques that support complex decision making and interaction in online environments in management education.

Competences

After the successful completion of this module learners will:

- Be able to incorporate learning theories and principles applied in online training in the field of management for higher education students.
- Be competent to adapt management education pedagogical approaches and teaching styles in online teaching.
- Be competent to incorporate practice and reflection while teaching management in online learning environments.
- Be competent to apply pedagogical approaches in management education that facilitates flexible and convenient online teaching that contribute to attractive learning experiences for students.
- Be able to practice adult education techniques in teaching management in online environments.
- Be able to adapt different teaching methodologies and activities in an online training course (role playing; Real like cases; gamification etc.).

Language

English

Training Content

The present module elaborates on four (4) distinct Learning Units, which correspond to:

1. Learning theories, pedagogies, and principles appropriate for distance/online learning.
2. Active learning pedagogies for online teaching in management education.
3. Collaborative learning for online teaching in management education.
4. Adult learning theories and principles and their applications in online teaching in management education.

Estimated duration: 25 hours

Learning Unit 1 Title
Learning Theories, Pedagogies and Principles appropriate for Distance/Online Learning.

Learning Object 1.1 Title
Activity (diagnostic assessment)
Learning Object Description/Introduction
Open-ended questions will be given in this learning object to assess your previous knowledge on distance/online learning. After submitting your answers, move on to the next learning object 1.2 for checking your response.
Learning resource type
Activity – Question
Learning Objective Content
Answer the following questions: - What is the difference between distant and online learning? - List up to 4 advantages/benefits of online learning. - List up to 4 disadvantages/barriers of online learning.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
15 minutes

Learning Object 1.2 - Title
Defining Distance and Online Learning
Learning Object Description/Introduction
The higher education (HE) landscape is characterised by the fast-moving proliferation of adult, distance, and online educational programs that offer a broad array of learning opportunities to HE students. Especially with the advent of COVID-19 crisis, terms such as “online” and “distant” have been more firmly entrenched in HE. But what is actually meant by these terms? Also, what are their pros and cons in HE? This Learning Object sheds light on above questions, defining distance and online learning, and depicting their origin, types, strengths and limitations to facilitate the higher education staff (HES).

Learning resource type

- Narrative Text (theory)
- Further Reading

Learning Objective Content

HE institutions hasten to create various options of online pedagogical approaches in their effort to align with technology. Within the modern highly competitive arena, they try to fully digitalise their operations, understanding the dire need of the new situation with the recent technological advances and the COVID-19 consequences. Their attempt to respond has led the **distance** and **online learning** to emerge as "a victor ludorum amidst this chaos" (Dhawan, 2020, p.7).

Yet, there seems to be no consensus among practitioners, authors and researchers for using common definitions and meaningful terminologies when referencing distance learning. Terms are often interchanged without clarity on their exact meaning. What is certain, though, pertains to that all forms of learning using ICT, whether referring to applications, programs, objects, or websites, can provide an opportunity for individuals to learn. Moore et al. (2011) have eloquently reviewed the relevant literature to determine how the term is used within various learning environments.

Visit the link below to discover more about definitions of Distance Learning:

e-Learning, online learning, and distance learning environments: Are they the same?

According to the specified literature review, "**distance education**" is the most acknowledged term used. It actually means access to learning for people geographically distant, while implying a remote but reciprocal interaction between the student and the trainer (Moore et al., 2011). Keegan (1996) has suggested that distance education is more like an "umbrella" term, and as such, there are clearly other terms identified as synonymous or derivatives. "**Online learning**" and "**e-learning**" are two such closely interrelated terms that are used instead of distance education. Both describe the two-sided relationship between the student and the trainer, with the Internet and its use at the core as an integral tool to help students to learn (Barr & Miller, 2013).

The **online learning**, composed of students, instructors and the course curriculum, requires also the use of technological tools for enabling access to the online learning environment. It is often described as acquiring of learning experiences via the use of technology and is acknowledged as an updated term for distance learning that improves access to educational opportunities for non-traditional and disenfranchised learners (Moore et al., 2011). Apart from the accessibility of online learning, others discuss also its connectivity, flexibility and ability to promote interactions. Hiltz and Turoff (2005) allude to how online learning relates with distance learning and traditional delivery systems, and they also state that online learning is a newer and improved term of distance learning.

Question for reflection

- ❖ Reflect upon an online training that you have designed and offered. What were its characteristics? What kind of difficulties did you face?

Online learning experiences can take place either in real time (**synchronous environments)** or not (**asynchronous** environments) with the use of different devices with Internet access (e.g., mobile

phones, computers) (Dhawan, 2020), as well as technologies based on the students' population sizes and time dependency. Such experiences are going to be thoroughly examined in **Module 3**, which expands on the designing and delivering of effective online courses by combining asynchronous and synchronous e-learning, and by using interactive techniques and practical experiences for engaging students.

Online courses have several advantages over traditional settings. However, as it happens with any learning medium, the use of the Internet in online learning has not only strengths and benefits, but limitations as well (Barr & Miller, 2013). The most significant pros and cons of online learning are just briefly presented in the following table (***Table 1***), since they are going to be described more explicitly within **Module 3**.

Table 1. Major Advantages and Disadvantages of Online Learning

Advantages/Benefits	Disadvantages/Barriers
Higher flexibility and accessibility	Isolation and missing of the social perspective
Reaching greater student population	Feeling lack of community
More information and learning resources	Social interactions highly influenced by the designed communication approaches at an online environment, lower satisfaction and interest
Greater opportunities for collaboration	
Attractive for new groups of digital learners	Technological difficulties (e.g., installation issues, download errors, failure to login, technical problems with audio and video, etc.)
Exceeds standard education, no time or location restrictions for students to learn	
Become familiar with the digital interface and tools of communication used widely in corporations	Overly theoretical online content, no chance to practice and learn effectively, lacking skills and techniques for an online format
cost effectiveness in the long-term (for HE institutions)	educators/faculty resistance to change, high start-up costs for developing online courses (software, computers, etc.), added costs for faculty/professor training

Sources: Barr and Miller (2013); Kaplan and Haenlein (2016)

Technical type

Text

- Document
- Table
- Hypertext

Image

- Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 1.3 Title
More information about the Online Learning
Learning Object Description/Introduction
Do you feel that as an educator you may need to acquire more knowledge on the content of the online learning? If so, read the following articles.
Learning resource type
– Further Reading
Learning Objective Content
Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review From distance education to open and distance learning: A holistic evaluation of history, definitions, and theories Online Learning: A Panacea in the Time of COVID-19 Crisis Best practices for online business education
Technical type
Text – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 1.4 Title
Mapping the Basic Learning Theories
Learning Object Description/Introduction
It is well established that effective online training is not ensured just by using online educational methods and tools. An appropriate online delivery that engages students to learn is also needed.

Towards this aim, some basic learning theories are used and must constantly be linked to the learning process. The current section elaborates on the most widely applied learning theories and basic educational approaches, upon which HES need to support their new online roles and practice.

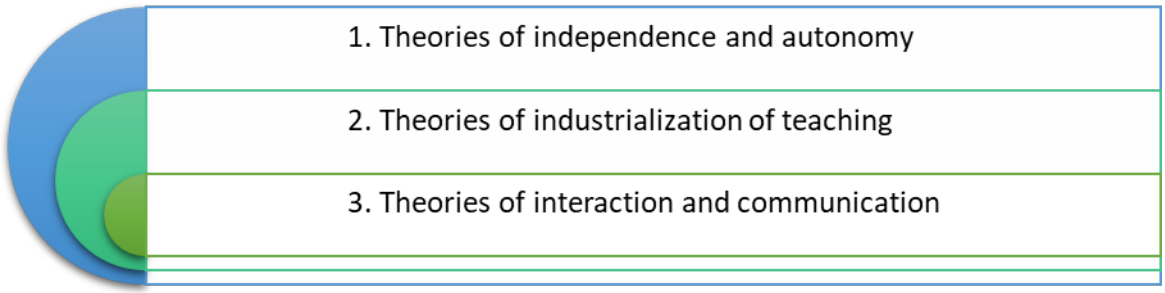
Learning resource type

- Narrative Text (theory)
- Further Reading
- Did You Know

Learning Objective Content

By all means, theory is very important because it directly influences how practices are conducted in each field. Accordingly, distance education theories are crucial, since they help educators to make decisions. In this regard, Keegan (1996) has classified such theories into three distinct groups:

Figure 1. Major Distance education theories by Keegan (1996)



In a more recent review, Bozkurt (2019) reports that there might also be a synthesis of various existing theories of communication and diffusion, as well as philosophical approaches of education.

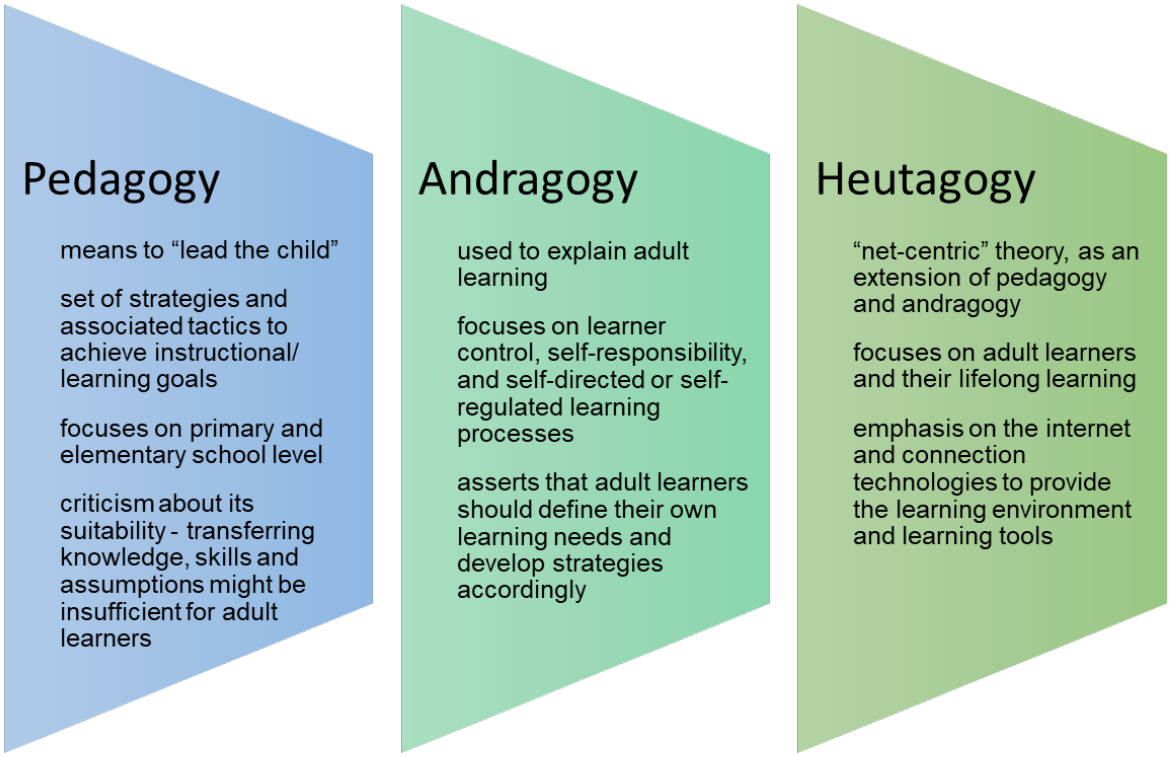
Find out more details about these groups of distance education theories in the following links:

Foundations of distance education

From Distance Education to Open and Distance Learning: A Holistic Evaluation of History, Definitions, and Theories

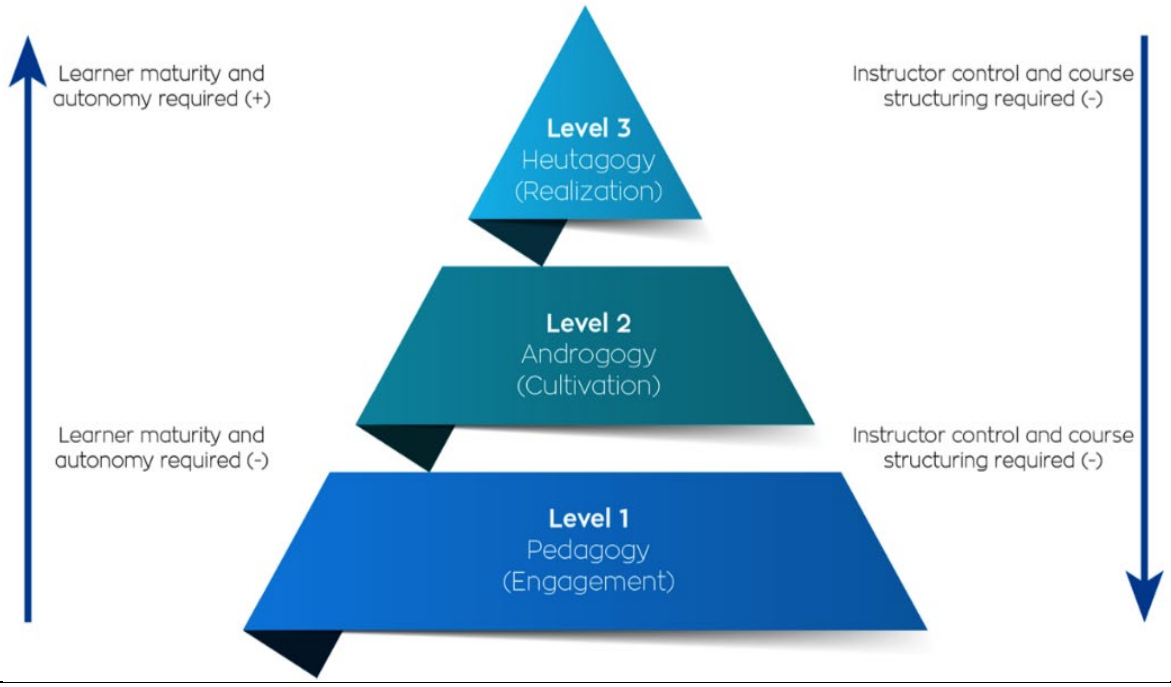
Bozkurt (2019) recognizes also three major **educational approaches**, which are the Pedagogy, the Andragogy, and the Heutagogy, as depicted in the following two figures (***Figure 2 and Figure 3***).

Figure 2. Major aspects and basic features of Pedagogy, Andragogy, and Heutagogy



Source: Bozkurt (2019)

Figure 3. The relationship between Pedagogy, Andragogy, and Heutagogy



Source: Bozkurt (2019, p. 264)

For more details on the content of these three educational approaches, read the following links:

From distance education to open and distance learning: A holistic evaluation of history, definitions, and theories

Effective pedagogies for managing collaborative learning in on-line learning environments

Leveraging adult learning theory with online tutorials

Questions for reflection

- What parallels can you draw between andragogy and pedagogy?
- What is the most suitable of the above theoretical frameworks to be applied in your field and class?

Did you know that Pedagogy, Andragogy, and Heutagogy have Greek origins? They all derive from the word "agogos" meaning "to lead". Their first components account respectively for "paidos" meaning "child", "anere" meaning "man", and "heautos" meaning "self".

In addition to the above educational approaches, there are four dominant learning theories that have been widely known and used in education, which have heavily influenced the study of learning since the 20th century. That is, **behaviourism**, **cognitivism**, **constructivism**, and **connectivism** which are all linked to the development and utilization of educational technology (see ***Figure 4***).

Figure 4. Behaviourism, Cognitivism, Constructivism, Connectivism

Behaviourism	situated learning, observable and measurable
	it involves conditioning, memory, stimulus and response
	mechanical process with repeated experiences
	learning material broken down into smaller instructional steps
	frequent review or revision with check tests, repeat practice with feedback
	do not account for individual differences in learning
Cognitivism	memory, thinking, reflection, abstraction, motivation and meta-cognition
	learners process information that can be stored and retrieved when needed
	recognises the importance of individual differences, which are accommodated
	focuses only on cognitive aspects
	neglects the affective domain in learning
	places more emphasis on the instructors to engage learners
Constructivism	it is considered as a response to behaviourism and cognitivism
	value on experiences, thoughts, interactions and inner workings of individuals' mind
	learners build knowledge through their own social and situational learning experiences
	students shape their point of view of the world, construct their philosophy of living
	pioneering educational games, multimedia development and dynamic online interactions
Connectivism	learning and knowledge rest in diversity of opinion
	learning is a process of connecting specialised nodes or information sources
	learning may reside in non-human appliances
	capacity to know is more critical than what is currently known
	nurturing and maintaining connections is needed to facilitate continual learning
	ability to see connections between fields, ideas, and concepts is a core skill
	learning activities intend to provide accurate and up-to-date knowledge
	decision-making is a learning process in itself

Sources: Bélanger (2011); Merriam (2018)

Another important theoretical foundation pertains also to the **social constructivist** view, introduced by Lev Vygotsky in 1978, which proposes that knowledge is created when people are socializing through conversation and they act together on common projects or problems.

According to this approach, learning cannot be separated from the ways of understanding and talking about the pragmatic world and reality based on shared cultural patterns (Merriam, 2018). In that perspective, the concept of **"proximal development zone"** contributes to learning theory. The idea is to evaluate the development and knowledge level of a learner, so as to create a learning situation that is beyond the actual level of the learner, yet not too challenging that could cause his/her failure. In this case, the learning situation stays within the learner's "proximal development zone" at that moment. The aim is to pose a learning situation or problem to the learner that is hard, complicated and thus challenging, but not very difficult to discourage him/her. The challenge is to find a zone of development within which the learner can receive support and, consequently,

achieve something that he/she could have not achieved all by himself/herself. The overall objective is to make learners mobilise their prior knowledge, using it with realities and critical perceptions that are new, in order to face and overcome the disequilibrium that a similar context may create.

Another major concept also related to social constructivism is that of **"scaffolding"**. The tutor has to support learners if he/she wishes to be effective. First, the tutor evaluates the current level of knowledge and skills of learners based on a specific situation. Then, the tutor adapts his/her support according to the individual needs of the learner, who may work inside their "proximal development zone". As a result, in certain situations, the tutor may support the learner as much as possible for the latter to find the motive to engage in a difficult learning process. Yet, the support should be decreased gradually with time and practice, providing the opportunity for the learner to become autonomous in confronting this type of situation.

The next figure (***Figure 5***) contributes to clearly distinguishing socio-constructivist key concepts from those of the constructivist approach that has been presented earlier.

Figure 5. Key concepts of the constructivist and socio-constructivist approach

Constructivist Approach	Socio-constructivist Approach
Central role of the learner (person acting) in his/her context	Situated learning
Cognitive conflict, contradiction, and resolution of dilemma	Social mediation, dialogue, interaction
Reflective practice and abstraction	Dialectics between the subject and the socio-cultural structure, between the acting person and the constituted order
Self-organisation and internal restructuring	Community of practices
Proximal development zone (PDZ)	Peripheral legitimate participation
Learning as an interactive process between subjective construction and external structure	Holistic approaches: the cognitive, conative and psycho-motor resources mobilized by the person in his/her action context
	Interactive process between subject and his/her context

Source: Bélanger, (2011, p.31)

FILM, VIDEO

Video: This video by ADED PSE (2019) makes an overview of 4 major learning theories applied to online courses: **Behaviourism, Cognitivism, Constructivism, Connectivism**

Source: Constructivist Theories of Learning and Online Course Design

In an extensive review of literature on the theoretical perspectives associated with educational technology and online learning, Ouyang and Stanley (2014) highlight that the theories of behaviourism and cognitivism have triggered scholars to spawn a **broad variety of other technology-related educational theories**, the most-well known of which are presented in the following figure (***Figure 6***):

Figure 6. Other Technology-related Educational Theories

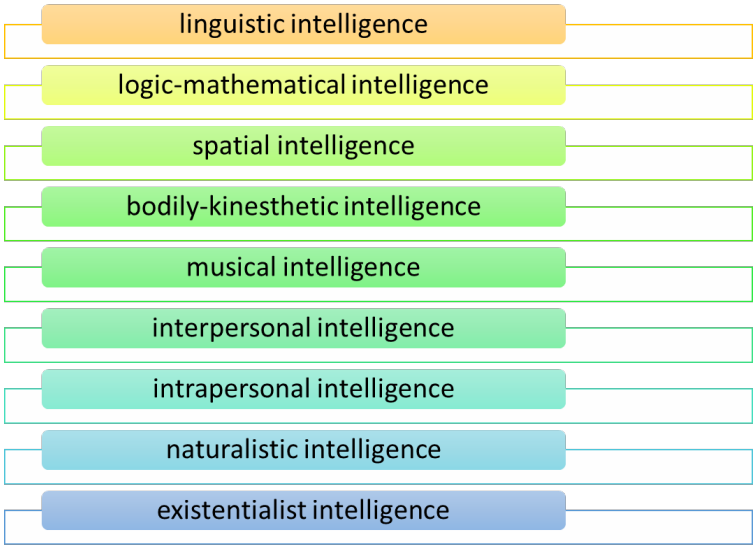
Anchored Instruction theory	Experiential Learning Theory
Cognitive Flexibility Theory	Script Theory
Innovative Diffusion Theory	Situated Cognition Theory
Elaboration Theory	Symbol Systems Theory

Question for reflection

- In your educational practice, what theories and approaches do you usually apply and why?

According to Gardner's (2000) **theory of multiple intelligences** everyone has his/her own unique intelligence that is utilized in education. If curriculum, instructional contents, methods and learning environment can fit into an individual student's unique intelligence, the instruction and learning will then become much more effective (Ouyang and Stanley, 2014). This theory has quickly caught the attention of educators. The research on this theory has positively promoted and guided effective use of educational technology to optimise individualised instruction. There are currently nine types of intelligence identified (see ***Figure 7***).

Figure 7. The Nine Different Types of Intelligence identified within Literature



Question for reflection

- Can you identify any type of intelligence that you have practiced as an educator? Then recall what type of intelligence has helped you as a learner in your typical education and training.

Technical type
Text – Document – Hypertext Image – Figure – Icon Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120 minutes

Learning Object 1.5 Title
More information about the technology-related educational theories
Learning Object Description/Introduction
To further explore the various technology-related educational theories, visit the links provided in this learning object.
Learning resource type
– Further Reading
Learning Objective Content

Theories and research in educational technology and distance learning instruction through Blackboard

E-learning theories in practice: A comparison of three methods

An investigation of epistemological and social dimensions of teaching in online learning environments

A case study of constructivist instructional strategies for adult online learning

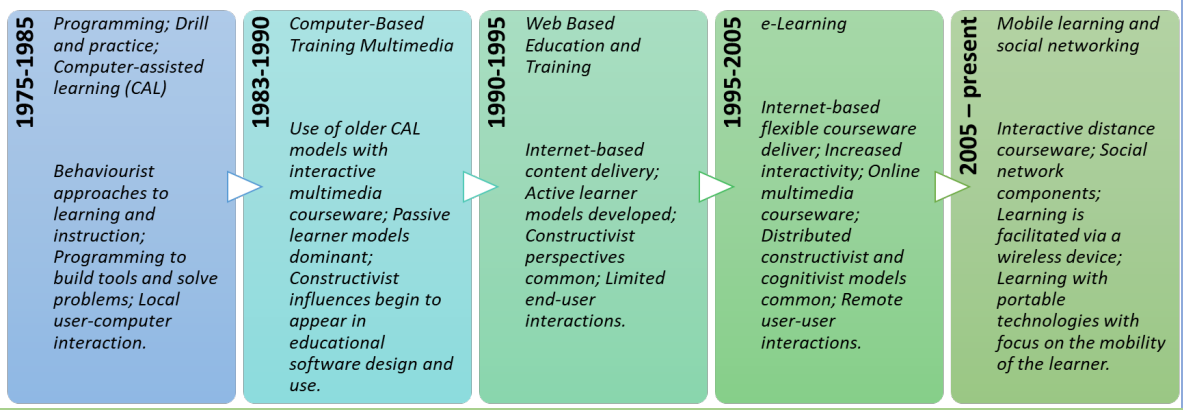
Toward constructivism for adult learners in online learning environments

Technical type
Text – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 1.6 Title
More information about the roots and history of Online Learning
Learning Object Description/Introduction
To further explore the roots and history of Online Learning read the content and the link provided in this learning object.
Learning resource type
– Did You Know
Learning Objective Content

Did you know that the history of access to online learning is known to have its roots in the 1980's? The following figure (***Figure 8***) presents briefly the historical context of online learning establishment and the course of evolution over the past 30 years for the educational technology.

Figure 8. Historical Context of Online Distance Education Development



Source: Keengwe and Kidd (2010)

For more about the roots and history of Online Learning read the following article:

Towards best practices in online learning and teaching in higher education

Technical type
Text – Hypertext Image – Figure – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
40 minutes

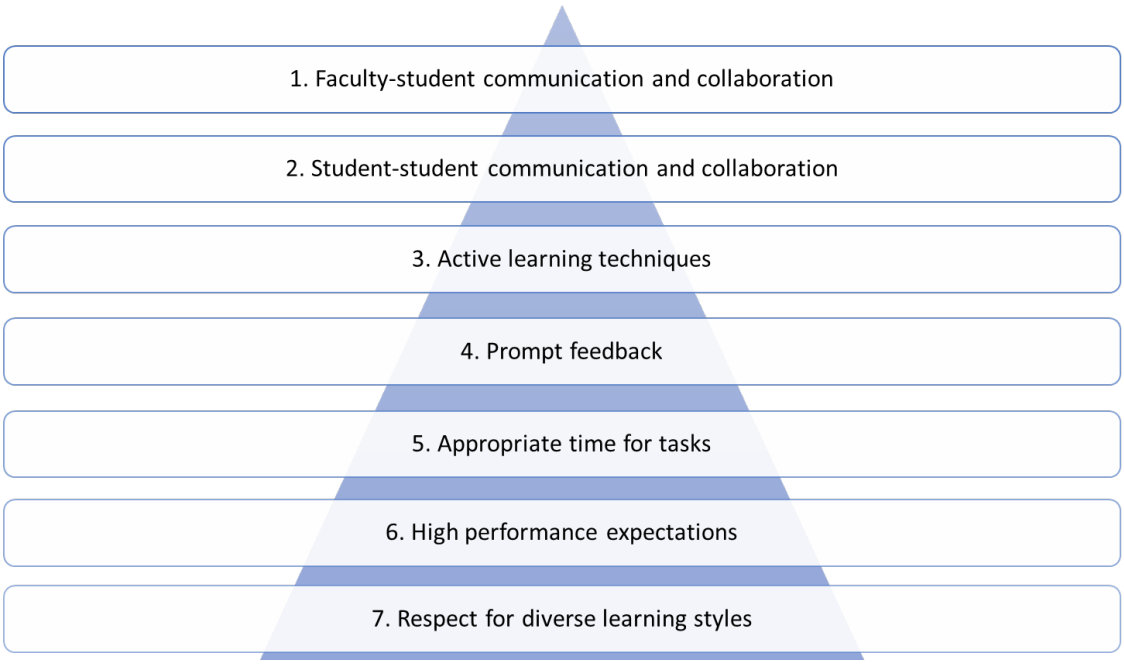
Learning Object 1.7 Title
Pedagogies and Principles of Online Learning
Learning Object Description/Introduction
Identification of pedagogical principles found in existing theories of learning, as well as those that emerge from experience, is an important step toward closing the divide between practice and theory. What is more, scholars have highlighted the need for different pedagogical principles for online learning (Huang, 2002). In this section the most common principles are presented to serve this purpose and allow educators to deliver the best online learning system and practices.
Learning resource type
– Narrative Text (theory)
Learning Objective Content
Adopting theories to deliver an online educational program does not assure automatic success of the online learning experience. As Barr and Miller (2013) precisely notice, online programs must be entirely embraced by both learners and instructors. Pedagogical principles are established to serve this purpose and allow educators to deliver quality learning. Particularly, instruction should be catered to facilitate student experiential learning with interactive elements, engaging learning styles, supporting critical thinking and encouraging collaborative learning experiences (Barr & Miller, 2013). Toward this aim, instructional designers need to **follow appropriate pedagogical principles** to match their desired learning goals and instructional methods to the appropriate learning theories.

Questions for reflection

- Reflecting on your own experience, what pedagogical principles do you follow in your teaching?
- Do they interchange according to the type of learning environment?
- Recall some examples from your own educational practice when applying a pedagogical principle. Are you satisfied with the result in terms of the learner's engagement?

Chickering and Gamson (1987) proposed the "Seven Principles of Good Practice" model to enhance engagement in face-to-face education. Chickering and Ehrmann (1996) expanded this model for online environments, noticing the increased demand for online learning. Eventually, their framework has become a reference for best practice in online design and instruction, with the collaboration, engagement, and differentiation to be overarching themes in this model. The seven principles are depicted in the next figure (***Figure 9***).

Figure 9. The Seven Principles of Good Practice



Source: Chickering and Gamson (1987)

Those principles continue to be acceptable for enhancing online learning and can also be used to evaluate university courses (Tanis, 2020). Barr and Miller (2013) have more recently reported that effective instruction in any learning environment needs to include the **creation of a positive learning environment by cultivating self-efficacy, providing meaningful and active engagement, along with inclusivity**. Therefore, they suggest that instructors of online learning programs must:

- Establish a nurturing and supportive environment, which reduces the level of stress that is associated with academic difficulties and peer conflicts.
- Ensure that communication between faculty and students is constant and effective. It may include emails, webinars, online discussions and phone contacts.
- Provide cooperative learning opportunities to facilitate critical thinking, brainstorming, problem solving and study in groups.
- Provide experiential and active learning activities (role-playing, case studies, scenarios) for higher order thinking that addresses the construction of knowledge through analysis, synthesis and evaluation.
- Give punctual feedback and establish peer tutoring when necessary.
- Motivate, commend success, provide stimulating activities and express high expectations from students continually.
- Embrace cultural diversity and different learning styles.
- Provide instruction personalised to students' needs.
- Discuss and clearly define course policies, expectations and goals.
- Accommodate learners needing special assistance with technology.

Technical type

Text

– Document

Image

– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30 minutes

Learning Object 1.8 Title

More information about the pedagogical principles of online learning

Learning Object Description/Introduction

Visit the links provided in this learning object to find out more details about the pedagogical principles of online learning.

Learning resource type

– Further Reading

Learning Objective Content

The seven principles of online learning: Feedback from faculty and alumni on its importance for teaching and learning

Implementing the seven principles: Technology as lever

Higher Education: The Online Teaching and Learning Experience

Technical type

Text

– Hypertext

Image

– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

40 minutes

Learning Object 1.9 Title

Practical activity for online learning theories

Learning Object Description/Introduction

Implementing the following activity, you will be able to identify learning theories and incorporate their basic principles in online training.

Learning resource type

Activity

– Assigned reading text

Learning Objective Content

Try to complete the following table with the most important features of the indicated theories (Behaviourism, Constructivism).

	Behaviourism	Constructivism
1.	*Knowledge acquisition is highly structured within a step-by-step process.*	*Learners are encouraged to shape their own point of view of the world.*
2.		
3.		
4.		
5.		
6.		

The first line is already completed as an example of the answers expected.

For more help on the current activity, please consult the following links:

- ⇒ Theories and research in educational technology and distance learning instruction through Blackboard
- ⇒ E-learning theories in practice: A comparison of three methods
- ⇒ An investigation of epistemological and social dimensions of teaching in online learning environments
- ⇒ A case study of constructivist instructional strategies for adult online learning
- ⇒ Toward constructivism for adult learners in online learning environments

Technical type

Text

- Document
- Table
- Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Unit 2 Title

Active Learning Pedagogies for Online Teaching in Management Education (ME)

Learning Object 2.1 Title

Introduction to Active Learning Pedagogies

Learning Object Description/Introduction

The advent of COVID-19 has expedited the transition from conventional classrooms to online learning (Toquero, 2020). As a result, complexities of the technology-driven learning experience intermix with the gradual erosion of traditional teaching and educational values. This formulates a new situation for HE institutions, educators and students. Thus, it is only natural for institutions to seek for faculty members that are both able and willing to address existing challenges and participate in developing and teaching online courses. Accordingly, educators need to embrace new skills to reach distant learners. Active learning strategies can be employed to address these concerns effectively. In this learning object, active learning is explicitly described, providing insight into why and how this method should be integrated by HE instructors in their online teaching.

Learning resource type

- Narrative Text (theory)
- Further Reading

– Did you know

Learning Objective Content

The delivery of online course faces further barriers to make students involve actively, particularly those not typically present in face-to-face courses. In online education the course design and development must take place before the actual delivery of the material, while effective time and resources management are necessary for both students and faculty members (Khan et al., 2017). In fact, online delivery methods differ greatly from those used for face-to-face teaching. Due to such special features that online learning entails, it is very important to focus on the methods of encouraging communication and interactions between students with their peers and the faculty. Educators should apply the most suitable and effective methods, and to do so they will need the appropriate teaching tools as well.

Active learning is considered to be among the best and most salient practices for delivering online learning with a considerable communication and interaction level. To define the term, active learning can be compared to "learning by doing" (Tanis, 2020). Learning by doing replaces passive listening, memorising and regurgitating answers with interactive discussions, reflections and relative applications. Thus, active learning can be *"anything course-related that all students in a class session are called upon to do other than simply watching, listening, and taking notes"* (Felder & Brent, 2009, p. 2). It encourages students to engage in the online course content with their colleagues. Interactive multimedia is one means of promoting active learning that makes the course alive (Tanis, 2020).

More details about active learning in the following studies:

If you post it, will they come? Lecture availability in introductory psychology

Implementing effective online teaching practices: Voices of exemplary faculty

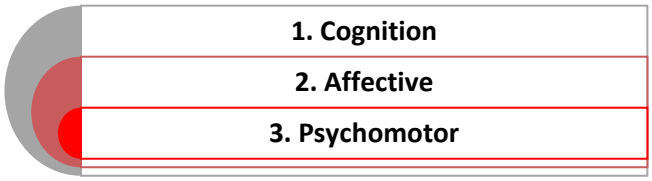
Questions for reflection

- Have you ever utilized active learning methods to encourage your students' communication and interactions amongst themselves and you? Was it effective?
- What special challenges do you face when applying active learning methods online? Is it more difficult than applying it in face-to-face teaching?
- What teaching tools do you usually choose and how do you use them for delivering online courses? Do you feel it is easy for you to start using other tools more frequently?

Studies have shown that employing methods of active learning improves both students' learning and their attitudes towards learning. However, many faculties still face challenges when integrating active learning into their courses. Experimentation and exploration in teaching and learning methods is required to develop and adapt unique teaching methods to a course - including those being taught online. While this may require additional effort, it is an effort that must be made if students are to be actively engaged in their learning, regardless of the medium in which the course is being taught (Khan et al., 2017).

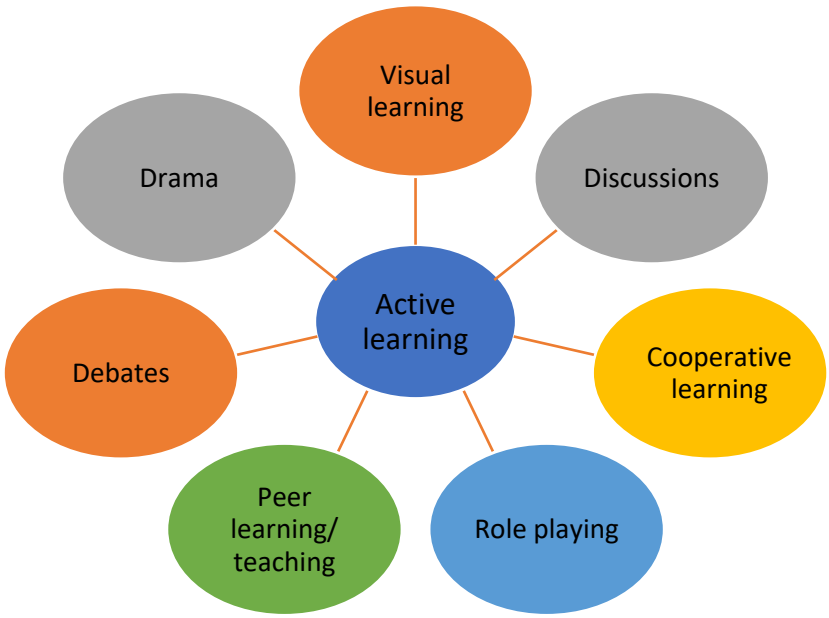
Student learning can be enhanced by utilizing **mechanisms of active learning** that are abundant. Bloom's Taxonomy is a core learning model for the development of active learning strategies. It defines **three domains of knowledge and skills that drive educational activities** (see ***Figure 10***):

Figure 10. Bloom's Taxonomy



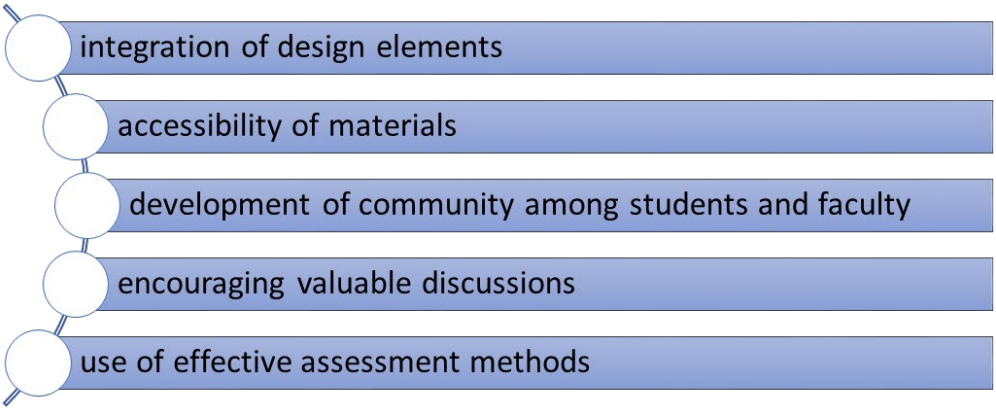
In ***Figure 11*** below, there are presented active learning strategies that can empower Bloom's higher order cognitive skills (knowledge, comprehension, application, analysis, synthesis, and evaluation).

Figure 11. Active Learning Strategies



Through these activities, students are enabled to direct their own learning. This is quite important in science disciplines, as scientifically-minded people are usually curious, constantly inquiring and lifelong learners (Snyder, 2003). Pedagogically-effective convergence of active learning strategies and methods and technology tools can help faculty and students to accomplish successful teaching and learning. However, further challenges caused by online course delivery, change how active learning practices are put into practice. Khan et al. (2017) highlight some aspects concerning active learning practices in online courses (see ***Figure 13***).

Figure 13. Aspects to consider for Active Learning Practices in Online Courses



To depict the connection with learning theories presented in previous sections of this module, **active learning can range from traditional instructional models to more constructivist and co-constructivist approaches** (inclusive of face-to-face, blended and online learning). Educators have the chance through active learning not just to act as facilitators, but to become activators of meaningful learning by being creative in choosing the right strategies to be mixed and adjusted to both the context and the learner.

FILM, VIDEO

Video: This video by Top Hat (2018) presents Active Learning and provides basic guidelines about how HE instructors should teach in order to engage their students effectively.

Source: Active Learning: How Professors Should Teach

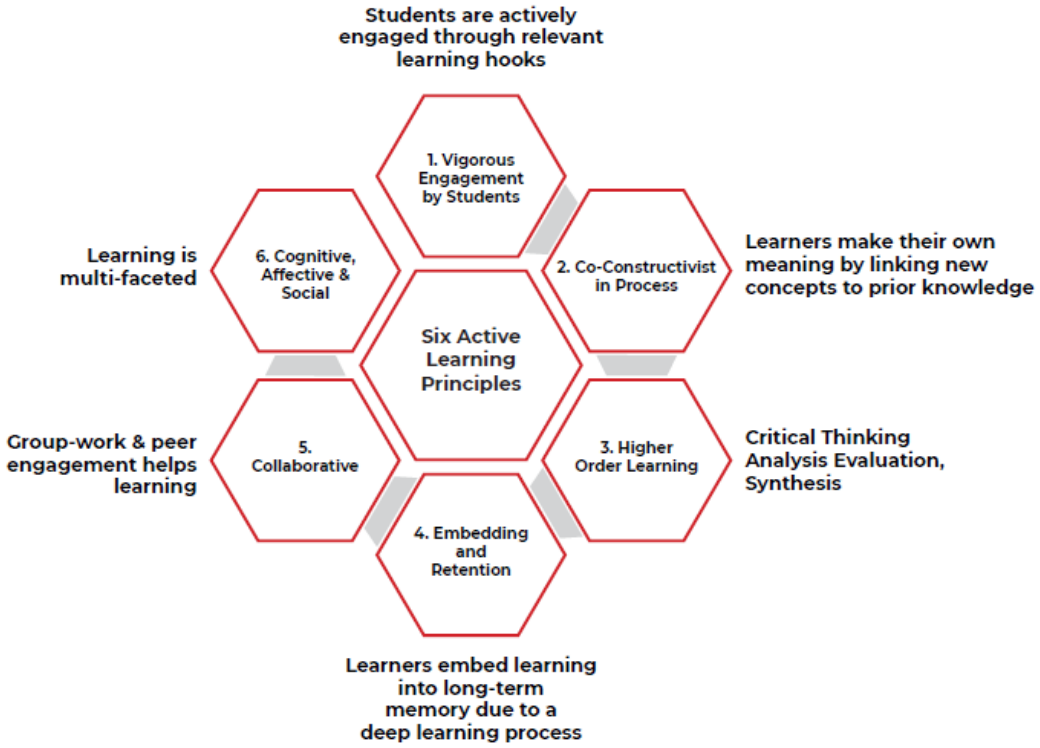
Some characteristics of active learning highlighted by Snyder (2003) are:

Figure 14. Active Learning Characteristics

- Greater emphasis on developing analytical and critical thinking skills
- Students do something other than simply listen passively
- Students are engaged in some form of activities
- Emphasis on exploring attitudes and values held about course material
- Courses with active learning focus on higher thinking (critical thinking, analysis, evaluation), rather than knowledge gathering
- Both students and instructors receive more and faster feedback

Some basic principles of active learning for higher students' engagement have also been reported by the Limerick Institute of Technology (LIT):

Figure 15. Active Learning Principles by LIT



source: *https://hub.teachingandlearning.ie/resource/active-learning-compendium-strategies-for-student-engagement/*

Technical type
Text – Document – Hypertext Image – Figure – Icon Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120 minutes

Learning Object 2.2 Title

More information about active learning pedagogies, theory, and practice

Learning Object Description/Introduction

Visit the links provided in this learning object to find out more details about active learning pedagogies, theory, and practice.

Learning resource type

– Further Reading

Learning Objective Content

Ropes, poles, and space: Active learning in business education
Where's the evidence that active learning works?
Eight Principles of Effective Online Teaching
Integrating soft skills through active learning in the management classroom
Introducing sustainability into business education contexts using active learning

Technical type

Text
– Hypertext
Image
– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Object 2.3 Title

Features of Management Education (ME)

Learning Object Description/Introduction

No one denies the important role of formal education in management development, as business schools are responsible to teach a great number of issues about managing. However, teaching management in old-fashioned ways in traditional classrooms leads to missing chances for creative learning suited to practicing managers. As a matter of fact, it is time to reconsider the very idea of **Management Education** (ME) and accordingly the design of degree programs for practicing managers (Gosling & Mintzberg, 2004). HE instructors in ME could work as a team, discussing how to improve their teaching methods and employ active learning procedures, based on competencies and professional skills they already possess, or those that they need to develop for applying new teaching techniques in decision-making.

Learning resource type

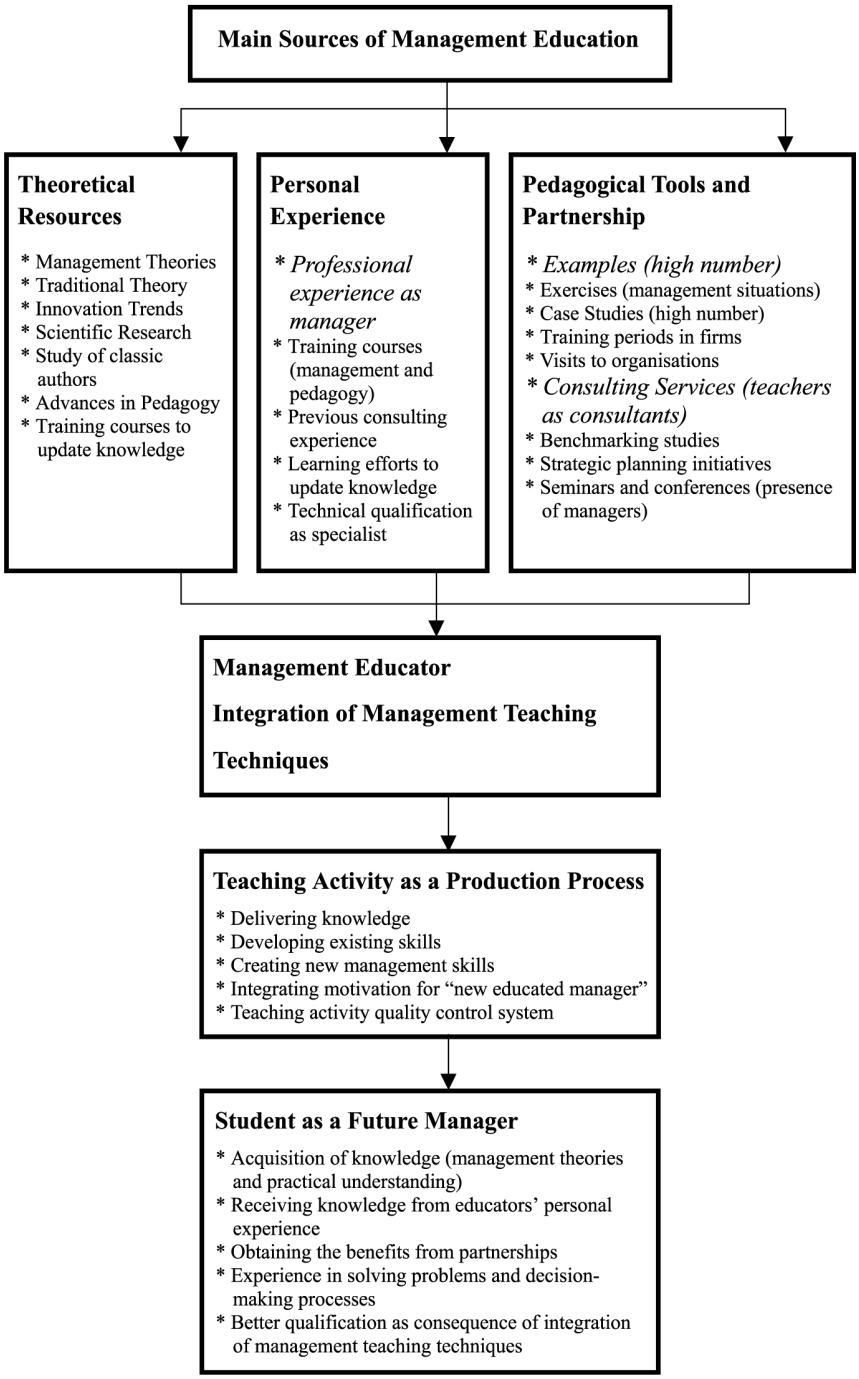
– Narrative Text (theory and examples)

Learning Objective Content

Management is a practice and, thus, it ought to be appreciated through experience, in context. Although it utilizes science, it is considered an art combined with science through craft. To put it

differently, managers have to confront issues and situations in the full complexity of living, not as compartmentalised packages. Despite knowledge seems to be important, wisdom (i.e., the capacity to combine knowledge from different sources and use it judiciously) is the key. A management education model (***Figure 8***) suggested by Carneiro (2004, p.437) aims to provide a better understanding of the integration process in what concerns theory, practice and the role of management educators.

Figure 16. Management Education Model



source: Carneiro (2004, p.437)

Questions for reflection

- Based on your educational experience, which teaching strategies do you consider important to use in the field of Management?
- Have you ever included visits to organizations, or interaction with managers and business professionals, in the teaching strategies you follow to effectively engage your students? Was it effective?
- Would you attempt to apply a similar practice in an online teaching? How would you design it to respond to this challenge?

Technical type

Text
– Document
Image
– Figure
– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Object 2.4 Title

More information about active learning in management education (ME)

Learning Object Description/Introduction

Visit the links provided in this learning object to find out more details about active learning in ME.

Learning resource type

– Further Reading

Learning Objective Content

Integrating soft skills through active learning in the management classroom
The education of practicing managers
Factors Affecting Student Attitudes Toward Flexible Online Learning in Management Education
What Do Online MBA Professors Have to Say About Online Teaching

Technical type

Text
– Hypertext
Image
– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Object 2.5 Title

Online Teaching in Management Education (ME) through Active Learning

Learning Object Description/Introduction

Regarding education, it is well known that the modern world is facing a new reality, where the need for contact and interaction between instructors and students has become supreme (Carneiro, 2004). Within this context, already entrenched online learning experiences have rendered active learning methodology into one of the best practices that HES should apply. This is also obvious regarding management education (ME), since ME students are considered to be the future agents of change, whose effectiveness will be based on the quality of their scholarship and firmness of their decisions as managers (Carneiro, 2004). This section encapsulates the online active learning dimension in the broader field of ME, providing significant research cases and interesting examples from the pertinent literature so far.

Learning resource type

- Narrative Text (theory) and Examples (articles)

Learning Objective Content

It has been well-established that active learning strategies, when implemented effectively, promote student engagement and influence greatly the student learning process. Their application online certainly benefits HE, serving one of its most significant purposes to "produce" graduates ready to fill available jobs in the marketplace. Thus, active learning enhances organizations that are looking for a workforce equipped with flexibility and facing change skills.

Particularly, HE in the management field should rely more on active learning, so as to be more practically oriented and incorporate main features of a competitive economy. A stimulus is needed for management students to apply creative thinking during their development processes. Theory, practice, and reflection must always connect to provide an actionable learning experience. Toward this aim, HE institutions and their faculty members need to produce management graduates with personal, social and communication attributes that organizations need to achieve their objectives (Carneiro, 2004).

To ensure a successful transition from traditional pedagogy to **active online learning pedagogies**, HE faculty members in management need to alter their teaching styles used within conventional courses and "traditional classrooms" and embrace new skills to effectively reach the distant learners. In any case, management students of the digital age appear already to be independent, more technology disciplined and technology savvy, complimenting the online environment well. **To meet the needs of this technologically dynamic population, instruction by management educators should be catered to facilitate student experiential learning with interactive elements, engaging learning styles, facilitating critical thinking and encouraging collaborative learning experiences** (Barr & Miller, 2013).

Close to action learning is the theoretical perspective called **project-based learning**. Its overall idea is to actually do something to help the individuals learn, instead of letting them read or hear about a subject. Project-based learning utilizes real-world scenarios and creates projects for learners that they could encounter in a future job. Learners can choose their own projects and pursue things they

are interested in, which is a great option for adult learners who need real-world applications from their learning.

The following table (***Table 2***) reviews some useful studies in the fields of HE and ME that can enrich your knowledge and further facilitate your teaching in management and familiar fields:

Table 2. Studies in the fields of HE and ME

STUDY	RESEARCH	READ MORE
Hove and Corcoran (2008)	Online students	Those with unlimited access to lecture video presentations earned higher grades than others who did not have the same access. The availability of such presentations provides students with study aids and offers a measure of control over their learning process. If you post it, will they come? Lecture availability in introductory psychology
Lewis and Abdul-Hamid (2006)	Thirty exemplary instructors (interview)	An innovative online educator incorporated contemporary news articles and videos to facilitate active learning. Another instructor invited guest speakers to her online class for synchronous chats to facilitate student learning and engagement about the subject. Implementing effective online teaching practices: Voices of exemplary faculty
Carneiro (2004)	Review on the aspects of ME (revising different issues)	Aspects of ME and discuss the relationships among HE institutions, teaching techniques, management educators and information and communication technologies. Emphasises the value of practical approaches of ME, the importance of pedagogy based on solving problems and the decision-making process. Introduces and presents an interpretative model for ME, supported by the integration of management teaching techniques. Teaching management and management educators: some considerations

The latter study implies that the success of ME processes depends also on a technological effort (Carneiro, 2004). Thus, the author suggests that management educators should consider:

1. How students perceive and use the attributes of new technologies and networks?
2. How management educators can be motivated to create more qualified graduates using teaching techniques based on these technologies?
3. Which technologies should be integrated to generate high knowledge levels and quality?
4. How can all above be integrated into a University Education System that will present a competitive perspective within the marketplace?

Within various guides developed for designing and delivering e-learning solutions (e.g., the guide by food and agriculture organization of the United Nations e-learning academy, 2021), a range of **instructional techniques** can be found and may be useful to present Management content in online learning environments through a more active manner. For instance, **gamification features**, or a pedagogical agent, could be employed to guide the learner more actively through the content and add a basic human presence. Another alternative could be the educator to employ techniques for developing skills, such as **storytelling, case-based scenarios** and **serious games, demonstration-practice methods**, or **toolkit approaches** to facilitate and speed up the information finding process.

Technical type

Text

– Document
– Table
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Object 2.6 Title

Practical activity for active learning pedagogies in the field of Management

Learning Object Description/Introduction

Implementing the following activity, you will be able to apply active learning pedagogies in your online teaching for Management, so as to encourage students to engage more in online learning.

Learning resource type

Activity

– Concept mapping

Learning Objective Content

Choose any subject you wish from the Management field and develop a 1-hour online lesson plan, including active learning pedagogies so as to engage your students. Then present it to your peers by sharing it through the already established folder/space on the OLMEdu learning platform.

To facilitate you construct the lesson plan, a template is provided right below:

LESSON PLAN	
Subject / Course	
Topic	
Lesson Title	
Level	
Lesson Duration	
Lesson Objectives:	
Summary of Tasks/Actions:	
Materials / Equipment:	
References:	
Home Tasks:	

For more help on the current activity, you may also consult the following links:

- Active learning: Engaging students to maximize learning in an online course
- The education of practicing managers

Technical type

Text

– Document
– Table
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Unit 3 Title

Collaborative Learning for Online Teaching in Management Education (ME)

Learning Object 3.1 Title

Defining Collaborative Learning

Learning Object Description/Introduction

Having already become acquainted with active learning pedagogies explicated in the previous Learning Unit, it is now established that the delivery of online learning requires students to be engaged and participate actively in the learning process. An effective way to achieve that refers to **collaborative learning** through group work among students, which enhances active learning by changing the traditional instructor-oriented learning environment into learner-oriented with students taking charge of the learning process. The current section focuses on **collaborative learning** as a method to facilitate HE instructors in ME.

Learning resource type

– Narrative Text (theory)

Learning Objective Content

The growth of online enrolments has set HE institutions focused on technology in their effort to approach and deliver online learning that will promote collaboration among students. New methods integrating demonstrations, assessments, lecture recordings, video conferences and virtual interactions have been brought with the advancement of online platforms to support student learning and encourage them to collaborate. Despite that **collaboration learning** is already receiving significant attention, there are still improvements to be made in this process of helping students to collaborate in an online environment.

To clearly define what the computer-supported collaborative learning is, it pertains to a social interaction that involves a community of learners and trainers, where members acquire and share experience and/or knowledge online (Zhu, 2012). It is based on the pedagogical assertion that students learn and construct knowledge through group interaction, supported by the online platforms and technological tools. It involves the joint construction of meaning through distant and reflective interaction with others, promoting meta-cognitive processes and problem solving. Educators are encouraged to assign group work offering the students the freedom to learn from one another through working in groups to accomplish a task.

According to Zhu (2012), educational research has shown that **working together** to accomplish a task is considered an indication of a powerful learning environment, which facilitates the active construction of knowledge. Studies have also found that students had more **constructive learning processes** in collaborative learning conditions, which can lead to successful development of learning improvement and learners' knowledge wider sharing. In online learning communities, students have the chance to **create, share information, practice critical reflection, negotiate meaning, test synthesis, and build consensus**. They can also enhance their knowledge construction through online collaborative assignments, group discussions, debates and critiques of arguments. Collaborative learning supported by the modern computer-mediated communication, focuses on developing HE students' capabilities to meet the increasingly complex situations and challenges of working in a postmodern world. When equity and group dynamics are appropriately addressed, then students enjoy and benefit a lot from collaborative learning with and from their peers.

Hartley and Collins-Brown (1999) notice a **distinction between cooperation and collaboration**. Cooperation implies that participants agree on the objectives of a common purpose, but the process may only be a collection or amalgamation of each individual's work. On the other hand, collaboration in learning makes stronger, interactive demands on the process and also on the shared goals. This means collaboration entails both the acquisition of the desired result and also the development of a sense of community. Interactions are clearly the key placed at the core of collaboration, since common understandings are negotiated and developed across **differences of personal knowledge, skills and attitudes**. Collaborative learning thrives on these differences. To fully take advantage of these benefits, the motivation and confidence to participate are clearly important and should be considered. Also, interchanges that involve question-answering and explaining, while being open to challenge and justification, will require participants to assume a variety of functional roles.

Questions for reflection

- Reflecting on your educational practice, have you employed a collaborative learning method or technique at your online teaching? If yes, how?
- Was it effective for your teaching based on the conditions or contexts of your case?
- Would you rather amend collaborative learning or combine it with another method?

Technical type

Text

– Document

Image

– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

40 minutes

Learning Object 3.2 Title

More information about collaborative learning

Learning Object Description/Introduction

To further explore collaborative learning, read the content provided in this learning object.

Learning resource type

– Did You Know

Learning Objective Content

A much-quoted **advantage of collaborative learning** according to Hartley and Collins-Brown (1999, p.3) is that "*collaboration encourages active learning and a more thoughtful participation in the learning process from teachers and students*". Students who self-question and self-explain have been proven to **perform more competently, show greater understanding and acquire new knowledge more easily**. During such activities, the missing knowledge is identified by students and this stimulates further their reasoning and enquiry as they try to develop their understanding. However, participants with a weaker sense of community, when explaining to others who are puzzled, may not take the same care or feel the same responsibility as when they are self-explaining and repairing their own misunderstandings. When educators become part of the dialogue process, the style of discourse can become more instructor-oriented and this may be a much more critical factor than the quality of peer interactions, as might be the type of tasks and the types of talk these tasks stimulate (Hartley & Collins-Brown, 1999).

Technical type

Text

– Document

Image

– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

10 minutes

Learning Object 3.3 Title
More information about collaborative learning
Learning Object Description/Introduction
Visit the links provided in this learning object to find out more details about collaborative learning.
Learning resource type
– Further Reading
Learning Objective Content
A new taxonomy for evaluation studies of online collaborative learning Collaborative agile learning in online environments: Strategies for improving team regulation and project management Student satisfaction, performance, and knowledge construction in online collaborative learning
Technical type
Text – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 3.4 Title
Collaborative Online Teaching in Management Education (ME)
Learning Object Description/Introduction
Successful academic and industry collaborations can play an important role in improving the use of technology and the cross-disciplinary work, as well as establishing a community atmosphere within the course participants. For HE institutions, it has an underlying potential to enhance recruitment, research and/or scholarship. Specifically, experiences can strengthen skills of faculty members by keeping them updated and in line with the industry expectations and best practices of online delivery and curriculum development. Carefully designed collaborations can provide students real hands-on experiences, strengthen their engagement in the course and even offer the chance of finding jobs. This section presents potential ways to promote collaborative learning through reflection and social negotiation, as well as useful tips and basic guidelines for the online educators in ME, who need to be acquainted with methods to foster collaborative learning in an online setting.
Learning resource type

- Narrative Text (theory)

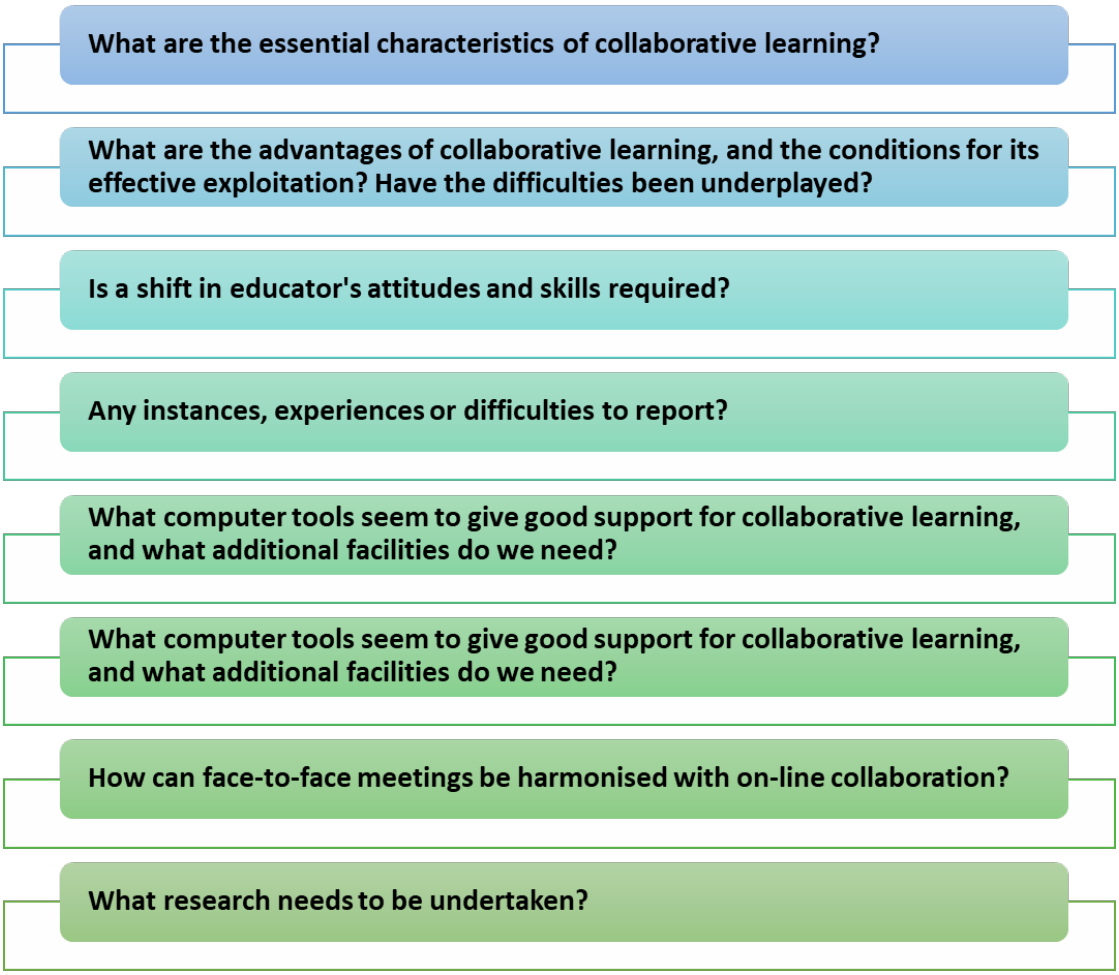
Learning Objective Content

As already described in the previous section of the current Learning Unit, collaborative learning technique encompasses the use of group work to learn a task. In the pedagogy of ME teaching, educators are encouraged to assign group work, allowing students to learn from one another, given that peers are generally at the same level, can handle adequately the same actions, have a common goal and work together for that.

Management courses conducted online provide the chance to build a beneficial environment of collaboration, which better prepares HE students for their future careers in management and engages them in their learning. Group work has been identified as a precious opportunity for HE students to learn effectively in an online environment. Therefore, it is important to foster collaborative learning environment, where students - even from varying disciplines with different cultures and ethnicities - can work together. Khan et al. (2017) highlight that the key is to promote collaborative learning with contemporary issues, allowing for interaction with different groups including the community. This type of setting fosters experiential learning through a social and cognitive process that helps developing skills such as critical thinking, collaboration and self-reflection.

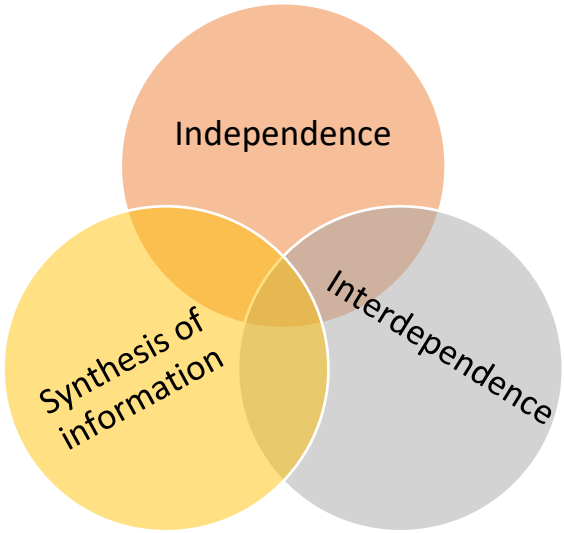
In his study, Huang (2002) agrees that the online educators need to find ways to promote collaborative learning through reflection and social negotiation. To facilitate online educators in this, Hartley and Collins-Brown (1999) pose several questions (see ***Figure 17*** below) for the issues that an online educator need to wonder about find answers in their attempt to promote collaborative learning:

Figure 17. Questions for online educators to promote collaborative learning



In another point in pertinent literature to facilitate online educators, Maina et al. (2017) claim that collaboration can be described by three important elements (***Figure 18***):

Figure 18. The Three elements of Collaboration



To ensure an effective online collaborative learning, the three above elements work together. **Independence** is concerned with the level that the instructor or any other participants interfere in individual participation and interaction (Maina et al., 2017). Posting new ideas rather than just providing answers is an indication that individuals are more independent and so more collaborative. **Interdependence** suggests active participation by each member. Participation refers to the number of messages and statements submitted by each individual and the group as responses to the other participants' posts (Maina et al., 2017). **Synthesis** can be measured by the interaction pattern of the discussion that appears when a participant makes a statement, while another individual synthesizes it by extending the idea and relative messages, thus yielding new ideas. Alternatively, synthesis can be analysed by checking the relationship between original comments and the final result (Maina et al., 2017). Based on these three elements, a table (***Table 3***) is constructed to depict the characteristics associated with the levels of collaboration competence:

Table 3. Characteristics Associated with Collaboration Competence Levels (CCL)

CCL	Characteristics
High	If a student logs-in often and participates and interacts actively, his/her profile is clearly collaborative, and the learner can be ranked into a higher level of collaboration competence.
Medium	If a student logs-in often and participates and interacts moderately, his/her profile is medium, and the learner can be ranked into a medium level of collaboration competence.
Low	If a student logs-in and participates rarely and there is no indication of interdependence, synthesis and independence, his profile is non-collaborative and the learner can be ranked into a low level of collaboration competence.

Source: Maina et al., (2017, p.27)

Bennett (2004, p.21-23) makes several suggestions for HE trainers and designers to consider:

- Think how working with others reflects real-world practice in the discipline and could help learners understand the nature of collaboration in context.

- Have available an array of online tools to utilize within the learning environment and make sure that students are well aware of them from the very beginning. It is important that they have the chance to choose the tools they need along with the way to use them. For more content about online tools available, follow the link:

  A comparative analysis of forums and wikis as tools for online collaborative learning

- Present the advantages and barriers of the online communication to students. Discuss with them about potential problems and strategies they might consider. Doing so, they will be more prepared about communicating in the online environment.
- Allow for both face-to-face and online communication within the design of the subject. Students should be also encouraged to think about when teams need to meet and how members will contribute to the project when they are apart.

Questions for reflection

❖ Recall an example of a collaborative activity that you have applied recently. What practice did you follow? Did it contribute effectively to your online teaching?

Technical type
Text – Document – Table – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
90 minutes

Learning Object 3.5 Title
More information about collaborative teaching in online environment of ME
Learning Object Description/Introduction
Find out more details about collaborative online teaching in ME by following the links provided in this learning object.
Learning resource type
– Further Reading
Learning Objective Content

Enhancing active learning pedagogy through online collaborative learning
Supporting collaborative project teams using computer-based technologies

Simulations and games in management education: Towards a multi-dimensional experience
Technical type
Text – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 3.6 Title
Practical activity for collaborative online teaching in the field of ME
Learning Object Description/Introduction
Implementing the following activity, you will be able to apply collaborative online learning in ME, so as to encourage your students to work collaboratively in groups.
Learning resource type
Activity – Scenario teaching
Learning Objective Content
Assume that your next lesson is about the strategic implications of Corporate Social Responsibility in modern businesses, which you intend to teach to your students online. ● What collaborative activity would you include in this teaching content? ● Justify your option by describing in brief why and how the proposed collaborative activity is expected to enhance your students' online learning process. The following link may also facilitate you with the current activity: Effective pedagogies for managing collaborative learning in on-line learning environments **Proposed collaborative activity and justification:** As a HE tutor in the Management field, I would create small groups of students (3-4 individuals) and assign tasks to them about identifying major thematic categories of Corporate Social Responsibility (CSR), which modern businesses can consider when developing a strategic CSR plan. For instance, a group will focus on the environmental aspect, another group on the social aspect regarding human rights, another on health and safety, another on the marketplace and workplace, etc. After finishing their work in small groups, students could present to each other their perspective (delegates may occur for each group) and make proposals for including their work within a main strategic CSR plan

according to the impact that this will have for a business. To do so, all small groups can work together and finalize the strategic CSR plan.

This collaboration activity is anticipated to make online learning more attractive for students. They are expected to engage more, since it involves critical thinking about current issues, negotiating, socializing in small groups, and the chance to make a presentation for a subject that they will study and be confident to explain to their peers.

Technical type

Text

- Document
- Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Learning Unit 4 Title

Adult learning theories and principles and their applications in online teaching in ME

Learning Object 4.1 Title

Adult Learning Theories and Principles

Learning Object Description/Introduction

Adult education (AE) and higher education (HE) have many common points of interest. Therefore, specific AE techniques are naturally anticipated to be applied also in HE. However, HE students are used to conventional ways of education, starting from school and continuing throughout the university, with only some differences but without essential divergences (Raikou & Karalis, 2016). Therefore, they are not familiarized with forms of education that encourage critical thinking. This implies that reflective processes and principles of AE are necessary to be embedded into HE, in order to ensure a better professional preparation of HE students, which is critical especially in the field of management. This learning object reviews the most significant **adult learning theories** and relative **principles** that are applied in ME.

Learning resource type

- Narrative Text (theory)

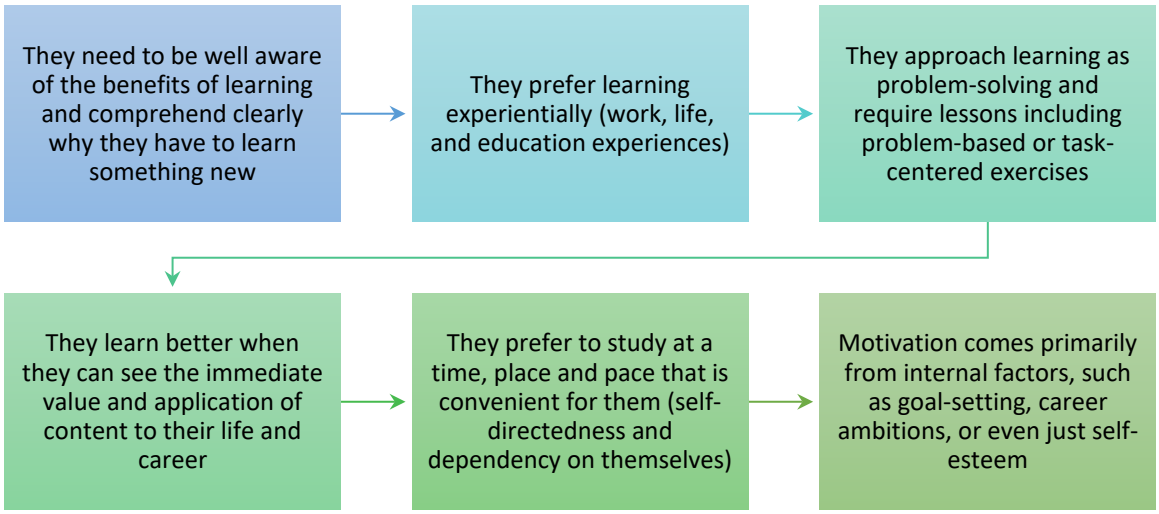
Learning Objective Content

Theories of future learning are changing how faculty members and educators envisage the design of the curriculum from one focusing on knowledge acquisition to another that is more concerned with adaptive intelligence. Future learning is increasingly linked with creativity, collaboration and capability, rather than just knowledge of a subject domain and attendant skills. This becomes

particularly profound as more adults are entering the HE, especially in the broader field of management. Moreover, the material has changed and the learning strategies that educators apply in the adults' classroom differ significantly. Yet, it remains important to remember that all educators bring a unique constellation of learning experiences to the table (Stoten, 2020).

To plainly define adult learners, they are learners that have completed formal education, but are still motivated to increase their knowledge and competences. They share common characteristics that are different from typical underage students and influence the design of learning programs.

Figure 19. Features that distinguish adult learners



Source: Knowles (1980, pp.56-61)

Questions for reflection

- Remember a situation when you adjusted your teaching to fit for adult learning. Did you face any obstacles? How did you feel about the adult students' attitude for your lesson? Try to explain the reasons for these feelings.

Within the perspective of adult learning, foundational theories have emerged as portrayed below:

Figure 20. Major Adult Learning Theoretical Models

Andragogy (Malcolm Knowles, 1980)

- Adults need to feel accepted, respected, and supported.
- Spirit of mutuality between trainer and learner as joint inquirers.
- Learners evolve gradually from being dependent to independent.
- Focus on giving students an understanding of why they are doing something, with plenty hands-on experiences and less instruction.
- Cultures may not be taken into consideration well enough.

Self-directed Learning (Alan Tough, 1970)

- Learners take initiative to set goals, determine their educational or training needs, trying to enhance their own learning.
- They plan, carry out, evaluate, and control their learning experiences without the help of others.
- They decide to take a class, find a mentor, or join an online discussion group.
- Some may lack the confidence and understanding to do self-directed learning well, thus, avoid pursuing self-directed learning.

Transformative Learning (Jack Mezirow, 1970)

- Focus on changing the way learners think about the world, and how they think about themselves.
- Often utilizes dilemmas and situations to challenge the learner's assumptions and principles.
- Promotes the use of critical thinking and questioning among learners to discuss, challenge, and expand their understanding.
- No concern for relationships, feelings, and cultural contexts, which makes learners feel unsafe or nervous to share their thoughts with instructors or other learners in the educational setting.

Experiential Learning (David Kolb, 1970)

- Role-play, hands on experiences, and reflective learning, rather than memorizing facts and figures.
- Learn by doing, instead of just hearing or reading about something.
- Focus on the idea that adults are shaped by their experiences, since the best learning comes from making sense of their own experiences.
- There is great value on goals, metrics, decision-making, and details that can be overlooked in experiential learning.

Source: Bélanger, (2011, p.35)

Many learning theories are firmly lodged in the Humanistic approach. Humanism focuses on adults taking ownership of learning and assumes that the ultimate purpose of learning is to facilitate a self-actualized, autonomous person (Arghode et al., 2017). This approach envisions an education for the sake of an individual's independence, self-reliance and self-awareness, where learners are responsible for their learning, and instructors are only the facilitators. Humanists believe the key purpose of humanistic education is to enhance personal growth and develop human potential, human feelings and other affective parameters (Merriam 2018). Other important theories of adult education are presented in the following table (***Table 4***).

Table 4. Adult Learning Theories

Theory	Source
Person-centered approach	Carl Rogers (1961, 1972)
Social Change	Paulo Freire (1977)
Theoretical model of Knox: individual's effort to meet life demands successfully	A.B Knox (1986)
The "Learning process" model	Peter Jarvis (1987)
Learning cycle	D. Kolb (1991)
Reflective practice theory	Donald Schon (1983)
Action Science	Cris Argyris & Donald Schon (1978)
Characteristics of Adults Learners (CAL) model	Cross (1981)
Three dimensions of learning	Knud Illeris (2002)

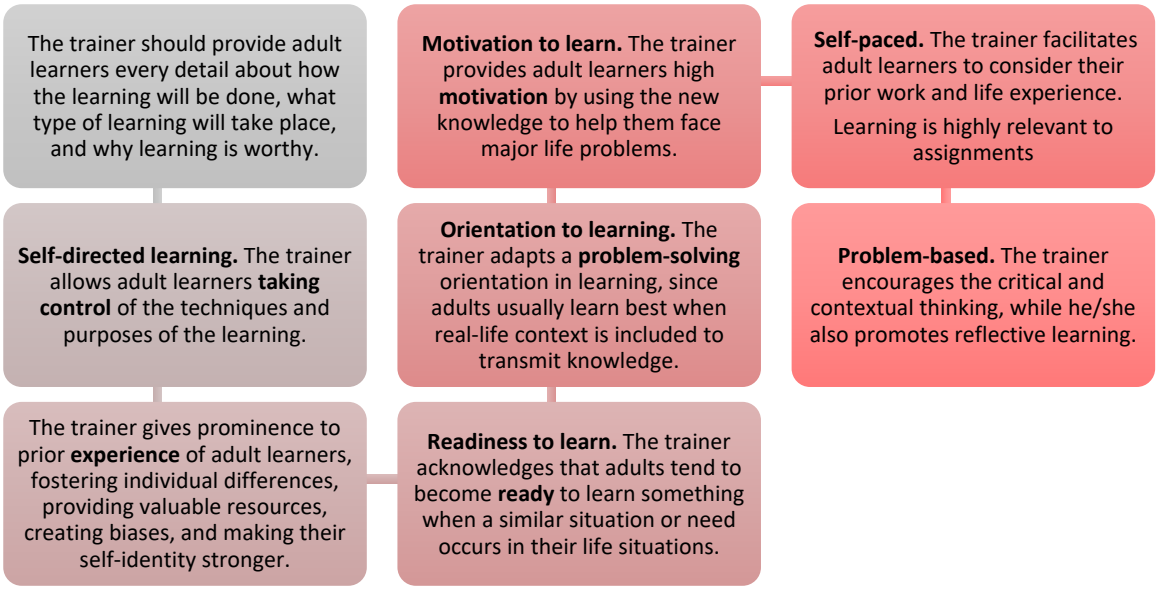
Most of the above theorists highlight how important is to exploit the rich experiences of adult learners. They suggested methodologies that encourage the active participation of adult learners in all phases of the learning process, considering the adult trainers mainly as instructors, motivators, and coordinators, rather than individuals who just intend to transfer knowledge and values.

Questions for reflection

- What are the differences between adult and underage learners?
- What do you think is the most suitable theory to be applied in your field and why?

Next, key principles of adult learning along with implications for teaching online are presented:

Figure 21. Key Principles of Adult Teaching



As Huang (2002, p.30) highlights, adult educators regard that learning occurs for each individual as a continuous life-long process. Facing new learning situations makes naturally every learner feel anxious or nervous, despite individual differences. Particularly, **adults need high motivation** for learning, as they have more responsibilities for their work and families. To this end, instructors need

to **reinforce adult learners positively** at the proper time. This entails also presenting materials that are well structured to increase the chances of success.

Also, Stoten (2020) cites "**Heutagogy**" as an alternative adult learning pedagogy. Heutagogy seems to provide a more suitable theoretical framework to understand the aim of promoting adult learning within a professional or training context. Among the key principles of heutagogy is empowering learners to negotiate their own learning process through a bespoke curriculum that meets their individual goals and is evaluated by specific criteria that are established by the learner. Heutagogy, therefore, is described as an attempt to personalize a curriculum that is focused on developing professional capability (Stoten, 2020).

Question for reflection

- Considering the above-mentioned principles of adult learning, how do they influence the way you deliver Management teaching to adults? Think about this case in general and particularly when teaching online.

Through the review of adult learning theories, it becomes clear that there is not just one theory or one set of principles that can conceptualize the full spectrum of what adult learning incorporates. Rather what we have is an expanding mosaic of relative theories, models, principles, and insights that altogether constitute what is known about adult learning throughout its lifespan. To refer to the most recent work in adult learning theory, the holistic conceptions of learning have been at the forefront. According to those conceptions, learning is viewed not just as the cognitive processing of information, but as something much more than this, involving emotions, body and spirit.

Technical type
Text – Document – Hypertext Image – Figure – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
100 minutes

Learning Object 4.2 Title
More information about adult learning theories and principles in online environment of ME
Learning Object Description/Introduction
Find out more details about adult learning theories and relative principles in ME by following the links provided in this learning object.
Learning resource type

– Further Reading

Learning Objective Content

Models of adult learning: a literature review
Adult learning theory: Evolution and future directions
Contemporary models of management education in the UK
Practical Heutagogy: Promoting Personalized Learning in Management Education
Analyzing principal professional development practices through the lens of adult learning theory
Organisational Learning: a Theory of Action Perspective
Helping adults learn
Theories in Adult Learning and Education

Technical type

Text
– Hypertext
Image
– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

100 minutes

Learning Object 4.3 Title

Practical activity for online learning theories for adults in the field of ME

Learning Object Description/Introduction

Implementing the following activity, you will be able to practice adult education techniques in teaching management in online environments.

Learning resource type

Activity

– Assigned reading text

Learning Objective Content

In this activity you are asked to read the following articles, so as to become fully acquainted with basic aspects of adult learning, including common theories and major pedagogical principles.

Contemporary models of management education in the UK
Practical Heutagogy: Promoting Personalized Learning in Management Education
Organizational Learning: a Theory of Action Perspective

Once you finish with reading the above links, please think and identify three major benefits and three major challenges that you may experience through teaching online for adult students. Then,

share with your peers the benefits and challenges you detected, and ask about their own options. In the end, try to come up with potential solutions that address the identified challenges.
The following link may also facilitate you with the current activity:

Effective pedagogies for managing collaborative learning in on-line learning environments

Technical type

Text
– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60 minutes

Conclusion of the module

Through the completion of this module, you are now acquainted with basic learning theories, pedagogies, and principles, as applied in distance and online learning contexts. You are also more aware of active and collaborative learning pedagogies and practices applied in online teaching of management.

Also, you are ready to effectively apply those active and collaborative learning practices to facilitate your work in distance learning and online learning environments. Advanced teaching techniques can be used effectively, in order to support the complex decision making and interaction in online environments in ME.

Additionally, you are in position to successfully incorporate aforementioned theories, pedagogical approaches, and principles in the field of management for your students, employing appropriate teaching styles, methodologies, activities, and reflection practices online, so as to make their teaching more flexible, convenient and attractive for students to engage.

Conclusion type

Text

Summative Assessment of the module

Question template for Multiple Choice Questions	
No.	1.
Question (stem)	Which of the following options are connected with the benefits / advantages deriving from online learning? (*There are more than one right answers*)
Possible answers	a) Reaching student populations. b) Flexibility and accessibility in education.

	c) The social perspective and the feeling of belonging to a community. d) Time limitations or location restrictions. e) Resistance by educators to change format in their teaching methods. f) Opportunities for collaboration.
Correct answer	a) Reaching student populations. b) Flexibility and accessibility in education. f) Opportunities for collaboration.
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

2. Can you recall the most basic features of the learning theories, pedagogies, and principles in distance/online learning contexts? Then, make the crossing accordingly.

a) Behaviourism	information can be stored and retrieved when needed (b)
	learners build knowledge through their own social and situational learning experiences (c)
b) Constructivism	involves conditioning, memory, stimulus and response (a)
	recognises the importance of individual differences (b)
c) Cognitivism	frequent review or revision with check tests (a)
	relies on individual experiences, thoughts, interactions (c)

Question template for Multiple Choice Questions	
No.	3.
Question (stem)	The collaborative learning method is suitable for a learning environment that is defined by differences of personal knowledge, skills, and attitudes among adult students.
Possible answers	• True • False
Correct answer	True
Response to correct answer	-
Response to wrong answer(s)	-

Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	4.
Question (stem)	Try to identify which of the following is **not** an active learning mechanism. (*Only 1 does not fit*)
Possible answers	a) Debate b) Role playing c) Individual inquiry d) Peer learning e) Drama f) Discussion
Correct answer	c) Individual inquiry
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	5
Question (stem)	Which of the following statements describes correctly an online teaching principle for adults? (*Only 1 answer is correct*)
Possible answers	a) The trainer has no impact on the self-identity of adult learners. b) The trainer, but not the learner, can have control of techniques and purposes of the learning. c) The trainer should provide high motivation by using the new knowledge to help adults solve important problems in their life. d) The trainer should ignore individual differences among adult learners. e) The trainer should ignore adult learners' prior work and life experience. f) The trainer should not provide details about how the learning will be conducted or what type of learning will occur.
Correct answer	c) The trainer can provide high motivation by using the new knowledge to help adults solve important problems in their life.
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Assessment type
– Multiple Choice Questions (single or multiple correct answers) – Matrix
Technical Type
– Text
Workload
The estimated study time needed for an average learner is **15 minutes**.
Number of questions in the assessment object
5

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Module 2: Design thinking approaches

Module Number
2
Module Title
Design thinking approaches
Short Description / Motivation text
This module provides the learners a set of learning units aimed at improving knowledge and skills about design thinking concepts and principles to better design online training activities and courses. The module is structured in three learning units that will help learners navigate into the subject, starting from a general introduction about the main theories of design online courses, with activities that will help the learner going in deep with the content and experimenting practices. The second part of the module is about design thinking and what this practice is, how to use it in management education and online training and moving on to using design thinking approaches to create content for online courses. Practical examples, activities and use cases are also provided. In this module, learners will also find several external resources to expand the content of the learning units like academic papers, link to video webinar, or resources that could help developing innovative online courses. After the completion of the module, learners will be able to practice methods, processes, and tools of design thinking so as to design and deliver effective online courses that promote students' positive attitudes and engagement and ensure real world situations' modelling.
Keywords
Design thinking, Online teaching, Management, Problem solving, Innovation
Learning Outcomes
Knowledge After the successful completion of this unit learners will: – Be familiar with the design thinking approach and its application in higher education – Relate the design thinking approach with the learning theories applied in management education and online teaching – Be familiar with the methods, stages, techniques and tools of design thinking applied in education design (content, material) and delivery (teaching strategy) – Recognize the impact and effectiveness of design thinking in design and delivery of online teaching – Learn how design thinking is used to conceive innovative online courses – Understand the concepts of design thinking approaches in digital material development Skills After the successful completion of this unit learners will be able to: – Design innovative online courses (content, material), using design-thinking approach – Deliver online training using design thinking as a teaching strategy to achieve specific learning goals – Apply the design thinking approach so as to model real world situations in online learning environments

Competences
After the successful completion of this unit learners will

- Be competent in developing online training using design thinking approach
- Be competent in practicing the methods, processes, and tools of Design Thinking in online training delivery
- Be competent in using design thinking approach for supporting team based and practice-oriented processes in online educational environments.

Language

English

Training Content

Learning Unit 1 Title

- State-of-the-art learning design theory for designing online courses

Learning Object 1.1 Title

Theories about e-learning design

Learning Object Description/Introduction

Organizing training programs is an increasingly complex challenge, whether this training takes place online or offline. Some of the specific aspects of creating training courses include 1) the subject being taught; 2) The level at which the subject is taught and the infrastructure. Each of the aspects mentioned plays an important role in the design phase of the training path, although some subjects lend themselves, due to their solidity, rigor, or other characteristics, to a linear and replicable path over time, others do not have this "advantage". The present learning unit provides an overview of the literature about theories of e-learning design.

Learning resource type

Narrative Text

Learning Objective Content

Today, more than ever, it is clear that training cannot be limited only to face-to-face teaching, both because of the limitations of this method due to the infrastructure (number of seats per room, timing, and so on) and because the demand for high-level training that can be used *on-demand* has been growing since the 90s and has now become almost a standard. In 2016, it was reported that the number of, “online courses grew to 5.8 million nationally, continually a growth trend that has been consistent for 13 years” (OLC, 2016).

However, it is useful to highlight differences between conventional and online learning in terms of primary sources of information, evaluation, or educational quality. While in traditional education, students are only evaluated by teachers, who also serve as their primary source of information, and the quality of education is determined by the teacher's knowledge and skills.In online learning, students can obtain information from a variety of documents uploaded to the platform, and the

quality of education is determined by the level of training that teachers have in using technology. Cheung and Cable (2017) identified and described eight core principles of effective online teaching, including:

1. Encouraging contact between students and faculty;
2. Collaborative learning;
3. Quick feedback;
4. Active learning;
5. Task time—encouraging students to allocate more time for completing tasks;
6. High expectations—the teacher should communicate their expectations in order to encourage and motivate students;
7. Diversified learning;
8. And technology application.

Given that the growth and use of systems and technologies supported the creation and extension of educational options, the use of E-learning in higher education and students' perceptions of its utility were study topics for many scholars. An interesting study was conducted by Vitoria et al (2018), with respect to the students' perception of E-Learning in higher education.

The COVID-19 pandemic has exacerbated this demand by making the organization and full shift of training from offline to online a necessity even in higher education systems such as universities, predominantly driven by offline training (Pokhrel & Chhetri, 2021). Speaking about theory around designing online courses, one of the most important aspects that should be considered is well expressed in the Technology Acceptance Model (TAM). TAM, developed by Davis (1989), is based on Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA), which states that beliefs can influence attitudes (feelings of favorability or unfavourability toward using technology), which then leads to intention to use (indicating the strength of one's intentions to use the technology in the future), and finally actual usage behavior. The behavioral intention to use E-learning is influenced by perceived utility and perceived ease of use, according to TAM. Indeed, in most of the cases, students are young people familiar with different types of technologies, so you can push them in using detailed and perhaps complex software, and provide them mobile-friendly solution (es. podcast) since maybe you are facing students that use public transportation. Although they can be familiar with some kind of technologies, it doesn't mean that all the proposed technologies will be easily accepted and could actually improve learning, so once you are designing an online course, you should take into consideration the aspects that are stated in the TAM.

Do you think that the tools you're using in delivering online classes are perceived as useful and easy to use by your students? Why not asking them after some period of testing the tool?

Have you ever tried recording your lessons? It could be an excellent starting point to a brief podcast on the topic you are teaching. Maybe you can ask your students to give their registered notes, if any.

In their paper Davis et Al. (2019) also provided some suggestions and tools to handle this situation in a better way, in this module we will see the Design Thinking approach as a tool that potentially helps you in delivering online courses.

Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 1.2 Title
Theories and models from instructional design for online learning
Learning Object Description/Introduction
Theories and model that can be used to design and implement online courses
Learning resource type
Did you know
Learning Objective Content
Did you know? There are many different theories you can consider once you start designing your online course, listed below some of the most used. 1- **Situated Cognition Theory** (Brown et al., 1989): this theory states that you cannot divide knowing from doing, its foundation is that learners must apply the knowledge (and newfound skills) outside the learning environment (so if you decide to apply this theory you must frame the course with real-world application); 2- **Sociocultural Learning Theory** (Vygotsky, 1934): according to sociocultural theory learning process is influenced by three elements - Culture, Language and zone of proximal development. According to this theory peers can influence thinking and feelings about a particular subject; 3- **Discovery Based Learning** (Bruner 1957): following the Discovery-based theory, we can find that learners have a really active role in the process, guiding themselves the learning process, framing the problem, formulating hypotheses and drawing the conclusion based on data gathered and analyzed. This process allows learners to confirm or debuck their original theories about a specific subject; 4- **Inquiry-based Learning** (Schwab, 1960): different from the Discovery-based, the inquiry based theory states that learners achieve learning outcomes by interacting with peers investigating on real-world situations (challenges), an important aspect of this theory is that allows learner to develop soft skills, such as listening, communication, cooperation and leadership; **5- Elaboration Theory** (Reigeluth, 1979)**:** applying this theory, means that the learners have to elaborate complex concept, starting from the most rudimentary ideas and information. The Elaboration Theory is composed of three main steps that are: looking at the big picture summing up problems and links among concepts in that specific

situation, examine individually each variable and link highlighted in the first step, look the big picture again and understand how each variables fits into the „puzzle";

6- **Individualized instruction Theory** (Keller, 1979): as the name of the theory suggests, this theory considers the learning process something that the individual has to manage. This theory is at the basis of the „Keller Plan" which argues that an individual must be able to explore and dig into the subject on their own, only through this process the learners can fully understand a topic. It consists in four principles (learners have to complete autonomously their work in order to understand strengths and weakness of their own knowledge; assessment should be frequent at the end of each lesson to monitor progress and knowledge mastery; written learning materials are more common than presentation; facilitators support learner giving them also a level of social interactions that add value to the learning experience).

Consider this theory as a toolbox in which you can choose when you have to design your online course, paying attention to the desired learning outcomes (if you are planning to teach HR management it could be more suitable rely on the Inquiry-based theory instead of the situated condition one).

Technical type

– Text
– Hypertext
– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 1.3 Title

Learning design for online courses in adult education

Learning Object Description/Introduction

Listed below is a mix of academic papers and external links to go in deep with the learning design for online courses and adult education.

Learning resource type

Further reading

Learning Objective Content

(Kamal, A. A., Shaipullah, N. M., Truna, L., Sabri, M., & Junaini, S. N. (2020). Transitioning to online learning during COVID-19 Pandemic: Case study of a Pre-University Centre in Malaysia. *International Journal of Advanced Computer Science and Applications*, *11*(6).

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Approaches to learning design

E-Learning theory

Technical type

- Document
- Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

250

Learning Object 1.4 Title

Practical Activity

Learning Object Description/Introduction

Implementing the following activity, you will better understand principles of different learning theories.

Learning resource type

Activity

- Assignment

Learning Objective Content

Based on the content of Learning Object 1.3 fill the table with the principles for each theory

Table 1 Template for designing online courses

Theory	**Main aspects**
Situated Cognition Theory	
Sociocultural Learning Theory	
Discovery-based Theory	
Inquiry-based learning	
Elaboration Theory	
Individualized theory	

Technical type

- Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

35

Learning Object 1.5Title

Good practice

Learning Object Description/Introduction

Good practices used to design online courses

Learning resource type

Good Practice

Learning Objective Content

Here you can find reports on best practices in online course design:

- *Best practice in Online course design*
- *Online course design best practices*

Technical type
Text - Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Unit 2 Title
● Introduction to the design thinking approaches

Learning Object 2.1 Title
Introduction to Design Thinking (DT)
Learning Object Description/Introduction
Designing online courses, as we saw in the previous learning unit, involves different stages and the very first one is to define the learning outcomes that we want our learners will achieve. In this process, we are already thinking about how to design, so basically, we have to set up a series of actions, that lead from step 1 to step *n*, at the end of our process, to let the learners achieve the desired outcomes that we state. In this learning unit we will see what the DT approach is and what are the main phases of the DT in designing online courses. The very first step of DT is that the DT approach is opposite to traditional teaching when we are facing problems with a limited number of right answers.
Learning resource type
Narrative Text (theory)
Learning Objective Content
In most of the courses, no matter whether online or offline, a typical scenario is where a teacher asks the students some questions and students answer these with the aim to give the 'right answer'. There is usually only one right answer, even when more than one answer is possible, or reasonable, there will be only one answer commonly defined as the right one. Stand this consideration, any other input is considered wrong. This kind of situation is what we see in the typical teacher-centered approach, a situation where teachers teach, and students listen passively with low interactions. The process of Design Thinking (DT) is opposite to this kind of teaching, using DT approach to deliver lessons actually means that you should shift from the teacher-centered approach, to a student-centered approach. While teaching DT, students are encouraged to explore real-world problems without easy solutions, perhaps without a solution at all! They are expected to take charge of their own learning, work together in teams rather than individually, and understand that there are no "right answers" to the greatest of challenges/problems.

Using the DT approach allows to move the center of the course from the content to the learners, giving them the responsibility to find a solution (or more) to a problem, the learners become responsible to find a possible path to achieve the outcomes related to the problem.

However, let's take a step back: **what Design Thinking actually is**?

In the past decade, several definitions of Design Thinking have been proposed, as reported in Shallmo et al. (2018), a list of definitions is provided in the table below:

Table 1: Design Thinking definition in literature

Author	**Definition**
Plattner et al., 2009	The Design Thinking approach is a systematic, user-oriented approach to solving real-life problems. Instead of focusing on how the problem can be technically solved, the main focus is addressing the user's needs and requirements.
Erbeldinger & Ramge, 2015	Design Thinking [...] is innovative thinking with a radical, user orientation. It is based on the interdisciplinary principle and connects the attitude of openness with the need for results.
Mootee, 2013	Design Thinking is the search for a magical balance between business and art, structure and chaos, intuition and logic, concept and execution, playfulness and formality, and control and empowerment
Curedale, 2013	Design Thinking is a people-centered way of solving difficult problems. It follows a collaborative, team-based cross-disciplinary process. It uses a toolkit of methods and can be applied by anyone from the most seasoned corporate designers and executives to school children.
Ideo, 2012	Design thinking [...] is about believing we can make a difference and having an intentional process in order to get new, relevant solutions that create a positive impact. Design Thinking gives you faith in your creative abilities and a process of transforming difficult challenges into opportunities for design.

Starting from these definitions is it possible to highlight common aspects that brought Schallmo et al. to a more general definition (Scahallmo et al. (2018) p. 3):

*"The approach of Design Thinking pursues the objective of developing new solutions for existing problems. These solutions are consistently oriented towards the **needs** of **users** and have a positive influence. The Design Thinking process is structured and iterative. Within the Design Thinking process, a multidisciplinary team uses techniques."*

This definition gathers different aspects of the DT approach, highlighting the main aspects of the process, which are:

- Developing solutions,
- Focusing on users,

- Iterative and structured process,
- And Multidisciplinarity.

The five elements listed above lead to the common definition of DT approach phases, which are the following:

1. **Empathize**: The objective is to identify problems that others may be facing. The students need to see themselves in the user's shoes and empathize by seeing, thinking, and feeling. As a facilitator, you need to guide them in doing so,
2. **Define:** Once the students have identified the problem and understood what the others must be facing, they need to clearly define the problem. The Point of View (POV) statement helps transition into the Define stage in Design Thinking,
3. **Ideate:** Using different ideation techniques, help students brainstorm, explore their creative potential and come up with solutions to challenges,
4. **Prototype:** Students now need to validate the ideas generated. Help them trim things down or marry thoughts and customize. The idea needs to become tangible. Also, you need to prepare students for feedback or suggestions from targeted users as well as for appreciation,
5. **And test:** testing will help determine what works and what does not. It may even land you and the students back at the drawing board! Or if the user likes the solution, then the process of design thinking can end. The best idea goes into execution.

Each of these stages answers a specific question, as summarized in the image below.

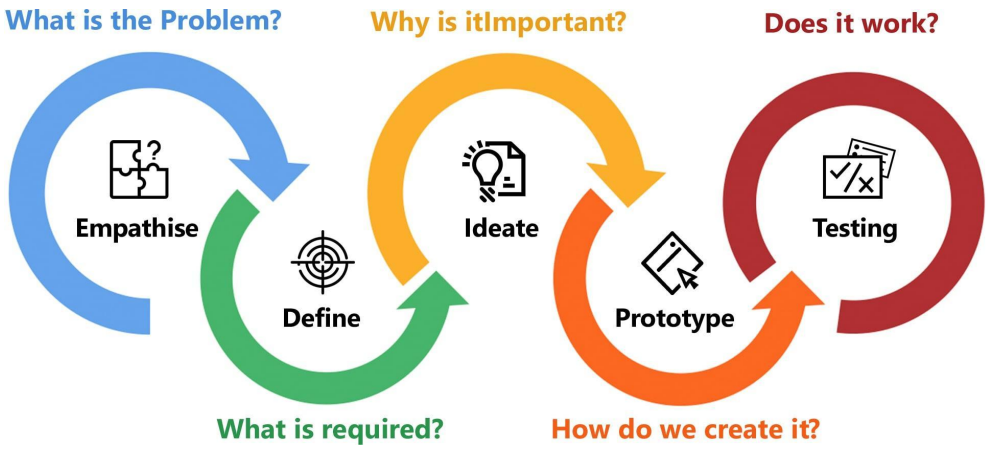

Figure 1 - Main steps of Design Thinking Approach - Source: https://www.mirketa.com/wp-content/uploads/2020/07/5-Stages-in-the-Design-Thinking-Process.jpg

Within these five stages, problems can be framed, the right questions can be asked, more ideas can be generated, and the best answers can be chosen.

The five stage of DT process do not underline a path that you should follow from the beginning to the end, even though it starts from the Empathize step, the other four are not linear; it means that once you have started the process, you can move back and forward before you get the very ideal

solution that can be tested. In other words, the stages can be repeated as many times as required. Think about a possible situation where your prototyped solution does not achieve any results, maybe you need to come back to the empathise phase and restart the process, asking different questions, or interviewing different people, or simply you should ideate something different.

In the field of higher education, DT can be used for different purposes, you can use DT approach to define your next course, to deliver a specific task and let your students apply DT approach to solve a reality problem to better understand a topic. More information about using DT in higher education is provided in the next learning object.

Why should you use the DT approach in online courses? It seems a reasonable question, in his article, Christopher Pappas highlights at least six benefits of design thinking in e-learning, that include:

1. Gives you the opportunity to view a problem from a different perspective;
2. Allows you to delve into a problem to determine its root cause;
3. Encourages innovative thinking and creative problem solving;
4. Ensures that the final outcome meets objectives and client requirements;
5. Results in an experience that is more effective and informative for your learners
6. Enables you to continually expand your knowledge

Once we listed the benefits, it is important to understand what should be the path that needs to be followed in order to implement and design online courses adopting the DT approach. As for the DT approach in general, here we have five different stages, that we will explore in the next learning object. It is important to remember that DT is a problem-solving strategy that can be used potentially in any situation that requires finding solution for a group.

Technical type
Text – Document – Hypertext Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30
Learning Object 2.2 Title
Curiosities
Learning Object Description/Introduction
DT approaches and human centered design
Learning resource type
Did you know

Learning Object content

- Design Thinking only starts to gain traction outside the design community only from 2008 when the related article from Harvard Business Review was published;
- DT Approach is also used as synonymous of Human Centered Design, which consist basically in the same stages of DT, the most important critics to the HCD is that we live a world that is not only made of humans, so this concept has to be readapted including the whole environment (natural and urban) were we are working;
- In the business field, the Design Thinking approach can also be framed into only three different steps that are:
    - **Invent** (it means that you have to fully understand the environment where you are)
    - **Test** (ideate and prototype your idea)
    - **Life** (bring your ideas on the market)

  These stages are not so far from the 5 listed in the previous part of our learning module, but is heavily linked to the development of a product, and not delivering a service, se for example the video explanation provided by Harvard Business Review at this link
    - https://youtu.be/_WI3B54m6SU
- To run focus group in your class, you can use sli.do , an audience management tool, useful to have all the answers at a time, in module 6 you will also be familiar with many other tools that will help you creating interactive presentation useful to apply DT approach.
- Another useful tool for mapping is graphcommons, it allows you to build up a network, you can use it to frame the context where you are teaching

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

15

Technical type

Text
- Document
- Hypertext

Image
- Image

Learning Object 2.3 Title

Further readings

Learning Object Description/Introduction

Collection of both academic and practitioners' publication on Design Thinking approaches

Learning resource type

Further readings

Learning Object content

- Brown, T. (2008). Design thinking. *Harvard business review*, *86*(6), 84.
- Matthews, J., & Wrigley, C. (2017). Design and design thinking in business and management higher education. *Journal of Learning Design*, *10*(1), 41-54.
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External resources

- MIT Management Sloan School
- Design Thinking - ASIMETRICA
- https://designthinking.ideo.com/
- https://www.thisisservicedesigndoing.com/methods
- https://www.designkit.org/

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

180

Learning Object 2.4 Title

Practice with design thinking

Learning Object Description/Introduction

The following activities will help you to understand the process and methods of Design Thinking approaches

Learning resource type

Activity

- Community based activity

- Activity for practice

Learning Object content

- Choose a subject from the management field, and ideate a survey to ask your students' what their expectations in terms of skills achievement at the end of the course are, share it with your peers through the already established folder/space on the OLMEdu learning platform and discuss on it;
- Develop a presentation for your course using the DT approach
- List at least three of the main advantages of DT approach in online learning

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

40

Learning Object 2.5 Title

Examples of Design Thinking uses in different environments

Learning Object Description/Introduction

Examples

Learning resource type

Example

Learning Object content

Here you can find examples of design thinking approaches used in higher education, and other environments.

The first link provides examples for each phase of the DT approach (empathize, define, ideate, prototype and test), you can find examples derived from Standford, Austin, and other institutions.

In the second link of the list, you can find a list provided by The Design Thinking Association (one of the most important associations on the topic) that contains case studies where the DT approach was implemented in different fields.

- https://er.educause.edu/articles/2015/1/using-design-thinking-in-higher-education
- Design Thinking Case study index
-

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

40

Learning Object 2.6 Title

Good Practice around the world

Learning Object Description/Introduction

Successful cases

Learning resource type

Example of successful cases

Learning Object content

Read this article to know the 40 Design thinking success stories

- https://theaccidentaldesignthinker.com/2017/09/16/40-design-thinking-success-stories/

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Unit 3 Title

- Design thinking in digital learning courses content and material development

Learning Object 3.1 Title

Developing materials with DT approach

Learning Object Description/Introduction

In the COVID-19 pandemic era, people were more and more isolated, even in the learning process that ran in person, this arose the necessity to reframe situations, build new environment, find solutions that are in line with the necessity and safety of the individuals and the society. As we read in the Learning unit 2 of the present module, design thinking is a human-centered process and can be applied to both service and product design, in this LU we will focus on digital learning and the development of learning materials.

Learning resource type

Narrative Text (theory)

Learning Objective Content

As we learned from the previous learning unit, Design Thinking is a human-centered process, so the need to identify the right need is the core element of our process (Empathize phase). Using the DT approach, we can shape our contents and reach better outcomes. In designing courses teachers have to focus on different aspects of the subject such as

- Key elements of the subject
- Most relevant use cases
- Example
- Updates on the field derived from academic and practice evidence

All of these elements seem to be far from a course designed using the DT approach because it starts from the subject that has to be taught and not from the students' learning needs. Designing online courses and developing materials with the DT approach, as we mentioned above in the learning units, is a process that starts from the participants, from a big and wide situation that we want to manage, not from the subject.

All the considerations made above may raise the question: *"How can I implement an online course, in a specific topic, with dedicated materials such as a set of predefined exercises, following the design thinking approach?"*

This is, without any doubts, one of the most important questions. About content creation and delivery, we will see in deep these aspects in module 3 and 6, relatively about "Design and delivery online training" and "Digital content creation and data protection issues". Regarding the creation of material to deliver online courses, an interesting base structure to use DT principles could be the following:

1. **Define your challenges and objectives** - in higher education, problems that you are more likely to solve is a lack of knowledge in particular topics, or how to exploit knowledge for reality problems, you will know your objective only if you ask your students what typology of problem they may have, to do so you can use many different survey/poll tools like for example Polly® (a software well integrated with Microsoft ® Teams (MS Teams) and Slack ®) or Slido;
2. **Research the obstacles** - maybe there are few interaction with companies that can bring the field experience, maybe is an emerging topic and the related literature is poor, as for above, run a focus group with your students during a lesson to better identify what are the obstacles (see for example the function related to create rooms in software like MS Teams ® or Zoom Meeting ® to let your students discuss and present results);
3. **Brainstorming and development** - this stage is typically after the process of ideating something that can solve the problems you encountered in the previous step (i.e. - to overcome the lack of field experience you organize a series of seminars with professionals on specific topic) and now you can discuss with your students whether this solution fits their needs;
4. **Launch** - in this stage you will run your course and test the solution you defined (your course).

Feedback - the most important aspect of developing using DT approach, relies on feedback process, only with a clear and precise feedback you can understand and define whether outcomes are reached, and at the very end, if problem is solved.In fact, design thinking in online Learning encourages you to explore your mistakes, so that you can improve your design and development strategy, push the boundaries of your eLearning mindset, and use innovation to your full advantage. Applying the principles of DT in online environment becomes a matter of tools, indeed, what you should have clear in mind is the process to follow, then you can choose the tool you prefer to address a specific outcome of the process. The other important aspect of the DT is that there is no "the perfect tool", just because the DT approach is focused on the learner, and what you should do is searching for the right tool for the group you have to manage, these aspects will be better seen in the module 3 and 6.

Do you even ask feedback on skills' achievement to your students? This could be a piece of important information considering the course as a prototyping phase of your teaching process.

Regarding specific topic inside a subject, you can ask your students to use DT approach to better understand a topic (i.e., tax management should be taught using DT not only during lessons, but asking your students to develop a particular solution, using DT approach, for a specific type of audience that is based on fiscal laws in force in your country). This use of DT allows you to better understand whether they reach specific learning outcomes, discussing about solutions that they develop. As we saw in the previous part of the module, DT forces you to go in deep in a problem, exploring solutions that actually fit the need of your audience, according to what is actually feasible. Under this lens, you can use the DT approach both for delivering courses, and for letting your students achieve specific learning goals enabling team working, creativity and many other different skills.

Another situation in which to work using the design thinking approach concerns simulations, such as the one seen above. For example, you could try dividing the class into two groups, one representing a particular community, the other having to adopt the DT approach to solve a problem that emerges from the group representing the community. This situation, best simulated at the end of a course, would allow you to check whether and how the solutions proposed by the group have used the notions learned during the other lessons.

Technical type

Text

- Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Object 3.2 Title

Further readings

Learning Object Description/Introduction

Collection of web articles and academic papers

Learning resource type

Further readings

Learning Objective Content

Listed below, a series of articles and papers connecting Design Thinking process and higher educational environment

Articles

- Applying Design Thinking to distance learning
- Can design thinking redesign higher education

Academic papers

- Beligatamulla, G., Rieger, J., Franz, J. & Strickfaden, M. (2019). Making Pedagogic Sense of Design Thinking in the Higher Education Context. *Open Education Studies*, *1*(1), 91-105. https://doi.org/10.1515/edu-2019-0006
- Lin, L., Shadiev, R., Hwang, W. Y., & Shen, S. (2020). From knowledge and skills to digital works: An application of design thinking in the information technology course. *Thinking Skills and Creativity*, *36*, 100646.
- Li, Y., Schoenfeld, A. H., diSessa, A. A., Graesser, A. C., Benson, L. C., English, L. D., & Duschl, R. A. (2019). Design and design thinking in STEM education. *Journal for STEM Education Research*, *2*(2), 93-104.
- Panke, S. (2019). Design Thinking in Education: Perspectives, Opportunities and Challenges. *Open Education Studies*, *1*(1), 281-306. https://doi.org/10.1515/edu-2019-0022

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

45

Learning Object 3.3 Title

Activities

Learning Object Description/Introduction

The following activities will help you to re-frame the process of developing learning materials

Learning resource type

Activity

- Open type questions
- Activity for practice

Learning Objective Content

- Consider the following situation: *your course starts with 24 learners, and the number starts to decrease in two weeks, how can you use DT approach to increase the number of your attendees?*
  Explain the process, remarking the action you are doing how are linked to DT stages, then share it with your peers in OMLEDU community and discuss about your solution.
- Think about you as a learner of something completely new (like maybe the present module) how would you prefer to learn it?? Elaborate an answer and share it with your peers.
- Develop a presentation using DT approach as presented in this learning unit related to a selected topic from the field of management, then share and discuss it with your peers.

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

45

Conclusion of the module
To conclude our journey in designing courses and materials in online training with Design Thinking approach, it could be useful to summarize the main topic we developed in the module highlighting pros and cons. We started from the process of designing online courses, the difference that we can face with a face-to-face one, and the main advantage for both students and professors. As we learned from the module once we are designing courses in higher education we are not dealing only with young students, but also adults and professionals that maybe want to upskill themselves or that have the need to update. This framework is helpful to tackle in consideration the so called "adult learning theory" which can help us in defining learning outcomes, provide materials and set the entire course. From the basic elements of designing online courses, we moved to the Design Thinking approach, a relatively new framework (a human centered framework) useful to find solutions in a complex environment. Remember that the starting point of the design thinking approach, is the community, you have to find what is the problem (or the need in the case of learning situations) to let the process begin. Useful modalities to engage students' community is let them be part of the process, letting them know they are part of the design of the course. *Have you ever tried to ask your students what are the expectations about the course, why they are following your course?* The other important aspect we have learned from the Design Thinking approach is that even if it has defined steps, the process can be repeated several times, as long as necessary (that could be one of the most relevant limitations of this approach in developing learning materials) to figure out the feasible solution for the specific situation. However, the process could bring exactly to the starting situation, so the Design Thinking approach should be used when something already active seems to not be working as expected.
Conclusion type
Choose from the list – Text – Infographic

Summative Assessment of the module [make sure that the questions address all the learning outcomes]. Automated feedback is provided by the platform.
Assessment type
Select the type from the list – Multiple Choice Questions (single or multiple correct answers) – Sorting choice
Technical Type

– Text – Document
Workload
Number of questions in the assessment object
Write how many questions are there in the assessment. Use the **Question template** below as many times as needed and modify accordingly to specific question type (1 template for each question).

Question template for Multiple Choice Questions	
No.	1
Question (stem)	What is the design thinking approach
Possible answers	- A teaching method - An innovative method to develop learning materials - A framework useful to manage communities - An innovative method to find new solutions to complex problems
Correct answer	- An innovative method to find new solution to complex problems
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	no

Question template for Multiple Choice Questions	
No.	2
Question (stem)	How many steps does the design thinking process consist of?
Possible answers	- 4 - 6 - 7 - 5
Correct answer	- 5
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	3
Question (stem)	Design thinking is a solution-centered method
Possible answers	- Yes - No
Correct answer	- No
Response to correct answer	
Response to wrong answer(s)	- Design thinking is a human centered method, it starts from the beneficiaries of the possible developed solution
Times the question can be taken	1
Is the question part of a test?	No

Link each stage of the Design Thinking process to the correct question the stage tries to find an answer

Prototype	Why it is important?
Ideate	What is required?
Empathise	Does it work?
Test	How do we create it?
Define	What is the problem?

Question template for Multiple Choice Questions	
No.	5
Question (stem)	What is the starting point of a design thinking process?
Possible answers	- Test - Define - Empathize - Prototype - Ideate
Correct answer	- Empathize
Response to correct answer	
Response to wrong answer(s)	- The design thinking, is a human-centered approach, so it starts always with empathizing with the beneficiaries' community
Times the question can be taken	1
Is the question part of a test?	no

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Module 3: Design and delivery of online training

Module Number
3
Module Title
Design and delivery of online training
Short Description / Motivation text
The aim of this module is to provide you with the knowledge and skills required for designing and delivering effective online courses by combining asynchronous and synchronous e-learning and by using interactive techniques and practical experiences for engaging your students.
Keywords
Online learning experience, digital design approaches, instructional design approaches, learning styles, asynchronous and synchronous communication in online learning, online interactive courses
Learning Outcomes
Knowledge After the successful completion of this unit learners will: - Be familiar with digital and instructional approaches to facilitate remote learning - Be familiar with the key elements of e-courses design - Be acquainted with the pedagogical and didactic characteristics and principles of asynchronous and synchronous modes of online training - Describe advantages and limitations of asynchronous and synchronous e-Learning - Recognize the importance of interaction for actively engage students in e-courses - Identify the characteristics of online interactive courses that facilitate the actively engaging of students - Discover how they can plan and deliver effective online teaching - Learn how they can design practical experiences for their students delivered in online environment **Skills** After the successful completion of this unit learners will be able to: - Perform the sequence of developing and delivering online courses - Design interactive online courses enriched by activities that facilitate their students' engagement - Be able to combine asynchronous and synchronous e-learning **Competences** After the successful completion of this unit learners will - Be competent to plan and design online training courses choosing the appropriate online training approaches - Be competent to adapt their teaching subjects to online teaching environments - Be competent to design online learning experiences that reflect the needs of their students - Develop flexibility and creativity is designing online courses

- Be competent in combining and balancing asynchronous and synchronous e-learning in order to offer effective online courses
- Be able to evaluate the implications of using digital technologies in higher education
- Be able to deal with risks of asynchronous and synchronous e-learning.

Language

English

Training Content

Learning Unit 1 Title

Design and delivery of online courses

Learning Object 1.1 Title

Activity (diagnostic assessment)

Learning Object Description/Introduction

You will be given with an open-ended question about your previous knowledge on e-courses design. After submitting your answer, move on to section 1.2. for checking your response.

Learning resource type

⇒ Activity
- Question

Learning Objective Content

Reflect on your previous knowledge on e-courses design. List the most essential digital and instructional approaches to facilitate online learning.

Technical type

Text
- Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

15

Learning Object 1.2 Title

The online learning experience

Learning Object Description/Introduction

The first learning unit kicks off with a short introduction to the online learning experience and what this entails

Learning resource type

⇒ Narrative Text (theory)

Learning Objective Content

The term "learning experience" refers to the experience that an individual has as part of his/her participation in any course, program, or other activity, through which learning takes place. A learning experience may occur in either formal or informal and nonformal learning contexts. The growing use of the term the past few years by educators, researchers, and academics, reflects the pedagogical and technological shifts that has been noted in the design and delivery of instruction.

An online learning experience can occur during the involvement and participation of an individual to a distance or online learning course. According to Kearsley and Moore (2012), distance learning (also referring to online learning and e-learning) implies a remote and reciprocal interaction between the students and the instructor. These terms refer to the learning that is taking place with the aid of technological means, such as the use of an online learning environment (platform) and online tools. For further information about distance and online learning, study learning object 1.2 'Defining Distance and Online Learning' of Module 1.

The effective and meaningful use of technological tools, their effective integration into the learning and teaching processes and therefore, the online learning experience itself, might be affected by certain digital skills and competences that students and the instructor need to demonstrate. On the one hand, students of the digital age appear to be more independent, more technology disciplined, and confident to use new technologies, as compared to their elders, being capable of using online learning environments well. In fact, scholars examining students' response to online learning in higher education during the pandemic period, demonstrate students' positive response and familiarity with tools, such as online learning platforms and social media platforms (Agormedah, et al., 2020). On the other hand, it is more likely for teachers not to be familiar with the use of technological tools in their class, depending on their discipline, institution culture, age, self-efficacy, pedagogical beliefs, and the type of courses that they were used to deliver as part of their teaching experience.

Delivering the best learning platform and using the best digital tools, does not assure automatic success of the online learning experience. Instructors need to be familiar with the use of such technology tools and how to effectively integrate them in their instruction. They also need to safeguard that the online environment, through which their courses are delivered, facilitate student experiential learning with interactive elements, critical thinking, collaborative learning experience (read more here: Tapscott, 2009), as well as the active participation and engagement of students in the course.

An online learning environment provides autonomy to the learners but at the same time it requires self-direction and self-discipline. In the absence of the latter, the possibilities for failures and/or dropouts increase. Online learning experiences must encompass the use of a variety of technological modalities, and self-paced learning practices. The quality and design of an online program are crucial elements to this end. The following components are essential to be considered

as quality standards, during the design of an online course. Those elements are described in more details in the sections that follow.

Fig. 1. Elements that affect the online learning experience

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 1.3. Title
Further reading for “The online learning experience "
Learning Object Description/Introduction
Further reading for “The online learning experience "
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Barr, B. A., & Miller, S. F. (2013). *Higher Education: The Online Teaching and Learning Experience*. Online Submission.

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Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 1.4. Title
Online learning facts - Did you know?
Learning Object Description/Introduction
Simple facts about e-learning
Learning resource type
⇒ Did you know
Learning Objective Content
Digital learning, online learning and e-learning started to flourish in the 1990s, leading the way into a digital area of education. The word "e-learning" (stands for electronic learning) was first created in 1998. The past twenty years that has been an amazing growth in the e-learning industry, which has naturally evolved from the use of new and emerging technologies in everyday life. E-learning has offered the possibility to everyone, regardless of space and time, to have access to education, learning and training opportunities in general. E-learning has offered a lot of potential and advantages that could not be ignored.

Fig. 2. Facts about e-learning. Source: [The Future Of Online Education - e-Learning Infographics (elearninginfographics.com)]

Online and distance learning have been widely adopted by almost all educational and academic institutions globally the last two years, due to the mitigation measures that were adopted by governmental authorities towards the wide spread of the covid-19 which was characterized as a Pandemic by the World Health Organization (WHO) in March 2020. As a results of those measures, face-to-face teaching was banned, and governments across the globe instructed all the educational institutions to shift from traditional learning to online learning using digital platforms. The pandemic has caused, among others, major implications for the way higher education students continued their studies.

Technical type
Text – Hypertext Image – Graph – Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
10

Learning Object 1.5. Title
Further reading for “Online learning facts"
Learning Object Description/Introduction
Further reading for “Online learning facts"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Learning more about how covid-19 has affected learning: Education during COVID-19; moving towards e-learning | data.europa.eu • Facts about e-learning: The Future Of Online Education - e-Learning Infographics (elearninginfographics.com)
Technical type
Text – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 1.6. Title
Digital and instructional approaches to facilitate online learning
Learning Object Description/Introduction
In this section you will be introduced to digital and instructional approaches to facilitate online learning. You will be provided with key information about instructional design in general, and then move on to core elements of e-courses design.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content

The integration of digital technologies in education has been gradually expanding in recent years. Online learning encompasses the use of a wide range of technological tools, digital and online platforms as well as the use of appropriate delivery methods and instructional designs.

When designing online courses, it is essential to reflect and embrace an instructional strategy and an appropriate training approach (check more about the latter in Module 1). Effective online instruction depends on learning experiences that are appropriately designed and facilitated by the instructor.

1. Instructional approaches

1.1. Accounting on learning theories

Instructional approaches followed in classroom teaching (traditional face-to-face), could be transferred to online learning environments ensuring that they remain appropriate for online instruction. For instance, elements of behavioural learning theory (e.g., positive reinforcement), cognitive learning theory (e.g., connecting previous knowledge to new content knowledge), social learning theory (e.g., encouraging peer work and interaction), constructivism (e.g., building on previous knowledge) etc. can be considered and applied in online learning environments as well. It has been further claimed that especially the constructivist-based instructional design is appropriate for adult learning in an online learning environment (Ruey, 2010). Learn more about constructivism and social constructivism by studying the learning object 1.4 'Mapping the Basic Learning Theories' of Module 1.

Johnson and Aragon (2003) in their paper (p. 34), suggest an Instructional Strategy Framework for Online Learning Environments. Read more about this here: An instructional strategy framework for online learning environments - Johnson - 2003 - New Directions for Adult and Continuing Education - Wiley Online Library

1.2. Learner-centred instruction

In ***learner-centred instruction***, the role of the instructors' switches from the dispenser of knowledge to a facilitator of students' learning, as in most cases the students are given with a more central role to their own learning journey. In this new role, the instructors should facilitate and share information while guiding and supporting students towards achieving their learning objectives. A student-centred approach is encouraged for online learning courses.

1.3. Addressing learners' needs and particularities

Aiming at a specific target audience so as to develop an effective online course that meets the expectations of your students. You need to understand their training and/or learning needs, their background, their prior knowledge to the course topic, as well as their learning preferences. You can get part of this information from your faculty (e.g., their background, the courses that they have already completed) but also through interaction with your students at the beginning of the course. Further to the above, when designing activities for online learning environment, instructors should consider the different ***learning styles*** that learners might have (check the next section for more information) and adapt their course and the content delivery accordingly.

1.4. Specific and measurable learning objectives

Instructors identify the particular objectives of their course, think ahead of time the design of their curriculum, and then consider how a specific online environment serves the instructional and

learning objectives and activities of the course curriculum. The latter requires the adoption of appropriate teaching and training approaches as well (read more about training approaches in Module 1). It is essential that your learners get informed about the scope and learning objectives of the course. A learning objective is a statement which describes what the learners will be able to do upon completing the course, in terms of skills, knowledge, or performance and competences. Learning objectives must be specific and measurable. Learn more about learning objectives by reading this paper: Learning: Objectives, Competencies, or Outcomes? (wy.edu)

1.5. Authentic and relevant content, activities, assessment

Provision of a ***learning contract (syllabus)*** in which the scope, the learning objectives and expected learning outcomes, a structure and schedule for each learning unit/ session, a description of the assessment methods to be applied, the communication tools, a list of main references to be used etc. are provided.

Authentic content creation which is relevant and meets your learners' needs. Your course content should challenge learners, arouse curiosity, and ignite a desire to learn. It is suggested that the course content is linked to real-world cases, problems, and situations that your learners will encounter in the future.

Content delivery through, lectures via synchronous online teleconferencing sessions and online material (presentations, recorded lectures, audio-visual material, instructions, notes etc). Ensure that the course content is easy to read, including not only text but also images, videos, animations, and audio. Your online course needs to balance all these elements to generate appealing, relevant content. Providing additional resources for further learning will also make your online course more comprehensive. The content delivery modalities should address the needs of learners, their needs and different learning styles.

Activities which can be completed on an individual level by the learners, but also collaborative activities with interactive elements, such as discussions through forums and chat tools (synchronous and asynchronous), small group work and collaborative learning, panels, and symposia.

Addition of ***online projects and assignments*** for your students, depending on the course objectives and your students' needs.

Assessment activities (initial, formative, and summative). You need to evaluate learners' attained knowledge, skills, and competences during and at the end of the course. Assessment activities are crucial to ensure this. You can use initial assessment activities at the beginning of your course, formative assessment tasks during the course delivery and summative assessment tasks at the end of your online course or at the end of a learning unit. Formative assessments are used for testing learners' understanding of the course content but most importantly to supporting students in their learning journey. Formative assessments can be also valuable for the instructor, as they provide feedback on the effectiveness of the teaching methods applied. The summative assessment comes at the end of the course or at the end of a learning unit, often in the form of a final quiz/exam. This is used to assess whether learners have achieved the learning objectives that have been set while designing your course. You can learn more about assessment in Module 7.

Overall, the course design should enable ***self-directed and self-paced learning***. Mentorship can be provided to your students throughout the course (by the instructor or a teaching assistant).

1.6. Tracking learners' progress

Tracking the activity of learners gives you valuable insights on their behaviour and responsiveness in the online course. You can track your learners' progress conveniently using a Learning Management System (LMS). By collecting and analysing the data, such as, last date that your learners logged into the platform, the time spent in an activity, the number of students who have submitted an assignment etc, you can identify learning trends and offer meaningful learning experiences to your learners. Tracking learners' progress can be also achieved through the implementation of formative assessment activities, which provide you with an insight into where your students stand in terms of understanding of the content, and acquisition of certain skills and competences.

2. Digital approaches

2.1. Use of digital and online tools

Digital approaches towards facilitating online learning include the use of digital tools to promote teaching and learning for students with varied educational needs. Such tools are listed below:

1. ***Technology devices*** (i.e., personal computers, mobile devises) are necessary for giving access into the online learning environment.
2. ***Computer-based systems*** transmitted through the Internet (e.g., Learning Management Systems).
3. ***Interactive audio and videoconferencing/ teleconferencing*** transmitted through the Internet (e.g., LMS or teleconferencing tools such as Zoom, Teams).
4. ***Web cameras*** and microphones during teleconferencing for increasing interaction among students.
5. ***Electronic books and articles*** that can reduce the cost of and ensure use of most current reading materials, and a larger variety of sources for your students.
6. ***Audio devises for recording lectures.***
7. ***Simulations, digital reality technologies, such as 360° videos, Virtual, Augmented and Mixed Reality*** can enhance the online learning experience. Read more about these elements in Module 8.

2.2. Interactive Methodologies

A range of ***interactive methodologies*** can be supported and delivered in online learning environments. Modern learning environments are offering the possibility for learning to become more collaborative, contextual, and active. For instance, the flipped classroom approach, the design thinking approach, and other such methodologies, can be supported through online learning environments. To find out more about the design thinking approach, check Module 2. Read more about digital content and the ways it can be utilized in education in Module 6.

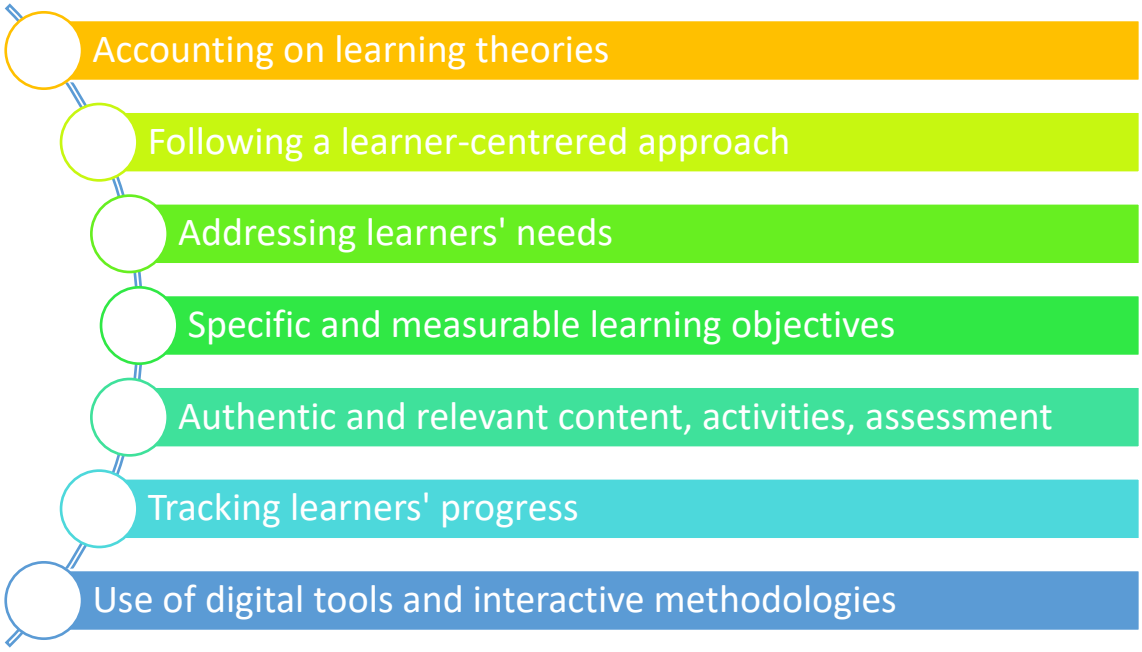

Fig. 3. Instructional and digital approaches to facilitate online learning

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
40

Learning Object 1.7. Title
Further reading for “Digital and instructional approaches to facilitate online learning"
Learning Object Description/Introduction
Further reading for “Digital and instructional approaches to facilitate online learning"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher education studies*, *10*(3), 16-25. • Castro, R. (2019). Blended learning in higher education: Trends and capabilities. *Education and Information Technologies*, *24*(4), 2523-2546.

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Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

120

Learning Object 1.8. Title

Learners' learning styles – narrative

Learning Object Description/Introduction

In this section you will be introduced to different learning styles that learners typically have and how those can be accommodated in an online learning environment.

Learning resource type

⇒ Narrative Text (theory)

Learning Objective Content

Learning styles

The concept around "learning styles" started from researchers, who claimed that due to inheritance, childhood experiences but also due to existing environmental requirements (e.g., educational structures or requirements), individuals tend to perceive and process information in different ways. In the literature we find the terms "learning style" and "cognitive style" alternate or equalized.

The term ‘‘learning styles’’ refers to the idea that individuals differ in relation to the mode of instruction or study that is most effective for them (Pashler, et al., 2008). Learning styles define the kind and modality of information (e.g., text vs image) that learners prefer while learning a new concept, and/or what kind of mental activity they find most engaging (e.g., analysis versus listening) while learning.

A complete theoretical understanding of teaching and learning styles is essential for management educators to delivering teaching of high quality, although they may be experts in their own field (Provitera & Esendal, 2008). Depending on the preferred perception channel (i.e., visual, auditory, or kinaesthetic) that everyone has, s/he can be classified in a different learning style. In a student cohort, it is expected that students of different learning styles will exist. For that reason, it is important while designing an e-course, to make sure that the information and content will be delivered in different modalities (text, audio, image, videos…), so that different perception channels will be used. Online learning environments can be used to their highest potential when they complement many students’ learning styles.

It has been argued by scholars that “learners with one learning style achieve the best learning outcome when given an instructional method that aligns with their learning style” (Pashler, et al., 2008). Further to the above, your students may further differentiate from one another due to their personal learning styles, that are associated with their personality and cognitive characteristics or cultural factors.

Online environments can accommodate learners with different learning styles, when being fully and effectively exploited.

Fig. 4. Learning styles

Visual Learners:

Visual learners learn better when information is presented to them visually and in a written form. They prefer receiving information and new content with the use of visual aids, such as images,

figures, concept maps, to list the essential points of a lecture and/or to present new concepts and their connections, but also information in written format (e.g., power point presentations). They also benefit from information obtained from textbooks and class notes. They tend to visualize information in order to learn and remember something. The online environment is especially appropriate for these types of learners because most of the course information is presented in writing and with the use of visual aids.

Auditory Learners:

Auditory learners learn best when information is presented aurally. They benefit more while listening to the instructor, participating in group discussions, and interacting with others, compared to other type activities (e.g., reading an article). They also benefit from listening to audio recordings. Online learning environments can complement these learners' style with the incorporation of auditory material, such as lecture recordings, synchronous web-conferencing, streaming audio etc.

Tactile/kinaesthetic Learners:

Tactile/ kinaesthetic learners learn best when doing physical, "hands-on" and interactive activities, while working with materials. They benefit from instruction that provides hands-on learning experiences, and fieldwork outside the classroom. In an online environment, tactile learners may benefit more when working with simulations and 3-Dimensional graphics that replicate physical demonstrations. In addition, the instructor may include fieldwork into coursework, and/or practical exercises to take place at home, followed by online discussions for sharing experiences.

Fig. 5. Learning styles. Source: Identifying your Learning Style | Turning Point Centre

Technical type
Text – Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 1.9. Title
Learners' learning styles – Good practices
Learning Object Description/Introduction
Tips to consider while designing online learning environments, so as to accommodate all different learning styles
Learning resource type
⇒ Good practices/ tips
Learning Objective Content
Tips - Include visual information in your learning material, such as power points, pictures, graphs, photos, infographics, concept maps videos etc. - Include audio information in your learning material, such as recorded instructions for activities, recorded lectures, synchronous web-conferencing etc. - Include physical, "hands-on" activities in your learning material, such as simulations with 3-Dimensional graphics that can replicate physical demonstrations.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
10

Learning Object 1.10. Title
Further reading for "Learners' learning styles"
Learning Object Description/Introduction
Further reading for "Learners' learning styles"
Learning resource type
⇒ Further reading
Learning Objective Content

Further reading

- Read more about Learning and teaching styles in management education in the following article: Provitera, M. J., & Esendal, E. (2008). Learning and teaching styles in management education: Identifying, analyzing, and facilitating. *Journal of College Teaching & Learning (TLC), 5*(1).
- Read more about learning styles: Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological science in the public interest, 9*(3), 105-119.

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Object 1.11 Title

Activity on learning styles (self-reflection and forum discussion)

Learning Object Description/Introduction

Having read about learning styles and how they relate to instructional design, in this activity you are asked to reflect on your courses' design and self-evaluate their appropriateness for learners of different learning styles.

Learning resource type

⇒ Activity
– Reflective based activity

Learning Objective Content

Self-assess your courses/ modules in terms of their appropriateness to addressing the needs of students with different learning styles. Would you change anything, so as to accommodate the needs of all students? What would that be?

Share your thoughts in the discussion forum with other trainees and discuss further.

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Object 1.12. Title
Key elements of e-courses' design
Learning Object Description/Introduction
In this section you will be introduced to key elements of e-courses design.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content

Even though each course may have its own particularities, in terms of content, scope and objectives, it is still essential for educators to be mindful of fundamental elements of e-courses in order to construct a well-structured training course that offers a unique and meaningful online learning experience to the learners. Educators should have their unique way of using these elements to design an e-course that adds value to their learners.

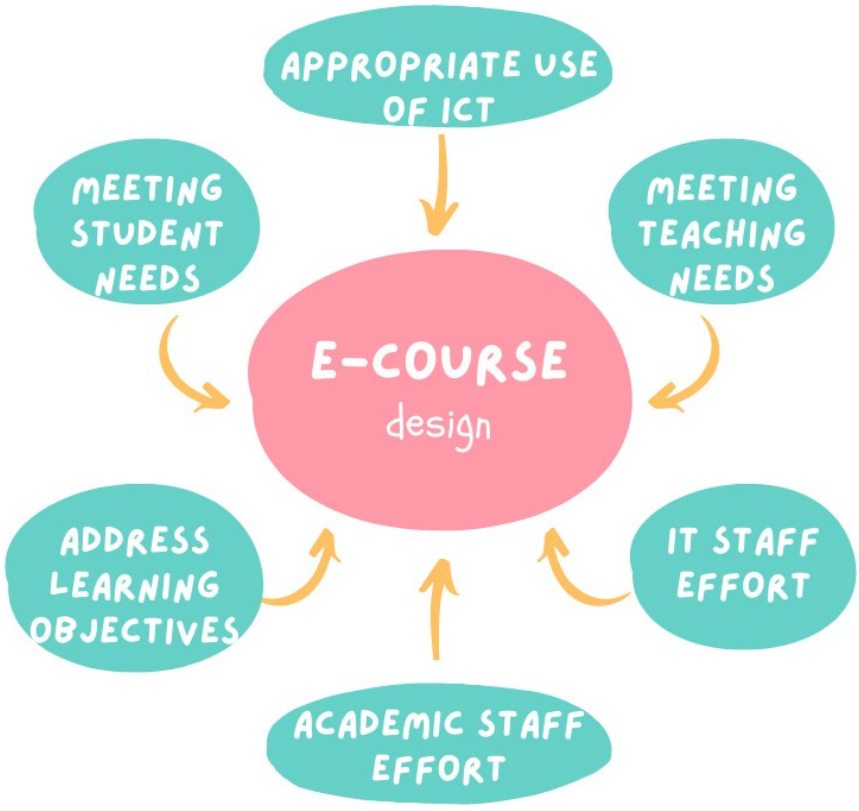


Fig. 6. E-course design elements

First, the appropriate use of digital technologies on content design is of utmost importance for an e-course to be useful to learners. The integration of such technologies in the class introduces new challenges, while an appropriate instructional design is required so that such an integration is meaning and beneficial for the learners. Second, e-courses should be developed in such a manner,

so as to meet the teaching and learning needs, including learners' needs and learning styles, and address the specific learning objectives of the course. Third, effective e-course development should be the collaborative efforts of both academic and IT staff. For that reason, do not hesitate to ask for the support of your IT department, when needed.

Below, you will find information about important elements that you need to consider when designing your e-course(s).

Online platform

An online course is often accessible through an online platform or a Learning Management System (LMS) such as Blackboard, Moodle, Open edX etc. which may vary according to their system features, content support, content creation, user management, reporting system etc. Learn more about LMS and their features in Module 4. As part of your courses' design, you will most probably use the platform or LMS that your academic institution is providing. The online learning system that you will use should encourage all students to attend classes regularly and should be well designed from the beginning to the end of the course, offering weekly content and assignment to your students, various elements of communication, evaluation and monitoring tools which allow the teacher to periodically evaluate students' participation and measure their progress.

Navigation

An online course should have easy navigation, through the course content, with a clear structure of how the learning material is distributed per academic week. A menu of the specific topics/ learning units should be visible, along with navigation buttons (next, previous). Navigation elements are typically included in the platform that your institution is offering for use, but there might be a case that you will need to improve a few aspects, with the support of your institution's IT staff. You can also enable learners to view their progress by allowing them to go between the past, present, and future modules/ learning units, but also to mark as 'done' each activity/task. Apart from that, it is then important to structure the content in a logical manner.

Content

Relevant and timely content is an important element in an online course. Given the nature of online learning, content should not be long and boring for your students, but rather, short, clear, and engaging, so as to avoid student dropouts or a decrease of their interest to engage and complete the course. Having specific learning objectives per module/learning unit which are clear, transparent, and measurable will help to this end. Consider your learners' needs and background knowledge when developing content, as well as their learning styles when deciding on the modalities of information that is provided through the course. Use stories, case studies and examples to clarify complicated concepts and their connections.

Design and visuals

The design aspect of your e-course is also one of the most crucial elements, as it might affect the first impression that the learners get for your course. Use appropriate visuals like images, colours, formatting, and tables in the right and unified way. Include audio-visual material and high-quality graphics with a uniform style. Use a consistent font and colour throughout your course (even for your presentations' layout and style). If your institution is offering specific templates (e.g., for

power point presentations) following a unified identity brand, you are advised to use those templates.

Interactivity

Interactivity in online learning involves the interaction that takes place among the course participants (students and the instructor), as well as between students and the course content. It is essential that the students have multiple opportunities throughout the academic semester, to interact with you and with their peers, during teleconferencing sessions, or during other types of synchronous and asynchronous learning activities. Interactivity in your course may also involve the incorporation of interactive content, such as interactive presentations and interactive videos, and interactive activities for your students, such as quizzes, games, simulations etc. Interactivity helps capture students' interest and boosts engagement.

Tracking learners' progress

Tracking learners' progress is important in online courses, as already mentioned earlier in this module. Almost all Learning Management Systems (LMS) offer the tools for tracking learners' progress through data collected. Data collected through an LMS is used to analyse learners' behaviour and actions in a given platform, and this can help you to tailor your content to a specific group of students. Such data could be: number of students who have submitted all their assignments, students responses to the assignments, students' scores at tests, quizzes, number of students who have successfully completed the course, etc.

Watch the following two videos on how to report and track learners' progress in two different LMS.

FILM, VIDEO

Academy of mine (2022, January 28). Report and Track Learners Progress in the LMS - Academy of Mine [Video]. YouTube. https://www.youtube.com/watch?v=NuY4lYxAXg0

FILM, VIDEO

Learn with KeralaMoocs (2020, April 27). Tracking the Progress of Moodle course activities [Video]. YouTube. https://www.youtube.com/watch?v=s76oYHYO7NQ

Communication among participants and a sense of community

The learning process is strengthened and sustained when higher education institutions and the instructors support the students through their learning journey and enhance their sense of belonging. Social isolation and a sense of disconnectedness might be experienced by some of the students, depending on their personality, while for others the online learning experience might work even better in comparison to conventional teaching, as they have the freedom to study the learning material at their own pace, or they might feel more confident to interact with their instructor and their peers through online tools such as chat tools and forums, rather than face-to-face interactions. Therefore, the diversity in the student cohort should be encountered. A strong feeling of community among students is vital, not only to increase thoroughness and commitment

in coursework, but also to encourage the engagement, commitment among students and their active participation in the e-course.

How can the instructors build a sense of community with their learners?

Instructors can contribute towards the creation of a sense of community and the reduction of the feeling of isolation that some students may experience in online learning environments. This can be achieved in multiple ways:

- early on in the course, ask your students to introduce themselves to the rest of the class, by posting a short description, even a short video, for introducing themselves to the others (their background, needs, preferences, what they expect from the course etc.). This can be done through a forum or a cyber-cafe space forum that you can create in your course.
- Include in your course collaborative activities, during which the students will be required to interact with their peers. This can be done through group assignments, forum discussions, peer assessment activities etc.
- Create an open environment in your class in which all the students will feel comfortable to ask questions, when needed, either in a forum or via private messages in chat tools. Those questions may relate to the course content, or to other admin, and social aspects of the course.

Overall, experts suggest that instructors of online learning programs can mitigate the isolation felt by students and increase a sense of community by increasing dialogue, encouraging mutual awareness and interaction, establishing proper communication, providing small group collaborative experiences, ensuring that group tasks are effective for all, embracing differentiated instruction practices, and managing community size as appropriate for student success (Rovai, 2002).

Technical type
Text – Document – Hypertext Streaming media Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 1.13. Title
Further reading for “Key elements of e-courses’ design"
Learning Object Description/Introduction
Further reading for “Key elements of e-courses’ design"
Learning resource type

⇒ Further reading

Learning Objective Content

Further reading

- Afifi, M. K., & Alamri, S. S. (2014). Effective principles in designing e-course in light of learning theories. *Turkish Online Journal of Distance Education*, *15*(1), 128-142.
- Cheung, K. S., Lam, J., Im, T., Szeto, R., & Yau, J. (2008, December). Exploring a pedagogy-driven approach to e-courses development. In *2008 International Workshop on Education Technology and Training & 2008 International Workshop on Geoscience and Remote Sensing* (Vol. 1, pp. 22-25). IEEE.
- Liu, Z. Y., Lomovtseva, N., & Korobeynikova, E. (2020). Online learning platforms: Reconstructing modern higher education. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(13), 4-21.
- Learn more about key elements that you need to consider when desiging a course in an online learning envrioment: Design for the online environment – Teaching without Walls at TRU: a practical guide with tools, tips, and techniques

Technical type

Text
– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

90

Learning Object 1.14. Title

Best practices for teaching online

Learning Object Description/Introduction

Best practices for teaching online are summarised in this section.

Learning resource type

⇒ Good Practice

Learning Objective Content

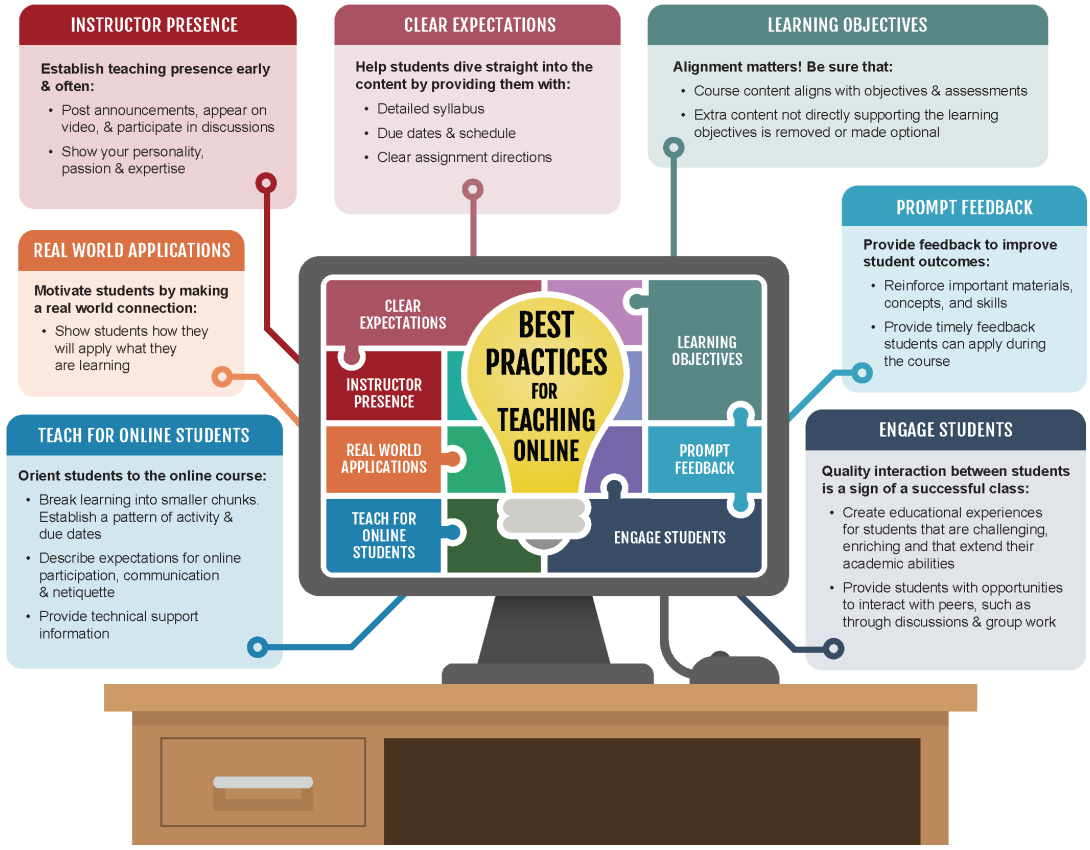


Fig. 7. Best practices for teaching online. Source: [Best Practices for Teaching Online - Teach Online (asu.edu)]

Technical type
Text – Hypertext Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
10

Learning Unit 2 Title
Characteristics, principles, and use of asynchronous and synchronous e-learning

Learning Object 2.1 Title
Principles of asynchronous and synchronous modes of online training
Learning Object Description/Introduction

In this section you will be introduced to principles of asynchronous and synchronous modes of online training.

Learning resource type

⇒ Narrative Text (theory)

Learning Objective Content

Online learning environments can accommodate *synchronous* and *asynchronous* ways of communication among the participants of a course (students, instructor, teaching assistants). In this learning object, you will learn more about asynchronous and synchronous e-learning modes.

Given that learning is shaped by context, conversation, and collaboration (Brown, Collins, & Duguid, 1989; Dewey, 1963; Vygotsky, 1978), the importance of social constructivism for online learning practices becomes apparent. As Swan (2005) suggests *"learning is essentially a social activity, [and] that meaning is constructed through communication, collaborative activity, and interactions with others. It highlights the role of social interactions in meaning making ... [and] knowledge construction"* (p. 5). When social constructivism is employed as a theoretical framework, therefore, discussions become critical as they connect individuals in an online learning environment and motivate them to take an active role in knowledge construction and meaning-making processes (Fung, 2004; Stacey, 1999). Online environments should support threaded discussions, through which individuals *"interact and observe the results of their interactions while responding to and engaging with others"* (Hill, et al., 2009, p. 89). Synchronous and asynchronous modes of learning in online learning environments enable such type of interactions and social construction of knowledge.

Asynchronous online learning

Asynchronous online learning occurs in delayed time and does not rely on simultaneous access in an online learning environment (Johnson, 2006). In other words, asynchronous online learning involves contact between the teacher and the students with a time delay (Berestok, 2021). This mode of e-learning appeared in education much earlier than the synchronous one. Online tools used to support asynchronous learning include the use of emails, self-paced e-courses, online forums, pre-recorded training sessions etc.

Tools that can be used during asynchronous learning

- Online Courses via LMS such as Moodle, Blackboard etc. LMS have the ability not only to offer students the learning materials, but also organize collaboration and communication, and monitor students' learning. Communication tools embedded in such systems, and which can support asynchronous learning include, forums and chat tools, in which threaded discussions can take place among students, and between the students and the teacher. The learning material provided through such platforms, including pre-recorded lectures, are part of the asynchronous learning mode.
- Emails. Via the exchange of e-mails, you can send information in relation to the course, material, assignments, or simply announcements to your students. Students can send you their completed assignments, projects etc via email as well. For the convenience of working with a group of addressees, you can create an e-mail distribution group.

- Social networks and social media channels allow you to upload videos, send assignments, links to materials and tests, the materials themselves and class schedules. Students, through chats or private messages, can send you their work or simply ask questions.

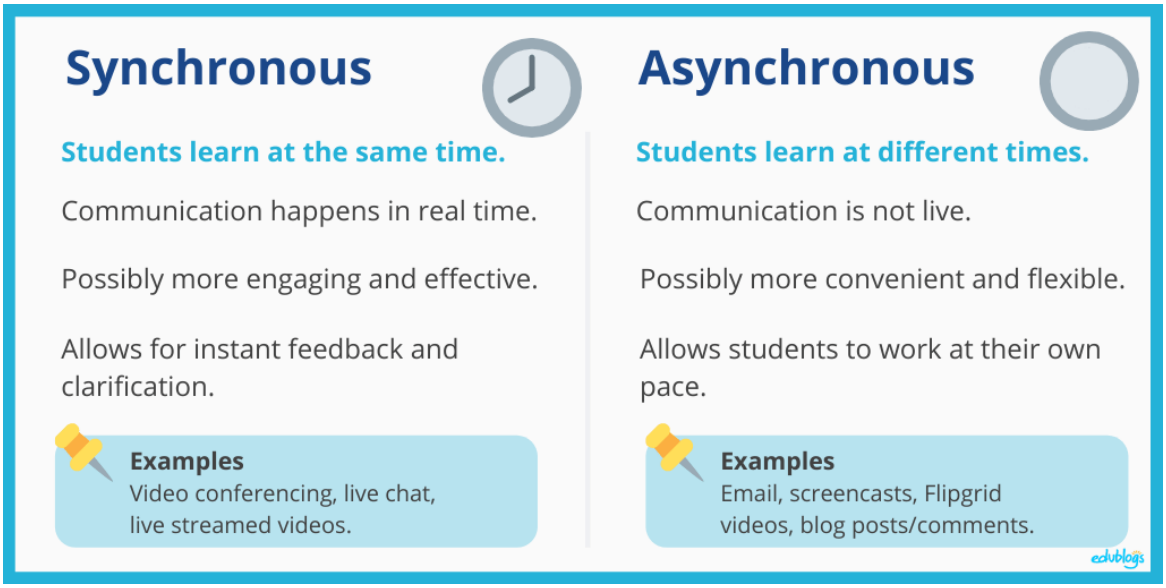


Fig. 8. Asynchronous vs Synchronous Delivery. Source: [The Do's and Don't's of Online Course Delivery: Asynchronous vs Synchronous Delivery (cotronline.ca)]

Synchronous learning

Synchronous learning involves real-time interaction (e.g., via teleconferencing or a chat tool). Learning environments that support synchronous learning can be collaborative in nature incorporating online activities, such as an instructor's lecture with a facility of real time questions-answer session. Likewise, synchronous communication involves real-time communication between teachers and students (Johnson, 2006) that requires simultaneous student-teacher presence. It is typically characterized by opportunities for interaction between the instructor and students and amongst students. Many of the student engagement techniques used in real classroom settings can be transferred to a digital learning environment for supporting synchronous learning.

Tools for synchronous learning

- Chat tools for synchronous communication.
- Webinars and video teleconferencing. Online sessions such as webinars and video teleconferencing can accommodate the participation of an unlimited number of students. Your synchronous online sessions can be also recorded, allowing students who did not manage to attend the session to study the recording at their own time. Video teleconferencing systems are offering nowadays a series of new features, that facilitate further the participants' interaction in real time (chat tool, hand raising button, reaction buttons, creation, and conduction of polls, etc).

Technical type
Text – Document

Image
– Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Object 2.2. Title

Further reading for “Principles of asynchronous and synchronous modes of online training"

Learning Object Description/Introduction

Further reading for “Principles of asynchronous and synchronous modes of online training"

Learning resource type

⇒ Further reading

Learning Objective Content

References

- Berestok, O. V. (2021). Synchronous and asynchronous e-learning modes: strategies, methods, objectives.
- Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause quarterly*, *31*(4), 51-55.
- Johnson, G. (2006). Synchronous and asynchronous text-based CMC in educational contexts: a review of recent research. *TechTrends, 50*, 46–53.
- Oztok, M., Zingaro, D., Brett, C., & Hewitt, J. (2013). Exploring asynchronous and synchronous tool use in online courses. *Computers & Education*, *60*(1), 87-94.

Technical type

Text
– Document
Image
– Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

80

Learning Object 2.3. Title

Asynchronous and synchronous modes of online training - Did you know?

Learning Object Description/Introduction

In this section you will be introduced to principles of asynchronous and synchronous modes of online training.

Learning resource type

⇒ Did you know

Learning Objective Content

Did you know?

"Asynchronous learning has its origins at the beginning of the 19th century, when educational and methodological materials were shared via mailing with students. In the 1920s and 30s, the first audio recordings were used in distance learning. The first educational films appeared and were actively broadcasted during the Second World War. The Internet, as a conducive environment for asynchronous learning, spread to Western high schools and universities in the early 1980s after significant investment in ICT and teaching software. In the 1990s, blended university programs emerged around the world, combining synchronous and asynchronous online learning. Today, advanced multimedia and ICT are making a significant contribution to the development of asynchronous learning, bridging the gap between the content creator and the learners. New tools such as learning blogs and wikis provide rich opportunities for the further development of asynchronous communication and learning."

Read the full text here: Berestok O. V. Synchronous and Asynchronous.pdf (snau.edu.ua)

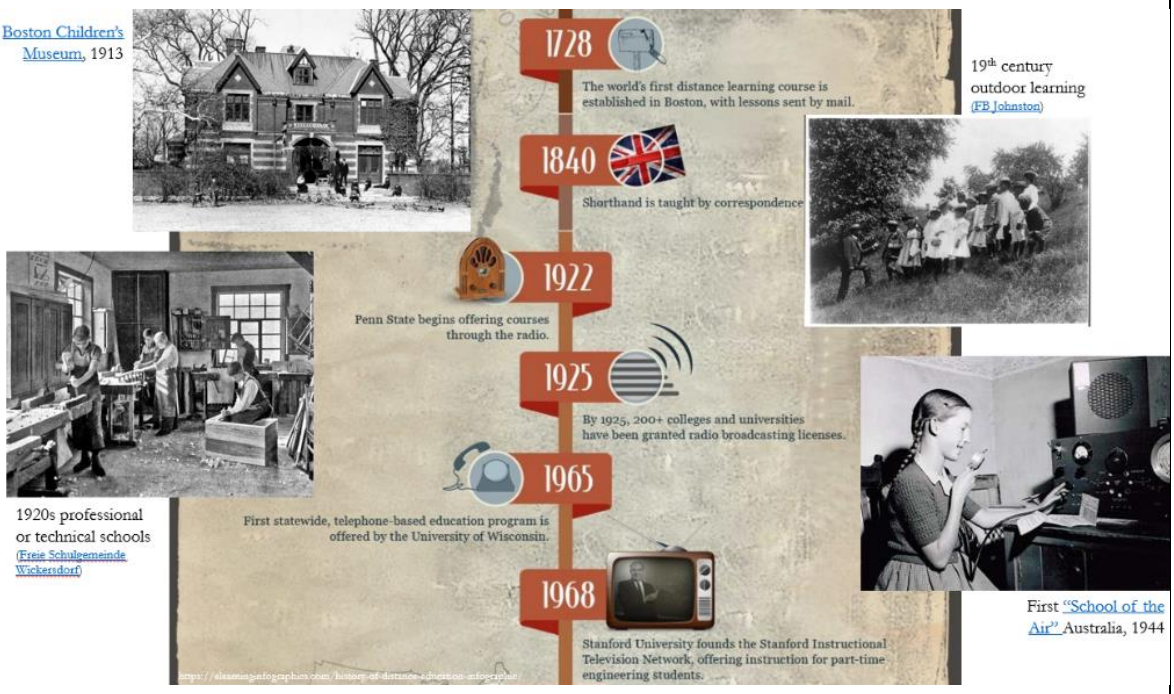


Fig. 9. Timeline of distance learning in school education. Infographic source: E-learning Infographics.com. Available at History of Distance Education Infographic - e-Learning Infographics (elearninginfographics.com)

Technical type

Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
15

Learning Object 2.4. Title
Advantages and limitations of asynchronous and synchronous e-Learning
Learning Object Description/Introduction
You will get informed about advantages and limitations of asynchronous and synchronous e-Learning.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content
Advantages of asynchronous learning Asynchronous learning encompasses all the learning activities that can take place in an online course at their students' own schedule and does not require simultaneous access to the activities. Students can generally complete a given task (e.g., assignments, group discussions, reading of resources) any time within the given timeline for the task; thus, asynchronous learning greatly promotes self-paced learning which can be considered as an advantage. An example of a self-paced course, using asynchronous modes of learning, is the OLMEdu training course that you are currently attending. The benefits of asynchronous communication have compared to synchronous communication and face-to-face courses, including time-independent access, opportunities for heightened levels of peer interaction, avoidance of undesirable classroom behaviour, and support for multiple learning styles have been highlighted by scholars (Morse, 2003). Asynchronous learning naturally supports core principles of ***constructivism*** (Gold, 2001). In addition, learning activities taking place in an asynchronous mode, bring in increased time-on-task, extra time for reflection, and sufficient opportunities for everyone to contribute to the discussion (Meyer, 2003). Students participating in asynchronous activities can experience a more active and central role to their learning (Heckman & Annabi, 2005). **Disadvantages of asynchronous learning** Due to the absence of direct and real time interaction with the course community, there is the risk for students to fall behind in an asynchronous learning mode, especially when they do not have proper motivation. Also, even though asynchronous communication may afford in-depth and thoughtful discussions, in terms of cognitive presence, there is some research evidence that students' contributions in asynchronous discussions fall in the lowest levels of cognition (Rourke & Kanuka, 2009). In that case it is unlikely that asynchronous mode of communication may lead to

meaningful learning. In addition, students may feel isolated or disconnected from the instructor and other students in such settings.

In the table below the main advantages and disadvantages of asynchronous communication in online learning are given.

Table 1. Advantages and disadvantages of asynchronous communication in online learning

Advantages	Disadvantages
Students study the learning material and complete their work on their own pace and according to their own schedule.	It is possible for students to fall behind and miss deadlines and assignments when proper motivation is missing.
Students can take the necessary time to digest, and study content that is difficult to deepen understanding.	Students may feel isolated or disconnected from the instructor and their peers.
Students can contribute to asynchronous class discussions, taking their time to compose their responses and opinions, increasing access to those with language and other barriers.	Lowest levels of cognition for students.

Advantages of synchronous learning

Synchronous learning takes place in real-time, like a video teleconferencing meeting or a chat, and provides the opportunity for spontaneous interaction between the participants (the students and the instructor). Students may perceive more social presence and the sense of community via synchronous communication in online learning environments, compared to asynchronous modes of communication.

Disadvantages of synchronous learning

Even though synchronous communication appears to have positive impact on the level of social presence, and that it also works well for content that "inspires natural debate or passion", it has been argued by researchers that asynchronous communication may be preferred for content that requires reflection (Oztok, et al., 2013). In other words, synchronous communication may not provide the time or concentration that is required to allow the students to engage deep ideas. In addition, synchronous learning can widen the divide for learners with certain disabilities. Finally, other disadvantages linked to issues of more technical nature, include: the unstable internet access that a student may have, inequitable access to devices and other equipment, and time zone differences.

In the table below the main advantages and disadvantages of synchronous communication in online learning are given.

Table 2. Advantages and disadvantages of synchronous communication in online learning

Advantages	Disadvantages
Provides opportunity for spontaneous interaction among students and between students and the instructor.	May not provide the time or concentration required to engage deep ideas.
Provides opportunity for immediate exchange of feedback.	Synchronous learning can widen the gap for learners with certain disabilities
Adds the “human” element	unstable Internet access
Builds the classroom community and foster the sense of the community	inequitable access to device and other equipment
Increased level of social presence	time zone differences

Technical type

Text
– Document
Image
– Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

40

Learning Object 2.5. Title

Further reading for “Advantages and limitations of asynchronous and synchronous e-Learning"

Learning Object Description/Introduction

Further reading for “Advantages and limitations of asynchronous and synchronous e-Learning"

Learning resource type

⇒ Further reading

Learning Objective Content

Further reading

- Gold, S. (2001). A constructivist approach to online training for online teachers. *Journal of Asynchronous Learning Networks, 5,* 35–57.
- Morse, K. (2003). Does one size fit all? Exploring asynchronous learning in a multicultural environment. *Journal of Asynchronous Learning Networks, 7*, 37–55.
- Rourke, L., & Anderson, T. (2002). Using peer teams to lead online discussions. *Journal of Interactive Media in Education*, 2002.

Technical type

Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 2.6. Title
Best practices in asynchronous and synchronous modes of learning
Learning Object Description/Introduction
In this section you will be introduced into best practices in asynchronous and synchronous modes of learning
Learning resource type
⇒ Good Practice
Learning Objective Content
Given the advantages and disadvantages that synchronous and asynchronous communication in online learning environments may have, it is still important for a teacher to be in a confident position of choosing the appropriate mode of communication, when needed. In the table that follows you will find some guidance in choosing the most appropriate mode of communication in online learning. In the pre-COVID era, online courses did not typically include synchronous communication means. During the covid-19 pandemic and the immediate switch to online communication at all levels, the synchronous mode of learning came to the forefront. Synchronous learning can elevate the design of a course, with the incorporation of interactive digital tools. Read more about choosing the right mode and technology for your teaching here: Synchronous and asynchronous learning (concordia.ca) Watch the following video, that provides useful pieces of information on synchronous and asynchronous online learning, digital tools that can be used in either case, tips and best practices.   FILM, VIDEO Ma'am Erly (2020, August 31). Synchronous and Asynchronous Online Learning [Video]. YouTube. *https://www.youtube.com/watch?v=b6FUa9fR2vI* The figure that follows provides tips and best practices on the use of synchronous and asynchronous modes of communication in online learning.

WHEN TO USE SYNCHRONOUS LEARNING

WHEN TO USE ASYNCHRONOUS LEARNING

Design your course so that synchronous learning activities make the most of the interactive nature of synchronous learning while complementing the asynchronous activities

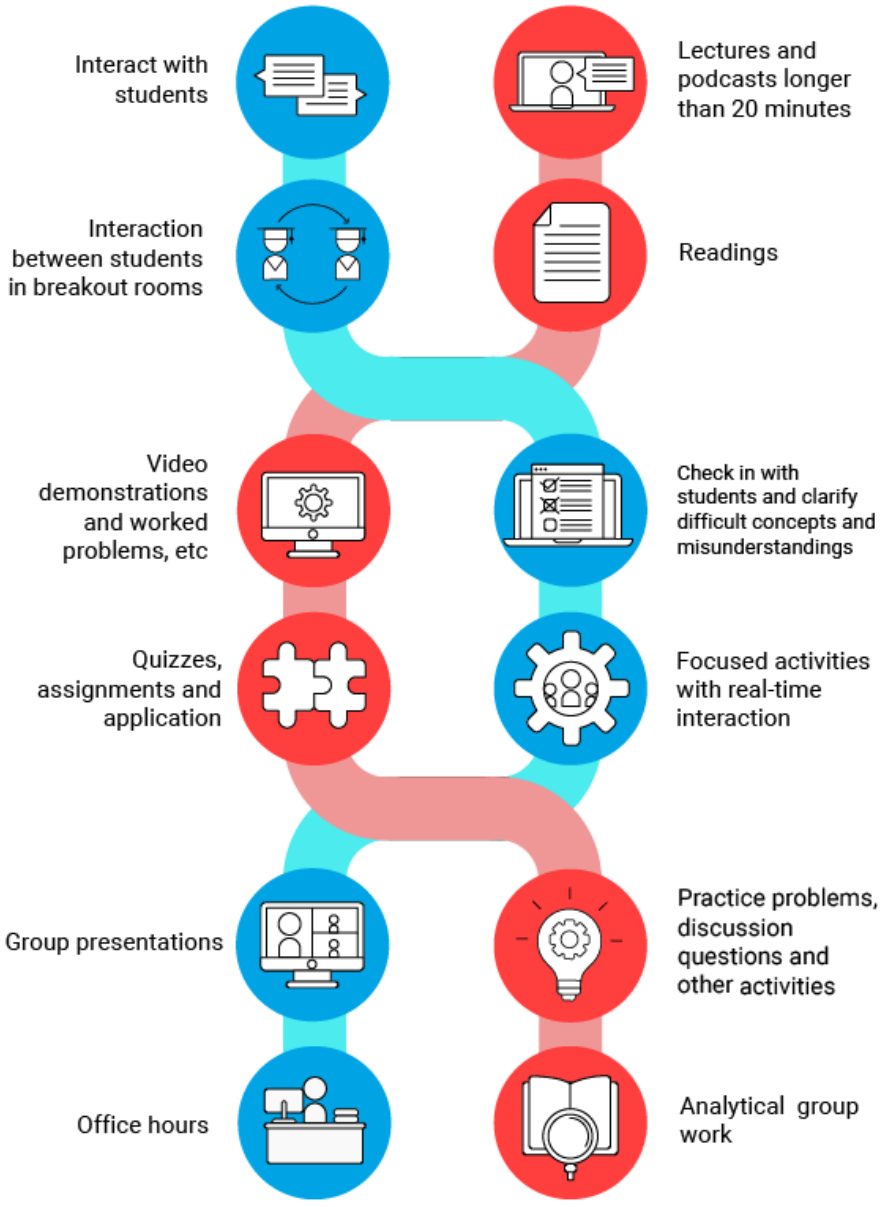


Fig. 10. Synchronous and Asynchronous Learning by Centre for Teaching and Learning, Concordia University CC BY-SA 4.0. Source: Synchronous and asynchronous learning (concordia.ca)
Technical type
Text – Document – Hypertext Image – Image Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 2.7 Title
Activity on synchronous and asynchronous learning (self-reflection and forum discussion)
Learning Object Description/Introduction
Having read about synchronous and asynchronous learning, their advantages, and disadvantages, in this activity you are asked to make a list of activities in which you will use synchronous and asynchronous learning in your course, considering the appropriateness of each mode per activity and its scope.
Learning resource type
⇒ Activity – Reflective based activity
Learning Objective Content
Make a list of activities in which you will use synchronous and asynchronous learning in your course, considering the appropriateness of each mode per activity and its scope. Share your thoughts in the discussion forum with other trainees and discuss further.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Unit 3 Title
Design of students' assignments and activities in online environment

Learning Object 3.1 Title
Design of students' assignments in online environments
Learning Object Description/Introduction
In this section you will be introduced to key elements that you need to encounter while designing students' assignments in online learning environments.
Learning resource type
⇒ Narrative Text
Learning Objective Content
The previous sections have already provided to you, insightful information about the key elements that you need to encounter while designing your e-courses in general, so as to be effective and interactive. These elements also apply while designing assignments and activities in online learning environments for your students. In this section you will read about the characteristics of effective online assignments. **Effective online assignments should:** ⇒ ***be aligned with the course learning objectives and scope*** Ensuring an alignment of the assignments with the learning objectives and the expected learning outcomes is a key element when designing the assignments. This stands true not only for online assignments in online courses, but also for assignments of conventional courses. ⇒ ***provide clear instructions, prompts and a rationale for each assignment*** You need to make sure that the instructions that are provided along with each assignment are delivered to the students in a clear manner, so that they comprehend what is expected from them to do when working on an assignment. As already mentioned above, especially in online courses in which asking clarifying questions on the spot is limited, in comparison to traditional classroom courses, you should ensure that the instructions are clear content-wise but also in relation to technicalities (e.g., how to submit the assignment, where and when to submit). Instructions should not assume that all students understand the assignment's purpose or what is required from their side to do. However, even though detailed instructions are important, you should make sure that your students will not feel overwhelmed with a lot of information. Consider using a short video or audio recording with short instructions when you need to convey a lot of information related to an assignment. In addition, the assignments should have a clear rationale which must be communicated to your students. The latter is particularly essential for assignments offered in online learning environments, where it can be more difficult for students to ask clarifying questions. Explaining why you have chosen a particular assignment and why you believe it is valuable for the students.

⇒ ***contain appropriate scaffolding***

Especially given that those assignments are delivered in online learning environments, in which immediate and face to face communication with you, the instructor, is missing, you should secure that the appropriate scaffolding is offered to your students, so as to support them successfully complete the assignment. Scaffolding is the process to help students take their experience and knowledge to continue to create meaningful connections to build their conceptual understanding and frameworks. That given, make sure that the students receive the appropriate support while doing an assignment, that could be in the form of: additional sources to study, examples of assignments, having a mentor (either yourself or a teaching assistant) to answering questions that might arise etc. Learn more about 'scaffolding' by studying the learning object 1.4 'Mapping the Basic Learning Theories' of Module 1.

Read more about scaffolding:

ERIC - ed384443 - Scaffolding Children's Learning: Vygotsky and Early Childhood Education. NAEYC Research into Practice Series. Volume 7., 1995

What Is Scaffolding in Education? | GCU Blog

⇒ ***take advantage of the web as a learning environment***

The web offers a variety of information, sources and online tools that can be incorporated into assignments and course activities. You can use its networked, hypertextual nature to enable interactivity. There is a list of different open sources, and open documents that you can use for the students' assignments and for fostering collaboration among learners. For instance, you can ask your students to work in groups and simultaneously work on Google docs for completing an assignment.

⇒ ***start engaging students early in the course***

Providing your students with a first assignment early in the course is a good practice, in order to secure their engagement but also to have a good indicator of whether the students will complete the course. In addition, students' response to your first assignment will provide you with insightful information of their prior knowledge of the course topic (initial assessment), the level of attained skills and competences. Interesting, challenging assignments early in the course draw students in, familiarise them to the kinds of coursework you have planned and engage them actively in the course community.

⇒ ***connect multiple parts of the course***

Connect multiple parts of the course (concepts, ideas, theories, practices) in assignments, targeting in more than one of the course learning objectives at the same time, if possible. In this way, you will help your students integrate what they have learnt through the course and develop a deeper understanding of the course topic, the main concepts, and their connections.

⇒ ***provide criteria for evaluation and assessment***

Assessment methods and practices vary widely in online courses, and per topic/ discipline, but in all cases the students must be aware from the beginning of the course how they are going to be

evaluated and assessed. Providing clear grading rubrics and other assessment criteria in advance can help students focus on the most important aspects of the assignment.

⇒ ***demonstrate variety and flexibility***

Flexibility and variety of students' assignments may increase the possibilities of keeping your students engaged and motivated in the course. Provide a variety of different types of assignments to your students and a flexibility in terms of modes of delivery, ways of organizing and presenting their work, allowing multiple types of answers and solutions to the given assignments. For instance, one assignment could be delivered by students in the form of a poster, a short presentation or even a narrative, given that the same learning objectives are being assessed in all cases. In that case, students are given with a flexibility to choose the modality of the solution that they prefer to deliver.

⇒ ***be inclusive and accessible***

Your assignments should be accessible by all and inclusive. Consider the native language of your learners when designing the course assignments, and whether all students have access to certain types of resources, tools, or software that are required for completing the assignment.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Unit 4 Title
Design online interactive courses for actively engaged students

Learning Object 4.1 Title
Characteristics of online interactive courses
Learning Object Description/Introduction
In this section you will be introduced to specific characteristics of online interactive courses that facilitate the actively engagement of the students.
Learning resource type
⇒ Narrative Text (theory) ⇒ Guidelines
Learning Objective Content

Practically there are quite a few ways to make your courses interactive. Active learning and conceptual understanding of the course content can be facilitated with the addition of elements in your content which encourage learners' engagement.

Elements of interactive content that you can add into your online courses

One of the most effective ways to help your students first navigate in your course, second to obtain information required so as to meet their learning objectives, is through the use of visual aids and multimedia content in general. Concepts and connections among concepts and information in general are best illustrated with the use of visuals, such as, images, graphs, concept maps, and videos.

Multimedia content

Multimedia content includes text, audio, images, graphics, infographics, and videos. Audio elements like podcasts or interviews are great for integrating information, which can even enhance your course content. Videos comprise an agile and entertaining format that connects with the learners instantly, providing context and facilitating storytelling. Interactive videos require active participation from the learners. Most of the LMS and online platforms support the creation of interactive videos, with features that allow you to add questions or complementary information at the point you want and reinforce ideas effortlessly

Concept maps

A concept map (or conceptual map) is a diagram that illustrates the connections and relationships among concepts. Concept maps can be used to organized and structure knowledge, either by the instructor as part of the content delivery, or by the students as part of an assignment. There are a lot of online free tools that you can use for concept mapping, such as: https://www.mindmup.com/ and https://www.visme.co/concept-map-maker/.

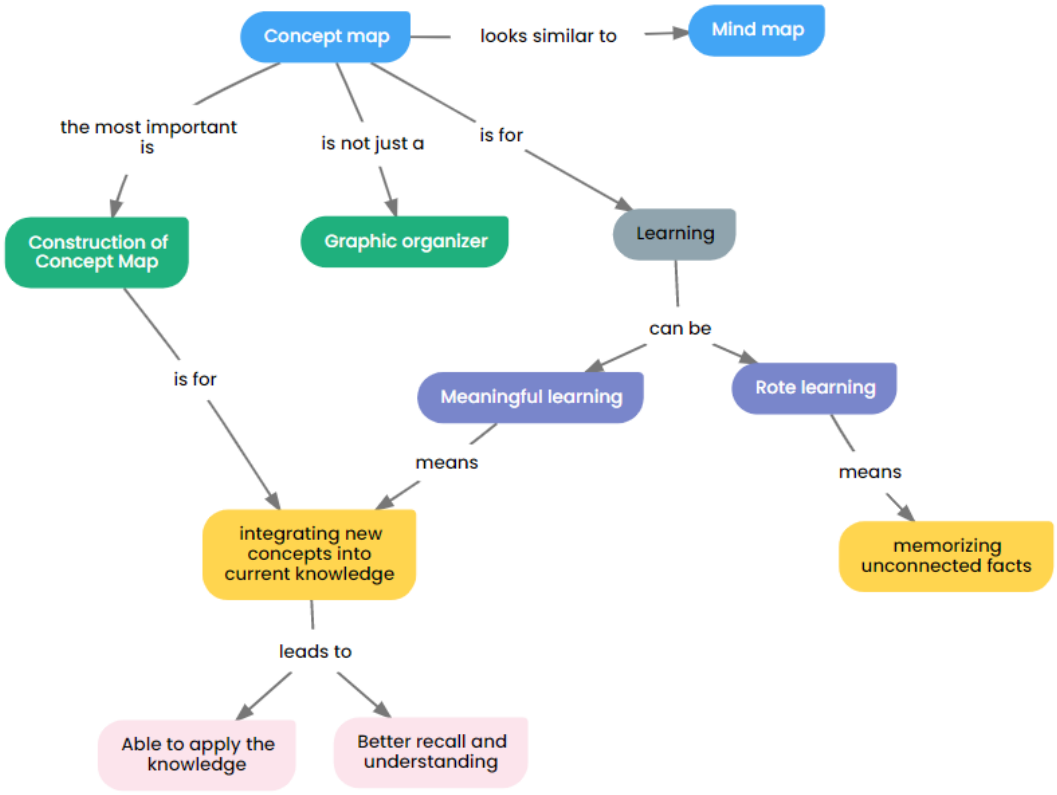


Fig. 11. Concept mapping. Source: [Concept Mapping: a Powerful Tool for Building Actionable Knowledge | Emerging Education Technologies (emergingedtech.com)]

Graphics

Graphics in general can make your content more interactive, making the content more dynamic by presenting the data in a different way. Well-designed educational graphics can increase student engagement and can foster their understanding, while improving the learning experience.

Humans are **'visually wired'**

20–30% of the **cerebral cortex** is involved in **visual processing**

>80% of information processed is **visual**

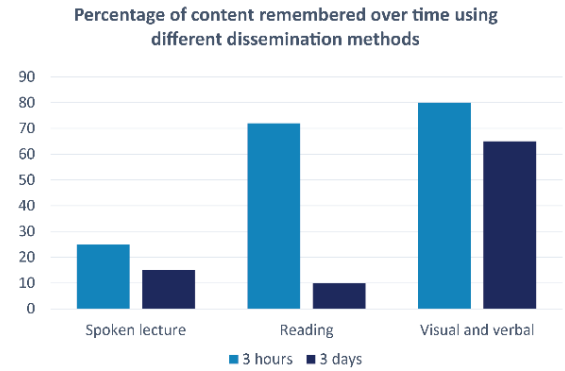
Visuals communicate information **60 000x faster** than text

In **education**, graphics can be **used** to:

- ATTRACT ATTENTION
- MAINTAIN MOTIVATION
- ENHANCE RETENTION
- IMPROVE PROBLEM-SOLVING
- INTEGRATE KNOWLEDGE

The picture superiority effect

Using a combination of **visual and verbal cues** leads to a significant **increase** in long-term **information retention**



Colour visuals increase willingness to read by **80%**

When people need to **follow instructions,** they do so **323% better** when there are **illustrations**

Second-language learners struggle with **iconography** more than first-language learners

Novice learners benefit more from **static diagrams** than from animated ones

Colour matters

Red activates a **'prevention-focused'** mindset and increases **caution**

Blue backgrounds can **improve** information **retention**

Strategic colour usage can **guide attention** and **decrease search time**

Fig. 12. Use of graphics in education. Source: Using Graphics in Education - Infographic | EDGE Education

Educational infographics

An infographic is a representation of information in a graphic format, designed to make the data easily understandable immediately. With an infographic, it is easy to scan, absorb and retain information. Infographics (and visual aids in general) help learners, especially visual learners (check learning styles unit), to find and understand information and content quickly. According to the cognitive theory of multimedia learning, "multimedia instructional messages that are designed in light of how the human mind works are more likely to lead to meaningful learning than those that are not so designed" (Mayer, 2014, p. 43).

Main reasons to use infographics in your course content include:

- Offering support attention to parts of your e-courses
- Activating or building prior knowledge
- Minimizing the cognitive load
- Supporting the transfer learning
- Boosting students' motivation

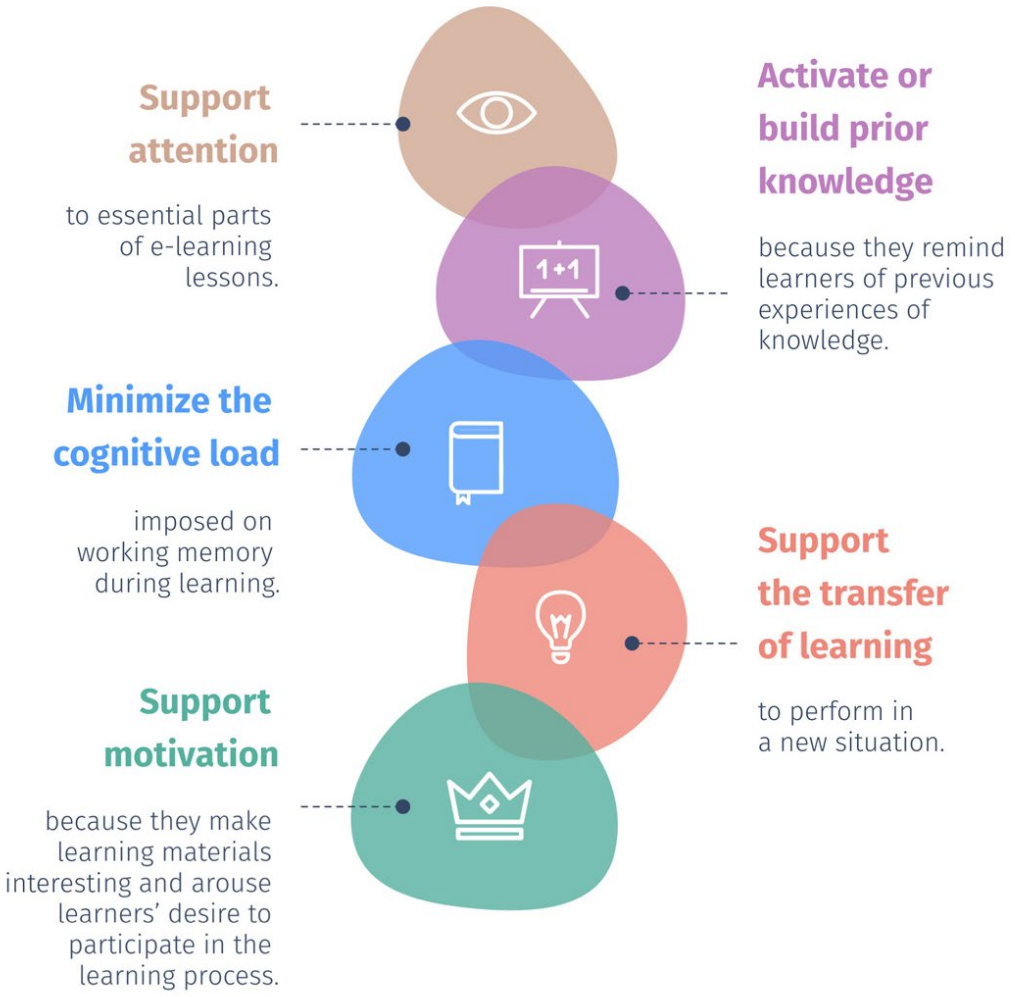


Fig. 13. Five reasons to use infographics in an online learning environment. Source: Educational Infographics: How to Use Infographics In Your Online Course (visme.co)

Interactive content

H5P (https://h5p.org/) can be used not just for the creation of interactive videos, but for the creation of interactive content in general. It allows you to create richer HTML5 content in existing publishing platforms (e.g., Moodle), share content seamlessly across any H5P capable site, and reuse and modify content in your browser. Specifically, H5P allows you to create interactive videos (see above), course presentations, branching scenarios and other types of interactive content.

In interactive video created with the use of the H5P tool, can accommodate multiple choice questions, fill in the blanks, text, and other types of interactions.

Joubel (2013, June 05). Interactive Course Presentation [Video]. YouTube. https://h5p.org/presentation

You can create engaging presentations with H5P in publishing systems like Blackboard, Moodle, WordPress and other systems. Check whether the LMS/ platform that your institution is offering for use, supports the use the H5P tool. Watch the following tutorial video on how to create interactive videos with H5P. Also, the check the net learning object, as an example of how an interactive presentation looks like.

Dr. Nellie Deutsch (2021, May 23). How to Create an Interactive Video with H5P on Moodle [Video]. YouTube. https://www.youtube.com/watch?v=dDSVAv0ttZw

Joubel (2013, June 10). Interactive Video [Video]. YouTube. https://h5p.org/interactive-video

Last, you can create a branching scenario content with the use of the H5P tool. This type of content allows users to create self-paced learning scenarios, dilemmas, and other types of adaptive learning. This feature might be especially appropriate for your Management Education courses, in which scenarios and use cases are greatly used as teaching methodologies. Watch the following video that provides instructional design tips on how to Create Branching Scenarios for eLearning.

Kimberly Goh (2022, February 01). How to Create Branching Scenarios for eLearning (Instructional Design Tips) [Video]. YouTube. https://www.youtube.com/watch?v=e44I1CLlxPk

Exercises, virtual activities, simulations, and games

Include exercises, simulations, virtual activities, and game-based activities available to your learners so as to make the learning process more enjoyable. For example, conduct Q&A sessions or assessments to encourage your learners to engage with you, with the content, and each other, increasing their collaboration and engagement. Exercises may include sorting activities with drag and drop dynamics, fill in the blanks, and short quizzes with some gamification elements e.g., using Kahoot (check Module 7 for more information on how to use Kahoot).

Technical type
Text – Document – Hypertext Image – Image Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 4.2 Title
An interactive presentation on characteristics of online interactive courses
Learning Object Description/Introduction
A summary of the characteristics of online interactive courses through an interactive presentation.
Learning resource type
– H5P Content
Learning Objective Content
[to be developed in IO3 and included in IO4 platform]
Technical type
Application – OLMEdu toolkit - H5P tool - Interactive Presentation

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 4.3 Title
Further reading for “Characteristics of online interactive courses"
Learning Object Description/Introduction
Further reading for “Characteristics of online interactive courses"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Van Der Werthuizen, M. (Sep 18, 2020). Using Graphics in Education – Infographic. Retrieved from: Using Graphics in Education - Infographic | EDGE Education Papadopoulou, A. (May 14, 2020). Educational Infographics: How to Use Infographics In Your Online Course. Retrieved from: Educational Infographics: How to Use Infographics In Your Online Course (visme.co) H5P website: https://h5p.org/ • Learn more about cognitive theory of multimedia learning here: Educational Infographics: How to Use Infographics In Your Online Course (learning-theories.com)
Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
100

Learning Object 4.4. Title
Interactive content creation: a Branching Scenario Activity
Learning Object Description/Introduction
Branching Scenario is a flexible content type that can be used for the creation of rich interactive content. The authoring tool allows the users to structure the content as a tree with multiple branches and endings. Learners make choices that determine the content they will see. This tool might be useful for creating interactive content for your online courses, in the Management Education domain.

Learning resource type
⇒ Activity – Else: Branching scenario (interactive content)
Learning Objective Content
The business management scenario will be created by learners using the OLMEdu toolkit - Interactive simulation tool – digital media storytelling After studying the material (including a tutorial and specific examples) provided in the toolkit for the Branching Scenario type of content, create an activity for your students, using this tool. Your activity may apply in one of the following ways of using branching, or others that you can think about: 1. Simple branching for personalized action plans. 2. 'Choose your own adventure' style branching. 3. Branching for role-specific content. 4. Branching in conjunction with game elements. 5. Complex branching and visual storytelling. Deliver your Branching Scenario as an assignment, and also specify: the name of the course, short description of your students, short description of the activity, list of learning objectives being addressed through this activity.
Technical type
Application – OLMEdu toolkit - Interactive simulation tool – digital media storytelling
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
180

Conclusion of the module
In this module you have been introduced to key principles for the design and delivery of effective online courses by combining asynchronous and synchronous e-learning and by using interactive techniques and practical experiences for engaging your students. In doing so, it is essential to first consider the online learning experience that your learners will have while participating in your course. This experience is influenced by the instructors (yourself), the course curriculum, and the appropriate use of technological tools. Online learning experience must encompass the use of a variety of technological modalities, and self-paced learning practices. Secondly, effective online instruction depends on learning experiences that are appropriately designed and facilitated by the educator. Thus, it is essential to consider digital and instructional approaches to facilitate online learning. Instructional strategies include the learning theories endorsed in your course design, the consideration of the target group (their needs, learning styles and particularities), specific and measurable learning objectives, the provision of a learning

contract/ syllabus, the creation of authentic and relevant content, the modes for content delivery, the assessment methods and activities which will be used, and ways to track your learners' progress. Digital approaches towards facilitating online learning include the use of new and innovative digital tools to promote teaching and learning for students with varied educational needs, but also the use of interactive methodologies (e.g., flipped classroom approach).

In addition, when designing your online course, it is also vital to consider your students' learning styles, which can be distinguished into visual, auditory and tactile/kinesthetic learners.

The appropriate use ICT on content design is of utmost importance in order for an e-course to be useful to learners. Yet, e-courses should be developed in order to meet the teaching and learning needs and address the specific learning objectives of the course, while effective e-course development should be the concerted efforts of both academic staff and IT staff.

Online learning can be supported by asynchronous and synchronous modes of communication. You have been introduced into these two types of communication, with reference to advantages and disadvantages of each mode, as well as specific examples of academic activities that can be implemented through asynchronous and synchronous communication. Worth mentioning is that it is still important for an instructor to be in a confident position of choosing the appropriate mode of communication, when needed, whereas there is no single 'right' way to teach online.

Key elements that you need to encounter while designing students' assignments in online learning environments have also been introduced. Concluding, you have been introduced to specific characteristics of online interactive courses that facilitate the actively engagement of the students. Those include the use of multimedia content, interactive content (i.e., interactive videos, presentations, and branching activities), as well as practical exercises, virtual activities, and game-based activities.

Conclusion type

Choose from the list

- Text
- Infographic

Summative Assessment of the module

[make sure that the questions address all the learning outcomes].

Automated feedback is provided by the platform.

Assessment type

- Multiple Choice Questions (single or multiple correct answers)

Technical Type

- Text

Workload

20 minutes
Number of questions in the assessment object
5

Question template for Multiple Choice Questions	
No.	1
Question (stem)	Which of the following options relate to the advantages deriving from asynchronous learning?
Possible answers	a) High levels of cognitive presence b) High levels of social presence c) More opportunities for deepen understanding
Correct answer	c) More opportunities for deepen understanding
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	2
Question (stem)	Which of the following options relate to the disadvantages deriving from synchronous learning?
Possible answers	a) May widen the divide for learners with certain disabilities b) May decrease student motivation and engagement c) Lacks the “human” element and sense of belonging
Correct answer	a) May widen the divide for learners with certain disabilities
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	3
Question (stem)	Which of the following design elements will facilitate the most the learning process of tactile/ kinaesthetic learners?
Possible answers	a) Infographics

	b) Audio recordings c) Simulations
Correct answer	c) Simulations
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	4
Question (stem)	When delivering online lectures in a synchronous mode of communication (e.g., teleconferencing), you should consider the following challenges which may arise:
Possible answers	a) Internet connectivity b) Students' active participation c) Different time zones d) All of the above e) None of the above
Correct answer	d) All of the above
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	5
Question (stem)	What are the most effective ways for tracking learners' progress in an online learning environment?
Possible answers	a) Collecting and analysing data through a dashboard b) Conducting a final exam at the end of the course c) Sending personal emails to learners to check how they progress d) Conducting formative assessment activities
Correct answer	a) Collecting and analysing data through a dashboard d) Conducting formative assessment activities
Response to correct answer	-
Response to wrong answer(s)	-

Times the question can be taken	1
Is the question part of a test?	No

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Module 4: Distance learning educational technologies, digital tools, and mobile applications

Module Number
4
Module Title
Distance Learning Educational technologies, digital tools and mobile applications
Short Description / Motivation text
This module is practically oriented. It aims to deliver the learners knowledge and skills on the available Open-Source Distance Learning Technologies, Digital Tools and Mobile Applications and how they can be used for educational purposes in higher education. The objective is to educate the learners and provide them with the foundations, guidelines and practical instructions on how to exploit them in practice for providing online teaching in ME.
Keywords
Learning management systems, Content management systems, e-learning platforms, digital tools
Learning Outcomes
After the successful completion of this unit learners will: – List and critically discuss the available e-learning platforms and learning management systems (LMS). – Explain how digital tools can be used in combination with e-learning platforms and LMS. – Utilize e-learning platforms and LMS for providing online teaching in ME. – Learn how to integrate digital tools with the e-learning platforms and LMS to deliver effective online teaching. – Explain the importance of mobile applications in online course delivery. – Learn how to use mobile applications for effective online teaching. – Describe advantages and limitations of using learning platforms, LMS, tools and mobile applications. – Discuss critically the challenges and trends of technology in providing online teaching in ME. – Identify and evaluate when and how to use Distance Learning Technologies, Digital tools and Mobile Applications in ME. – Outline the importance of using Information and Communication Technologies (ICTs) in asynchronous and synchronous e-learning in ME.
Language
English
Training Content

Learning Unit 1 Title
Distance Learning Platforms and Tools.

Learning Object 1.1 Title

Introduction to Learning Management Systems

Learning Object Description/Introduction

A variety of software platforms has been developed and services they provide to their users:

- both teaching materials and services of participation in Online lessons
- as well as the possibility of working as team members to learn.

The environments of the first category are Content Management Systems (CMS) or Learning Management Systems (LMS), while in the second, we meet the Social Network Services mainly on the Internet. This particular learning unit provides an overview of distant Learning Platforms and Tools, combining theoretical aspects and practical examples.

Learning resource type

Narrative Text (theory)
Further Reading

Learning Objective Content

Distance learning has always been an opportunity to spread knowledge to places where economic, geographical, and organizational problems are an obstacle to the community's cultural growth.

E-learning often is conceived as a single homogeneous product. In reality, the market is very heterogeneous with an extensive product variety, as demonstrated in the e-learning value chain (Elloumi, 2004). E-learning software, in support of the implementation of e-Education or virtual campuses, can refer to learning management systems, virtual classrooms, authorware, tests and assessment tools, or simulators. There is a broadly available supply of both open and closed source applications for education to guarantee an acceptable degree of freedom of choice and multiple possibilities of matching demand and supply. There are already several providers of commercial learning management systems. The wide availability of solutions has not led to broad adoption, however. For example, Hilding-Hamann and Massy (2004) concluded that concerning e-learning, "poor quality procurement practices (in all sectors but especially in the public sector) are a barrier to growth and adoption."

Question for reflection

Can you describe the main characteristics of Learning Management Systems?

A series of applications have been created to help educational institutions develop, organize, and deliver learning content, track student activities and performances, and evaluate learning outcomes. These software applications are commonly called learning management systems (LMS). They can support all the administrative and logistic processes of training in addition to the communication and evaluation activities mentioned before.

In general, a Content Management System (CMS) is an environment with organized storage and management of large volumes of data, such as text, images, audio, etc. In addition, they provide a variety of content searches.

On the other hand, a Learning Management System (LMS) is an environment that manages learner activities, such as user access (login, etc.), course lists, user tasks, appropriate information for support system management.

A Learning Content Management System (LCMS) is an environment for creating, managing, and retrieving content intended to drive learning.

- Its content is based on a Learning object model and thus is easily reused in other courses,
- These systems, because they separate the content, which is often in XML format, from its presentation, can also publish information on a variety of platforms or devices, such as Web, Palm, etc.,

Learning Objects refers to stand-alone content sections related to an educational object that can be assembled with other such areas to create lessons, thus being reusable learning objects and giving flexibility in creating or updating teaching materials. The most well-known model related to creating learning objects for the production of courses is the SCORM (Sharable Content Object Reference Model).

Question for reflection

Can you describe the main characteristics of Learning Management Systems?

Visit the link below to discover more about Learning Management Systems:

What is a learning management system? And why do I need one?

Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 1.2 Title
An overview of available e-learning platforms and learning management
Learning Object Description/Introduction
Draft overview of currently used and available platforms.

Learning resource type

⇒ Narrative Text (theory)
⇒ Further Reading
⇒ Did you know

Learning Objective Content

A variety of software platforms has been developed and services they provide to their users:

- both teaching materials and services of participation in Online lessons
- as well as the possibility of working as team members to learn.

The environments of the first category are Content Management Systems (CMS) or Learning Management Systems (LMS), while in the second, we meet the Social Network Services mainly on the Internet. This particular learning unit provides an overview of distant Learning Platforms and Tools, combining theoretical aspects and practical examples.

There are plenty of e-learning platform, in two categories (freeware, now freeware) see for example:

Open source available platforms (freeware)

Moodle

Moodle is a free Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities. It's Simple, lightweight, efficient, compatible, low-tech browser interface. Easy to install on almost any platform that supports PHP and requires only one database.

The "A" stands for Accessible and it has excellent support for key accessibility standards (Atutor, Acontent, ATutor social).

Source:
https://moodle.org/theme/image.php/moodleorg/theme_moodleorg/1642682278/moodle_logo_small

https://moodle.org/

ATutor

ATutor social is a social networking module that allows ATutor users to connect with each other. They can gather contacts, create a public profile, track network activity,create and join groups and customize the environment with any of the thousands of OpenSocial gadgets available all over the Web. ATutor Social can be used as a standalone social networking application.

Source: https://cdn1.atutor.ca/wp-content/uploads/2020/04/atutor-logo.png

https://atutor.ca/

.LRN

This is one of the world's widely adopted, opensource, full-featured applications for rapidly developing Web-based learning communities. It supports a variety of learning styles,ranging from traditional structured learning to group collaboration. Its customizable layout allows users to personalize learning space. It is built as a platform for "learning communities" rather than a narrow system for "course management" or online learning.

Source: http://www.dotlrn.org/resources-dotlrn/theme-selv

a/Selva/dotlrn/images/Logo.gif

http://www.dotlrn.org/

Proprietary available platforms (not freeware)

Blackboard Learn

Was founded in 1997 is a leading provider of eEducation enterprise software applications and services. Its main characteristics are:

courses Management, content creation, didactic units, textbook online, teaching and learning tools, administration of personal information, board discussion, group project, book of qualifications and control panel.

Source: *https://www.blackboard.com/themes/custom/blackboard/images/Blackboard-Logo.png*

https://www.blackboard.com/en-eu/teaching-learning/learning-management/blackboard-learn

Question for reflection

Have you ever used used on of the above e-learning platforms?

Technical type
Text – Document – Hypertext Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 1.3 Title
Additional Resources for further reading
Learning Object Description/Introduction
Listed below a list of academic papers for further reading regarding the use of learning platforms and tools
Learning resource type
⇒ *Further Reading*
Learning Objective Content
Listed below a list of academic papers for further reading regarding the use of learning platforms and tools Black, E. W., Beck, D., Dawson, K., Jinks, S., & DiPietro, M. (2007). Considering implementation and use in the adoption of an LMS in online and blended learning environments. *TechTrends*, *51*(2), 35-53.

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Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 1.4 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: What is LMS [Learning Management System?

Source: https://www.youtube.com/watch?v=ezbJwaLmOeM

Question	True	False
A Learning Management System concern administrative activities of educational institutions		

A Learning Management System provides only educational material		
Can I group different learners in this system?		
Can I assign different tests to each participant?		
A Learning Path describes the path of participants to each course?		
A Learning Management System is available only for school students?		
A Learning Management System is needed mainly for large businesses		
A student needs a special device to acess a Learning Management System?		
An LMS is a web-based system that helps you automate employee training?		
Can an LMS reduce expenses for things like transport and accommodation?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 1.5 Title

What is MOODLE? What are Online Learning Managements Systems?

Learning Object Description/Introduction

Examples of learning management systems in education and digital tools' integration will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more about learning management systems and their role in education in the following article:

- https://www.distancelearningportal.com/articles/161/what-is-moodle-what-are-online-learning-managements-systems.html

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 1.6 Title
Good practices
Learning Object Description/Introduction
Good practices about successful Learning Management Systems
Learning resource type
⇒ Good Practice ⇒ *Further Reading*
Learning Objective Content
Here you can find reports on best practices about successful implementations of learning Management Systems in the following links: - How to Implement an LMS successfully: 10 Best Practices - LMS Selection And Implementation: Best Practices **Question for reflection** Describe according to your opinion which is the best practice on implementing a successful LMS
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Unit 2 Title
Mobile Applications for Educational Purposes

Learning Object 2.1 Title
Introduction to Mobile Applications for Educational Purposes
Learning Object Description/Introduction

Consumers have downloaded mobile applications (apps) approximately 230 billion times since 2008. The Google Play store has over 3,5 million available apps, and the Apple App store has about 2.2 million. The most commonly downloaded Apple Apps are games, followed by apps for business, then education. At the same time, the most frequently downloaded Android Apps are educational. Also, many educational websites and Web tools were improved following Web 2.0 and developed mobile-friendly versions, which can be utilized with mobile devices. With the growing number of mobile resources, educators have the opportunity to harness mobile applications as a tool for their education toolbox.

Learning resource type

Narrative Text (theory)
Further Reading

Learning Objective Content

Mobile learning (m-learning) is education via the Internet or network using personal mobile devices, such as tablets and smartphones, to obtain learning materials through mobile apps, social interactions, and online educational hubs. It is flexible, allowing students access to education anywhere, anytime.

Mobile apps for educational institutions have done an excellent thing for the students, making the learning process fun and easy. Also, the various app features to boost engagement through knowledge-oriented activities.

Question for reflection

Do you use education apps in your mobile phone?

Visit the link below to discover more about Mobile Applications for Educational Purposes

5 Benefits Of Using Mobile Apps In Education

Technical type

Text

– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

120

Learning Object 2.2 Title

Additional Resources for further reading

Learning Object Description/Introduction

A list of academic papers and web links for further reading regarding the utilization of mobile applications for effective online teaching

Learning resource type

⇒ *Further Reading*

Learning Objective Content

A list of academic papers and web links for further reading regarding the utilization of mobile applications for effective online teaching

Basal, A., Yilmaz, S., Tanriverdi, A., & Lutfiye, S. (2016). Effectiveness of mobile applications in vocabulary teaching. *Contemporary educational technology*, *7*(1), 47-59.

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Salama, R., Uzunboylu, H., & Alkaddah, B. (2020). Distance learning system, learning programming languages by using mobile applications. *New Trends and Issues Proceedings on Humanities and Social Sciences*, *7*(2), 23-47.

Knohova, L. (2017). The Art of Teaching with Mobile Applications. *Retrieved on*, *2*(06), 2017.

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.3 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: Best Apps for Teachers
Source: https://www.youtube.com/watch?v=vTDh-h7Xti4

Question	True	False
Can Minecraft be used for education?		
Is Padlet a tool for creating quizzes;		
Plicker is ideal for random selection of students?		
Can you create electronic quizzes for students without mobile devices?		
Can you engage students to share their thoughts via Google Classroom?		
Can you provide questions for students after watching a video with edpuzzle?		
Can a teacher manage a classroom with Classcraft?		
Minecraft education has resources for Language Arts?		
No Hands application raises automatically the hands of students?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.4 Title

The Use of Mobile Applications in Education

Learning Object Description/Introduction

Examples of mobile applications in education and the comparison with learning platforms will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more about growing trend in education industry in the following article:

Mobile Applications: A Growing Trend In The Education Industry

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 2.5 Title
Good practices
Learning Object Description/Introduction
Good practices about successful use of mobile applications for effective online teaching
Learning resource type
⇒ Good Practice ⇒ *Further Reading*
Learning Objective Content
Here you can find reports on best practices identifying *and evaluating when and how to use mobile applications for effective online teaching* in the following links: 20 Best Applications for Teachers What Are The Best Tips For Teaching With Apps?
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 3 Title
Challenges and Trends in using ICTs and Tools in Education Management

Learning Object 3.1 Title
Introduction to ICTs and Tools in Education Management
Learning Object Description/Introduction
In this section we will try to provide a short introduction to ICTs and Tools in Education Management and how can ICTs help schools today.

Learning resource type
Narrative Text (theory) *Further Reading*
Learning Objective Content
ICT makes dynamic changes in society, influencing all aspects of life, especially schools. Students and teachers via ICT have more opportunities to adapt issues like learning, teaching, and fulfil their individual needs. Therefore, society is forcing schools to respond to this innovation aptly. It provides effective ways of mitigating some of the challenges each country's educational system faces. These technologies distinguish themselves by their vast evolution, continuously changing the modes of engagement. *Nowadays, ICT has demonstrated varying impacts on learning as educational institutions are expected to play a crucial role as the engine for learning environments. Therefore, ICT has become an essential part of our everyday life. Accordingly, this integration in school improvement is for teaching and learning and educational management use. It has also become one of the most influential factors in school improvement. Therefore, ICT plays a vital role in improving the functional effectiveness of the school system.* **Question for reflection** How can ICT help schools today?; **Visit the link below to discover more about web conferencing tools:** THE USE AND MANAGEMENT OF ICT IN SCHOOLS
Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 3.2 Title
Additional Resources for further reading
Learning Object Description/Introduction
A list of academic papers and web links for further reading regarding the challenges and trends of Distance Learning Technologies, Digital Tools and Mobile Applications
Learning resource type
⇒ *Further Reading*

Learning Objective Content

A list of academic papers and web links for further reading regarding the challenges and trends of Distance Learning Technologies, Digital Tools and Mobile Applications

Fatma, S. F. (2013). E-learning trends issues and challenges. *International Journal of Economics. Commerce and Research*, *3*(2), 1-10.

Keengwe, J. (Ed.). (2014). *Advancing higher education with mobile learning technologies: Cases, trends, and inquiry-based methods: Cases, trends, and inquiry-based methods*. IGI Global.

Dabbagh, N., Benson, A. D., Denham, A., Joseph, R., Al-Freih, M., Zgheib, G., ... & Guo, Z. (2015). *Learning technologies and globalization: Pedagogical frameworks and applications*. Springer.

Fatma, S. F. (2013). E-learning trends issues and challenges. *International Journal of Economics. Commerce and Research*, *3*(2), 1-10.

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.3 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: Role of ICT in Educational Management

Source: https://www.youtube.com/watch?v=ScmXSMhGsEQ

Question	True	False
ICT in Educational Management can bring a greater transparency in educational administration?		

The concept of Educational Management derives from Management Principles?		
Is Educational Management related to alternative models based on observation?		
ICT is needed in Educational Management for increasing efficiency and accuracy?		
Is it easier to maintain heath records of students with use of ICT?		
The use of ICT is not convenient for participation in co-scholastic activities		
The use of ICT is mainly used for dissemination of information?		
Economic information like student fees can be managed by ICT?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.4 Title

ICT in Education around the world-They key trends

Learning Object Description/Introduction

The global trends in ICTs and tools in Education Management will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more about the global trends in ICTs and tools in Education Management in the following article:

ICT in Education around the world-They key trends

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.5 Title
Good practices
Learning Object Description/Introduction
Good practices about identifying and evaluating when to use Distance Learning Technologies, Digital tools and Mobile Applications
Learning resource type
⇒ Good Practice ⇒ *Further Reading*
Learning Objective Content
Here you can find reports on best practices *identifying and evaluating when and how to use Distance Learning Technologies, Digital tools and Mobile Applications* in the following links: Technology and tools for online learning Ensuring effective distance learning during COVID-19 disruption: guidance for teachers
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 4 Title
Using ICTs and Tools in Education Management

Learning Object 4.1 Title
Introduction to ICTs and Tools in Education Management
Learning Object Description/Introduction
In this section we will try to provide a short introduction to ICTs and Tools in Education Management and especially why administration and management of the academic sector are two complex tasks.
Learning resource type
Narrative Text (theory) *Further Reading*

Learning Objective Content

The field of education has seen rapid and exponential growth over the years. It has made the administration and management of the academic sector a complex task. The ICT and its various tools have tried to change the administrative system to enhance its efficiency and efficacy.

This section will study how ICT has changed administration and management processes in the educational system and how educational institutions are adopting e-governance and automated school management programs. It is essential to state that this needs capacity building of the stakeholders for its implementation.

Question for reflection

In your opinion, why are administration and management of the academic sector two complex tasks?

Visit the link below to discover more about virtual Communication and Collaboration

What are the uses of ICT in education?

Technical type

Text

– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

120

Learning Object 4.2 Title

Additional Resources for further reading

Learning Object Description/Introduction

A list of academic papers and web links for further reading regarding Using information and communications technology in Education Management

Learning resource type

⇒ *Further Reading*

Learning Objective Content

A list of academic papers and web links for further reading regarding using information and communications technology in Education Management.

Coutts, N., Simpson, M., & Drinkwater, R. (2001). Using information and communications technology in learning and teaching: A framework for reflection, planning and evaluation in school development. *Teacher Development*, *5*(2), 225-239.

Webb, M., & Cox, M. (2004). A review of pedagogy related to information and communications technology. *Technology, pedagogy and education*, *13*(3), 235-286.

Higgins, S., & Moseley, D. (2001). Teachers' thinking about information and communications technology and learning: Beliefs and outcomes. *Teacher development*, *5*(2), 191-210.

McCormick, R., & Scrimshaw, P. (2001). Information and communications technology, knowledge and pedagogy. *Education, Communication & Information*, *1*(1), 37-57.

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.3 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: Synchronous and Asynchronous Online Learning

Source: https://www.youtube.com/watch?v=b6FUa9fR2vI

Question	True	False
In asynchronous learning the interaction of teachers and students happens in real time		
In asynchronous learning the materials can be accessed 24/7		
The learning approaches of online learning are four?		
Asynchronous communication can be through live streams?		

A stable internet connection is needed for asynchronous learning?		
Synchronous communication can be through live streams social media platforms?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.4 Title

Asynchronous & Synchronous E-Learning

Learning Object Description/Introduction

Examples of successful use of Information and Communication Technologies (ICTs) in asynchronous and synchronous e-learning will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more about the benefits and limitations of asynchronous and synchronous e-learning and addresses questions such as when, why, and how to use these two modes of delivery in the following article:

Asynchronous & Synchronous E-Learning

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.5 Title

Good practices

Learning Object Description/Introduction

Good practices of Using Information and Communication Technologies (ICTs) in asynchronous and synchronous e-learning

Learning resource type

⇒ Good Practice
⇒ *Further Reading*

Learning Objective Content

Here you can find reports on using Information and Communication Technologies (ICTs) in Education Management in the following links:

ICT for Educational Management

Information and communication technology (ICT) in education

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Conclusion of the module

In the course of this module, we aimed to deliver knowledge and skills on the available Open-Source Distance Learning Technologies, Digital Tools and Mobile Applications and how they can be used for educational purposes in higher education. Our objective is to provide the foundations, guidelines, and practical instructions on how to exploit them in practice for providing online teaching in ME.

Distance learning has always been an opportunity to spread knowledge to places where economic, geographical, and organizational problems are an obstacle to the community's cultural growth. A series of applications have been created to help educational institutions develop, organize, and deliver learning content, track student activities and performances, and evaluate learning outcomes. These software applications are commonly called learning management systems (LMS). They can support all the administrative and logistic processes of training in addition to the communication and evaluation activities mentioned before.

Mobile learning (m-learning) is education via the Internet or network using personal mobile devices, such as tablets and smartphones, to obtain learning materials through mobile apps, social

interactions, and online educational hubs. It is flexible, allowing students access to education anywhere, anytime.

Mobile apps for educational institutions have done an excellent thing for the students, making the learning process fun and easy. Also, the various app features to boost engagement through knowledge-oriented activities.

Nowadays, ICT has demonstrated varying impacts on learning as educational institutions are expected to play a crucial role as the engine for learning environments. Therefore, ICT has become an essential part of our everyday life. Accordingly, this integration in school improvement is for teaching and learning and educational management use. It has also become one of the most influential factors in school improvement. The field of education has seen rapid and exponential growth over the years. It has made the administration and management of the academic sector a complex task. The ICT and its various tools have tried to change the administrative system to enhance its efficiency and efficacy.

Conclusion type

Choose from the list

- Text

Summative Assessment of the module

Question template for Multiple Choice Questions	
No.	1
Question (stem)	Which of the following is not an example of a Learning Management System?
Possible answers	a) Moodle b) Blackboard c) Skype for Business d) ATutor
Correct answer	c)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	2
Question (stem)	A Learning Management System
Possible answers	a) provides educational material b) concerns administrative activities of educational institutions

	c) is a web based system d) All the above
Correct answer	d)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	3
Question (stem)	Which of the following is correct about asynchronous learning:
Possible answers	a) The materials can't be accessed 24/7 b) the interaction of teachers and learners happens in real time c) can be through live streams d) None of the above
Correct answer	d)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Assessment type

- Multiple Choice Questions (single or multiple correct answers)

Technical Type

- Text

Workload

The estimated study time needed for an average learner is **10 minutes**.

Number of questions in the assessment object

3

References

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Camilleri, M. A., & Camilleri, A. (2017, April). The technology acceptance of mobile applications in education. In 13th International Conference on Mobile Learning (Budapest, April 10th). Proceedings, pp., International Association for Development of the Information Society.
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Fetaji, B., Fetaji, M., Ebibi, M., & Kera, S. (2018). Analyses of Impacting Factors of ICT in Education Management: Case Study. International Journal of Modern Education & Computer Science, 10(2).
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Higgins, S., & Moseley, D. (2001). Teachers' thinking about information and communications technology and learning: Beliefs and outcomes. Teacher development, 5(2), 191-210.
Hilding-Hamann, K., & Massy, J. (2004). Study of the e-learning suppliers'"market" in Europe—Final Report. National Centre for Vocational Education Research (NCVER), Heriot-Watt University.
Hrastinski, S. (2008). Asynchronous and synchronous e-learning. Educause quarterly, 31(4), 51-55.
Ismail, J. (2001). The design of an e-learning system: Beyond the hype. The internet and higher education, 4(3-4), 329-336.
McCormick, R., & Scrimshaw, P. (2001). Information and communications technology, knowledge and pedagogy. Education, Communication & Information, 1(1), 37-57.
Mobile Applications: A Growing Trend In The Education Industry
Ninoriya, S., Chawan, P. M., & Meshram, B. B. (2011). CMS, LMS and LCMS for elearning. International Journal of Computer Science Issues (IJCSI), 8(2), 644.
Omona, W., van der Weide, T., & Lubega, J. (2010). Using ICT to enhance knowledge management in higher education: A conceptual framework and research agenda. International Journal of Education and Development using ICT, 6(4), 83-101.
Wiley, D. A. (2002). The instructional use of learning objects (Vol. 1). Bloomington: Agency for instructional technology.

Module 5: Web conferencing tools and online classroom management

Module Number
5
Module Title
Web conferencing tools and online classroom management
Short Description / Motivation text
In module 5 learners will be able to define, access and select web conference tools to provide targeted support in the educational process, to use digital technologies to foster and enhance learner collaboration and communication skills.
Keywords
Web conference
Learning Outcomes
Knowledge – After the successful completion of this unit learners will: – Be familiar with the use of web conferencing tools – Be aware of the principles of online classroom management – Identify the functions of the web conferencing tools that facilitate the online teaching Skills – After the successful completion of this unit learners will be able to: – Use of web conferencing tools to support online training – Be able to combine the functions of web conferencing tools to improve the online teaching – Be able to use the appropriate web conferencing tools for different learning purposes Competences – After the successful completion of this unit learners will – Be competent to use effectively web conferences tool and manage an online classroom – Be competent to boost the communication, interaction and cooperation in online learning environments – Be able to support their students in building knowledge collaboratively in online environments – Be competent to engage their students and motivate them to actively participate in web conferences
Language
English
Training Content

Learning Unit 1 Title
Web conferences tools in Education

Learning Object 1.1 Title
Introduction to Web conferences tools
Learning Object Description/Introduction
Web conferencing is an umbrella term for various types of online conferencing and collaborative services, including webinars, webcasts, and web meetings. In this topic, we will discuss the Web conferences tools suitable for education.
Learning resource type
Narrative Text (theory) Further Reading
Learning Objective Content
The term **web conferencing** refers to two-way communication in real-time via audio, animation, and data between two or more remote points. The advantages of web conferencing tools are the direct audiovisual communication "face to face" without having to travel and without the related financial costs (due to relocation, organization of premises and infrastructure, supervisory and support staff, etc.). Web conferencing can be collaborative and include voting, questioning, group work, and collaboration between teacher and students in general (Bonk et al., 2002). Web conferencing sessions use the Internet infrastructure to transfer complex data remotely (Spielman & Winfeld, 2003). If placed in a well-designed pedagogical context, **web conferencing** will be able to improve the communication and interaction between teachers and students (Paivarinta & Munkvold, 2010). In particular, interactive video conferencing is an essential technological tool which under pedagogical and social conditions could significantly contribute to the opening of the school to broader social and learning environments, removing geographical constraints between teachers and students by establishing a communication environment that provides no simply possibilities of communication between the two parties (e.g., through the exchange of views or data sharing) but through their active participation in a dynamic environment of interaction, with the main feature of the collaborative construction of knowledge from a distance in real-time (Anastasiades, 2010). **Question for reflection** Can you describe the characteristics of web conferencing?

The term **web conferencing platforms** refers to software packages that allow users to meet in a modern (online) communication environment through the Internet. In an online teleconference, each participant is on their computer and connects to the other participants via the Internet either by using software installed on their computer or an online application. The participants access the meeting by following a link given to them. Due to the unique technological tools it offers, teleconferencing facilitates communication between users, enhancing the learning process while it can take either collaborative form, including voting, questioning, and group work, and generally supporting collaboration.

Visit the link below to discover more about web conferencing tools:

Web conferencing

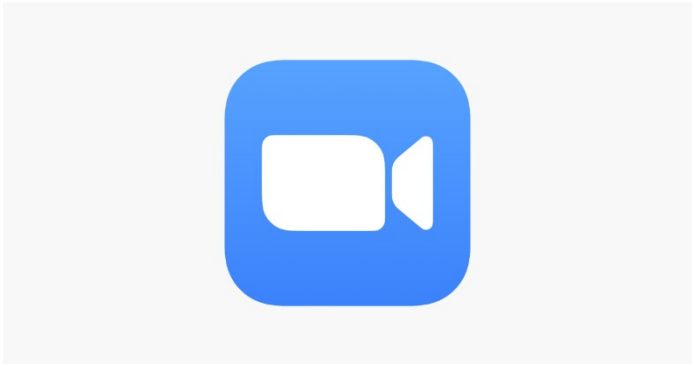
Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 1.2 Title
An overview of available e-learning platforms and learning management Conferencing tools
Learning Object Description/Introduction
Draft overview of currently used and available *Web Conferencing tools*
Learning resource type
⇒ Narrative Text (theory) ⇒ Further Reading ⇒ Did you know
Learning Objective Content
All participants in a web meeting invoke web conferencing software. Some technologies include software and functionality that differs for presenters and attendees. For example, the software may run as a web browser application (often relying on Adobe Flash, Java, or WebRTC to provide the operational platform). Other web conferencing technologies require downloading and installing software on each participant's computer, which is invoked as a local application. Many web conferencing vendors provide the central connectivity and provisioning of meeting "ports" or "seats" as a hosted web service, while others allow the web conference host to install

and run the software on its local servers. Another installation option from certain vendors provides the use of a proprietary computer appliance installed at the hosting company's physical location.

There are plenty of Web Conferencing tools, visit the links below for some examples:

Zoom



Source: https://is4-ssl.mzstatic.com/image/thumb/Purple116/v4/29/ae/c1/29aec1c2-98e2-e823-3d8f-c3e811c215f5/AppIcon-0-1x_U007emarketing-0-9-0-85-220.png/1200x630wa.png

Zoom is one of the most popular video conferencing platforms, ideal for hosting online meetings. Here are some of the features it provides:

- Host up to 100 video participants (in a pro version more than 100 persons can participate)
- Record your videos
- Multiple participants can share their screens simultaneously.
- Chat with groups, integrated file sharing
- 40 minutes limit on group meetings
- Breakout Rooms allow you to split the meeting into as many as 50 separate sessions for discussion, projects, and more.
- Private and group chat; Virtual background; Whiteboarding
- Web, Android, and iOS versions are available

Blackboard Collaborate

Source: https://online.umkc.edu/wp-content/uploads/2019/06/Blackboard-Collaborate.jpg

Blackboard Collaborate provides you with a digital space where you can connect face to face with your students

Here are some of the features it provides:

- Interactive whiteboard
- Polling
- Breakout groups
- Recordings of the sessions
- Private meetings

Skype

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/6/60/Skype_logo_%282019%E2%80%93present%29.svg/1200px-Skype_logo_%282019%E2%80%93present%29.svg.png

Skype is another popular platform for video conferencing. Here are some of the features it provides:

- Supports up to 50 students in a video or audio conference

- Call recordings
- Private conversations
- Chat feature and reactions
- Web, Android, and iOS versions are available

Microsoft Teams

Source: https://play-lh.googleusercontent.com/jKU64njy8urP89V1O63eJxMtvWjDGETPlHVIhDv9WZAYzsSxRWyWZkUlBJZj_HbkHA

Microsoft Teams is yet another popular platform for video conferencing. Here are some of the features it provides:

- Supports up to 250 members in a single meeting
- Unlimited chat and search options
- Screen sharing
- Works on the web, Android, and iOS

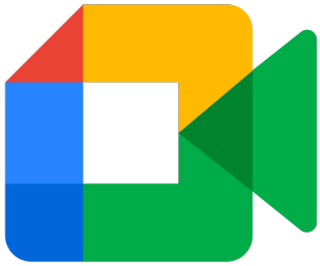
Webex

Source: https://play-lh.googleusercontent.com/tFFAvb_eZM5BlHYFiuyVwhM54o7mvfCOFX3AGbgTULfKpEancPmZnP1PRu44CZiZgyI

Another powerful web conferencing platform. Webex works across different browsers and devices. Here are some of the features it provides:

- Supports meetings with up to 100 participants
- Screen sharing
- Custom layouts
- 1:1 and group messaging

Google Meet



Source: https://play-lh.googleusercontent.com/GBYSf20osBl2CRHbjGOyaOG5kQ3G4xbRau-dzScU9ozuXQJtnUZPkR3IqEDOo5OiVgU

Google Meet is another popular video conferencing platform for teachers and educators. Here are some of the features it provides:

- Host meetings with up to 250 participants
- Edit documents, presentations, and spreadsheets in real-time, collaborating with the others
- Create group chats for up to 150 participants

Question for reflection

Which one of the web meeting tools presented in this section is more suitable for education and why?

Technical type
Text – Document – Hypertext Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 1.3 Title
Additional Resources for further reading
Learning Object Description/Introduction
Listed below a list of academic papers for further reading, regarding the use of learning platforms and tools
Learning resource type
⇒ *Further Reading*
Learning Objective Content
Listed below a list of academic papers for further reading, regarding the use of learning platforms and tools Jones, P., Kolloff, M., & Kolloff, F. (2011). Best practices to promote learning through web conferencing: Resources, tools and teaching methods. Murphy, K. L., & Cifuentes, L. (2001). Using Web tools, collaborating, and learning online. *Distance Education*, *22*(2), 285-305. Forrester, D. (2009). Global Connections: Web Conferencing Tools Help Educators Collaborate Anytime, Anywhere. *Learning & Leading With Technology*, *36*(5), 24-25. Aminifar, E., Porter, A., & Caladine, R. (2005). Evaluating of Web conferencing Tools for teaching Mathematics and Statistics.
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 1.4 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: Top 5 Video Conferencing Apps in 2022 Explained

Source: https://www.youtube.com/watch?v=lji3wkMn5YM

Question	True	False
Is Skype also available for mobile devices?		
Can you use Cisco Webex without downloading an application?		
Is Zoom only a paid application ?		
Skype offers the option of breakout rooms?		
How many participants can use Microsoft Teams?		
Can you use Google Meet also via a web browser?		
Can participants change their backgrounds in Cisco Webex?		
The cloud storage option is only in the paid version of an application?		
Is Skype for Business available now?		
Webex Meetings and Webex Teams are the same platform?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 1.5 Title
Web Conferencing and other tech tools for education
Learning Object Description/Introduction
Examples of different web conference tools will be presented through selected articles from the internet and scientific sources.
Learning resource type
⇒ Example
Learning Objective Content
You can read more about different web conference tools in the following article: - 8 best web conferencing tools **Question for reflection** According to the article, which web conferencing tools are convenient for over 200 participants?
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 1.6 Title
Good practices
Learning Object Description/Introduction
Good practices about teaching with web conferencing
Learning resource type
⇒ Good Practice ⇒ *Further Reading*
Learning Objective Content
Here you can find reports on best practices about teaching with web conferencing in the following links: Best Practices for Teaching with Web Conferencing

Best Practices When Teaching with Zoom

Question for reflection

Can you describe the required actions for active listening?

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Unit 2 Title

Managing an e-learning course – how web conferencing tools can help.

Learning Object 2.1 Title

Introduction to Web conferencing tools for Educational Purposes

Learning Object Description/Introduction

Web conferencing is a real-time video conferencing software allowing users to see, hear and interact virtually with others using a computer or mobile device. It can be considered a learning technology in any classroom environment that facilitates teaching and learning by better connecting instructors and students.

Learning resource type

Narrative Text (theory)

Further Reading

Learning Objective Content

Web conferencing is a real-time video conferencing software allowing users to see, hear and interact virtually with others using a computer or mobile device. It can be considered a learning technology in any classroom environment that facilitates teaching and learning by better connecting instructors and students.

There are various ways that web conferencing can help in an online, blended, or traditional face-to-face course. Below are a few practical examples of using web conferencing tools to achieve teaching and learning goals.

Guest Speaker

You can quickly bring in a guest speaker for your course, and students can interact and ask questions. In addition, with most web conferencing software, you can record the session to make it available for absent students.

Virtual Examinations Sessions

You can use web conferencing tools for one-on-one or group meetings with your students. Most platforms allow you to share files or your screen so you can discuss course materials, grades, and assignments or conduct oral examinations.

Question for reflection

Can you propose some ways to engage student collaborations within a web meeting?

Group Collaboration Space

Students can work together on a group assignment by creating web conferencing sessions or rooms where students can be moderators. This allows students to efficiently use the space to work on a group project or task or quickly meet about anything course related.

Online Class

You can hold an interactive class online with web conferencing where students can work in smaller groups in Breakout Rooms to answer a question together or brainstorm for a case study. After you can then bring everyone back to the main room to discuss what they worked on.

Visit the link below to discover more about the use of web conferencing tools for Educational Purposes

Schools Need an Education-Specific Video Conferencing Tool

Technical type

Text

- Document
- Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

120

Learning Object 2.2 Title

Additional Resources for further reading

Learning Object Description/Introduction

A list of academic papers and web links for further reading the management of an e-learning course.

Learning resource type

⇒ *Further Reading*

Learning Objective Content

A list of academic papers and web links for further reading the management of an e-learning course.

Li, J. (2014). Greeting you online: selecting web-based conferencing tools for instruction in e-learning mode. *Journal of library & information services in distance learning*, *8*(1-2), 56-66.

Pema, E. R. M. A., Celiku, B. L. E. R. I. N. A., & Pema, O. L. S. A. (2017). A general outlook on the e-Learning alternative tools in higher education. *Interdisciplinary Journal of Research and Development*, *4*(2), 219-226.

Hart, T., Bird, D., & Farmer, R. (2019). Using blackboard collaborate, a digital web conference tool, to support nursing students placement learning: A pilot study exploring its impact. *Nurse education in practice*, *38*, 72-78.

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.3 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: Video conferencing tools for online teaching

Source: https://www.youtube.com/watch?v=WUozV2Sxa-I

Question	True	False
Can a teacher present a PowerPoint with a web conference tool?		
Is there a chat available in a web conference tool?		
Is it possible to share an excel file for presentation?		
Do the web conference tools provide a whiteboard?		
The students can use the chat to communicate with each other?		
A breakout room contains only more than 5 students?		
Is the teacher able to lower the hands if needed?		
The teacher can communicate via chat privately to a certain student?		
The students are assigned to each breakout room automatically?		
The students can speak via microphone only If they raise their hands?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.4 Title

Good practices

Learning Object Description/Introduction

Good practices about the role of features of web conferences tools in education

Learning resource type

⇒ Good Practice
⇒ *Further Reading*

Learning Objective Content

Here you can find reports on best practices regarding the role of features of web conferences tools in education, *in* the following links:

Basic Features of Web Conferencing You Need to Know

Benefits of Teaching with Web Conferencing

Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 3 Title
Effective e-learning classroom with Web Conferencing

Learning Object 3.1 Title
Effective e-learning course with web conferencing - An introduction.
Learning Object Description/Introduction
In this section we will try to provide a short introduction about effective e-learning courses with web conferencing.
Learning resource type
Narrative Text (theory) *Further Reading*
Learning Objective Content
Virtual classrooms are incredibly flexible – they bend to the needs of learners. For example, at a web conference, you can get videos for sure, while in a virtual classroom, you can get the whole experience of a media-rich session anytime you want, as if the session were still being held live. This is called persistence, and it means all sharing and communication streams that contribute to a session –video, teacher-to-student, and student-to-student chats, hand-outs, etc. – are accessible at any time. Another significant advantage virtual classrooms have over web conferencing is that they are highly customizable. Instructors can alter the look entirely and feel of the platform interface or

launch highly personalized learning plans to individuals and groups through do-it-yourself workflows. Virtual classrooms can host all kinds of content, including PPTX, video, PDF, DOCX files, and AICC, xAPI, SCORM formats. Instructors can get as creative as they want in creating profoundly immersive and incentivized learning experiences through fun and rivalry-enhancing gamification, leaderboards, or badges.

Question for reflection

Mention a difference between Virtual classrooms and web conferences;

Visit the link below to discover more about web conferencing tools:

E-learning Is the future of education—how can online meeting platforms help?

Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
120

Learning Object 3.2 Title
Additional Resources for further reading
Learning Object Description/Introduction
A list of academic papers and web links for further reading about effective e-learning classroom with web conferencing.
Learning resource type
⇒ *Further Reading*
Learning Objective Content
A list of academic papers and web links for further reading about effective e-learning classroom with web conferencing. Nedeva, V., Dineva, S., & Atanasov, S. (2014). Effective e-learning course with web conferencing. *feedback*, *4*, 6.

Thelwall, M., & Kousha, K. (2008). Online presentations as a source of scientific impact? An analysis of PowerPoint files citing academic journals. *Journal of the American Society for Information Science and Technology*, *59*(5), 805-815.

Guzman, M. (2016). The best ways to build audience and relevance by listening to and engaging your community. *Retrieved from American Press Institute: https://www. americanpressinstitute. org/wp-content/uploads/2016/05/How-tobuild-audiences-by-engaging-your-community. pdf*.

Septiana, D., & Zuhriyah, S. (2021, June). The use of video conferencing to support distance learning and developing students' communicative competence. In *UNNES-TEFLIN National Seminar* (Vol. 4, No. 1, pp. 91-99).

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.3 Title

Self-assessment activity

Learning Object Description/Introduction

Watch the video and answer true or false in the questions

Learning resource type

⇒ Activity
- Activity for practice

Learning Objective Content

Watch the video and answer True or False in the options below

Video: How to Hold Effective Video Conferencing Sessions in an Online Course
Source: https://www.youtube.com/watch?v=cmDbTmf35I0

Question	True	False
Are role-plays ideal for pair practice for a video conferencing session?		
Can online learning be related to real life?		
In the beginning the students should ask their questions to the teacher?		

A teacher shouldn't use in the lesson new words from the students assignments		
A web conference can be used only for whole class interactions		
Can the students take part in role-plays in different breakout rooms?		
The summary of a mini lesson should be another video?		
The new activities should be demonstrated offline?		
The students should check the new e-activities on their own?		
The tips provided by the teacher should be sent by e-mail?		

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.4 Title

Effective E-learning Course with Web Conferencing

Learning Object Description/Introduction

The ways to use videoconferencing in remote learning will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more about the ways to use videoconferencing in remote learning in the following article:

5 Ways to Use Videoconferencing in Remote Learning

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.5 Title
Good practices
Learning Object Description/Introduction
Good practices about the fundamentals of effective online presentations and engaging your audience
Learning resource type
⇒ Good Practice ⇒ *Further Reading*
Learning Objective Content
Here you can find reports on best practices for maximizing virtual presentations and engaging your audience in the following links: Eight principles for maximizing your virtual presentations Engaging your audience
Technical type
Text – *Document* – *Hypertext*
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 4 Title
Improve Communication and Collaboration Skills in Web Conferencing, Best Practices

Learning Object 4.1 Title
Find your ways to improve virtual Communication and Collaboration
Learning Object Description/Introduction
In this section we will try to provide a short introduction about the ways to improve virtual Communication and Collaboration.
Learning resource type

Narrative Text (theory)

Further Reading

Learning Objective Content

Virtual teams have access to various communication technologies, including email, video conferencing, chat platforms, social media channels, and web conferencing. Teachers usually prefer to use tools they are accustomed to or the most convenient ones. But some technologies perform specific tasks better than others, and using the wrong one can result in poor performance.

So they should consider first the functions before choosing communication tools. For example, use text-based channels like chat, email, and bulletin boards for one-way communication, while video and web conferencing tools are convenient for handling complex tasks like negotiations and problem-solving.

Question for reflection

What criteria do teachers use to choose their tools?

Visit the link below to discover more about virtual Communication and Collaboration

Virtual Communication and Collaboration: 5 Lessons From Highly Successful Leaders

Technical type

Text

– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

120

Learning Object 4.2 Title

Additional Resources for further reading

Learning Object Description/Introduction

A list of academic papers and web links for further reading about improving communication and collaboration skills in web conferencing

Learning resource type

⇒ *Further Reading*

Learning Objective Content

A list of academic papers and web links for further reading about improving communication and collaboration skills in web conferencing

Hurst, E. J. (2020). Web conferencing and collaboration tools and trends. *Journal of Hospital Librarianship*, *20*(3), 266-279.

Li, J., Leider, S., Beil, D., & Duenyas, I. (2021). Running online experiments using web-conferencing software. *Journal of the Economic Science Association*, *7*(2), 167-183.

Hill, N., & Bartol, K. (2018). *Five ways to improve communication in virtual teams*. MIT Sloan Management Review.

Dixon, R. A., Hall, C., & Shawon, F. (2019). Using virtual reality and web conferencing technologies: Exploring alternatives for microteaching in a rural region. *Northwest Journal of Teacher Education*, *14*(1), 4.

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.3 Title

How to Run a Successful Virtual Event

Learning Object Description/Introduction

Examples of how to run successful virtual events will be presented through selected articles from the internet and scientific sources.

Learning resource type

⇒ Example

Learning Objective Content

You can read more how to run successful virtual events in the following article:

A How to Run a Successful Virtual Event

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.4 Title

Good practices

Learning Object Description/Introduction

Good practices of improving communication and collaboration skills in web conferencing.

Learning resource type

⇒ Good Practice
⇒ *Further Reading*

Learning Objective Content

Here you can find reports on improving communication and collaboration skills in web conferencing in the following links:

5 Ways to Communicate Better in Meetings

10 Ways to Improve Virtual Communication and Collaboration

Technical type

Text

- *Document*
- *Hypertext*

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Conclusion of the module

In the course of this module, we aimed to deliver knowledge and skills on the available web conference tools to provide targeted support in the educational process, and on how to use digital technologies to foster and enhance learner collaboration and communication skills.

The term web conferencing refers to two-way communication in real-time via audio, animation, and data between two or more remote points. The advantages of web conferencing tools are the direct audiovisual communication "face to face" without having to travel and without the related

financial costs (due to relocation, organization of premises and infrastructure, supervisory and support staff, etc.). Web conferencing can be collaborative and include voting, questioning, group work, and collaboration between teacher and students in general

Web conferencing is a real-time video conferencing software allowing users to see, hear and interact virtually with others using a computer or mobile device. It can be considered a learning technology in any classroom environment that facilitates teaching and learning by better connecting instructors and students.

Virtual classrooms are incredibly flexible – they bend to the needs of learners. For example, at a web conference, you can get videos for sure, while in a virtual classroom, you can get the whole experience of a media-rich session anytime you want, as if the session were still being held live. This is called persistence, and it means all sharing and communication streams that contribute to a session –video, teacher-to-student, and student-to-student chats, hand-outs, etc. – are accessible at any time.

Virtual teams have access to various communication technologies, including email, video conferencing, chat platforms, social media channels, and web conferencing. Teachers usually prefer to use tools they are accustomed to or the most convenient ones. But some technologies perform specific tasks better than others and using the wrong one can result in poor performance.

Conclusion type

Choose from the list

- Text

Summative Assessment of the module

Question template for Multiple Choice Questions	
No.	1
Question (stem)	Which of the following is not an example of a Web Conferencing Tool?
Possible answers	a) Microsoft Teams b) Blackboard Collaborate c) Skype d) Google Classroom
Correct answer	d)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions

No.	2
Question (stem)	Zoom, Blackboard Collaborate, Skype, Google Meet can be used also on mobile applications?
Possible answers	a) Yes b) No
Correct answer	a)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	3
Question (stem)	Can a teacher communicate via chat to a certain student privately?
Possible answers	a) Yes b) No
Correct answer	a)
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	4
Question (stem)	Can the students be assigned to each breakout room automatically?
Possible answers	a) Yes b) No
Correct answer	a) Yes
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	5
Question (stem)	Is there a chat available in a web conferencing tool?
Possible answers	a) Yes b) No
Correct answer	a) Yes
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Assessment type

- Multiple Choice Questions (single or multiple correct answers)

Technical Type

- Text

Workload

The estimated study time needed for an average learner is **15 minutes**.

Number of questions in the assessment object

5

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Bonk, C. J. (2002). *Online training in an online world*. Bloomington, IN: CourseShare. com.

Dixon, R. A., Hall, C., & Shawon, F. (2019). Using virtual reality and web conferencing technologies: Exploring alternatives for microteaching in a rural region. Northwest Journal of Teacher Education, 14(1), 4.

Guzman, M. (2016). The best ways to build audience and relevance by listening to and engaging your community. Retrieved from American Press Institute: https://www. americanpressinstitute. org/wp-content/uploads/2016/05/How-tobuild-audiences-by-engaging-your-community. pdf.

Hart, T., Bird, D., & Farmer, R. (2019). Using blackboard collaborate, a digital web conference tool, to support nursing students placement learning: A pilot study exploring its impact. Nurse education in practice, 38, 72-78.

Hill, N., & Bartol, K. (2018). Five ways to improve communication in virtual teams. MIT Sloan Management Review.

Jones, P., Kolloff, M., & Kolloff, F. (2011). Best practices to promote learning through web conferencing: Resources, tools and teaching methods.

Li, J. (2014). Greeting you online: selecting web-based conferencing tools for instruction in e-learning mode. Journal of library & information services in distance learning, 8(1-2), 56-66.

Murphy, K. L., & Cifuentes, L. (2001). Using Web tools, collaborating, and learning online. *Distance Education*, *22*(2), 285-305.

Päivärinta, T., & Munkvold, B. E. (2010, September). Establishing on-line corporate training in distributed, synchronous eCollaboration: a field study. In *International Conference on Collaboration and Technology* (pp. 81-96). Springer, Berlin, Heidelberg.

Spielman, S., & Winfeld, L. (2003). *The Web Conferencing Book: Understand the Technology, Choose the Right Vendors, Software, and Equipment, Start Saving Time and Money Today!*. Amacom Books

Thelwall, M., & Kousha, K. (2008). Online presentations as a source of scientific impact? An analysis of PowerPoint files citing academic journals. Journal of the American Society for Information Science and Technology, 59(5), 805-815.

Module 6: Digital content creation and data protection issues

Module Number
6
Module Title
Digital content creation and data protection issues
Short Description / Motivation text
This module focuses on digital content and the ways it can be utilized in education. It also addresses data protection issues. First, the definition of digital content is provided, along with its usefulness, its necessity in today's world and the hindrances that obscure its application. A "did you know" quiz is available as an additional interactive and engaging activity. Next, we present three different categories of digital content: webpages/online tools, mobile applications, and online courses/educational videos. For each category we explain its attributes, based on which digital content can be categorized, and provide examples of such applications that can be utilized for education. We also present a fourth category, interactive games, which provides the reader with a wide toolset for creating many different games and puzzles. Having provided the reader with a wide range of digital content, the module examines the ways in which the appropriate digital content can be selected, per scenario, and provides guidelines/good practices for creating quality digital content. Finally, the module incudes material on the protection of personal data and privacy, copyrights, GDPR and licenses. The module concludes with exercises that test the knowledge gained by the reader, from previous learning objects. By the end of this module, the reader will be able to answer the following questions: ● How can I make what I am teaching more exciting, intriguing and interactive? ● How can I ensure that all my students have easy and affordable access to the content I am teaching them about? ● How can I modernize my teaching methods through a variety of digital methods available? ● How can I handle data protection issues and apply GDPR? ● How can I handle copyright issues?
Keywords
Digital content, education, interactive, online courses, data protection, copyright, GDPR
Learning Outcomes
Knowledge After the successful completion of this unit, learners will: ● Be familiar with the procedures and principles of online content creation ● Define different types of digital content and identify their use for different educational purposes

- Be aware of how digital services use a “Privacy policy” and GDPR requirements to inform how personal data is used
- Recognize data protection issues, GDPR and copyright

Skills

After the successful completion of this unit, learners will be able to:

- Create interactive digital content
- Handle data protection issues and apply GDPR
- Handle copyright issues

Competences

After the successful completion of this unit learners will:

- Be competent to design interactive digital content, so as to raise the interest of their students
- Be competent to design digital content that affect student’s engagement, and other soft skills (critical thinking, reflection, problem solving, etc.) and metacognitive skills
- Be competent to integrate an online presentation (audio, sound, assessment tools, etc.)
- Comply with data protection issues and GDPR
- Follow the rules about copyright

Language
English
Training Content

Learning Unit 1 Title
Digital Content: Definition and Introduction

Learning Object 1.1 Title
Definition and Introduction
Learning Object Description/Introduction
During the time spent on this Learning Object, the reader will learn what digital content is, how it can prove useful, what the shortcomings of current alternatives are, and what hindrances make the wide-spread adoption of digital content difficult.
Learning resource type
⇒ Narrative Text (theory)
Learning Object Content

Digital Content defines products provided to end users in the form of digital data, including video content, motion and/or still pictures, TV programs or other broadcasting content and products consisting of character text, pictures, photographic images, graphic symbols and/or the like.

Digital media in education refers to the use of interactive multimedia in the classroom setting. Digital media involves incorporating multiple digital software, devices, and platforms as a tool for learning (Wikipedia, n.d.). Consequently, digital content refers to the goods or services which are produced and supplied in digital form, the use or consumption of which is restricted to a technical device, and which do not include in any way the use or consumption of physical goods or services (Law Insider, n.d.). Examples of such content are photos, slideshows, videos, and applications.

The use of digital media in education is growing rapidly in today's age. They compete with books as the leading means of communication in the classroom which is more than ever before. This new form of education is slowly combating the traditional forms of education that have been around for a long time. With the introduction of virtual education, there has been a need for increased inclusion of additional digital tools and platforms in online classrooms, such as mobile applications and online tools for collaboration (Wikipedia, n.d.).

The main benefit of digital media in education is that it can increase students' engagement. Moreover, it helps students work through difficult concepts with multiple resources, while presenting difficult topics, that are often hard to understand, in a more comprehensible way. Also, digital technology can break barriers of availability and affordability in students, such as lack of money or natural resources (e.g., books). On that same note, online resources are especially valuable to students, who often purchase expensive textbooks at the beginning of a semester or training course, only to resell them for half their value a few months later. Additionally, many people find out that their textbooks are no longer of value, as their edition is out of date (Mimeo blog, n.d.).

Regardless of the associated benefits, prohibitive costs are often the main deterrent for most primary and secondary educational institutions from adopting digital content. According to Ed Week, many districts can't afford to purchase laptops, tablets and other electronic devices, as well as purchase licenses for software and digital content. Furthermore, some schools don't have the resources to train staff on how to use the technology and integrate it across different subjects. Others simply don't have the Internet bandwidth, while the fear that less privileged students won't have proper Internet access after school, causing them to fall behind on digital assignments (Mimeo blog, n.d.).

Technical type

Text

– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

10

Learning Object 1.2 Title
A quick “Did you know?” Quiz
Learning Object Description/Introduction
The following quiz has been created using Typeform, an online digital content tool that allows the user to create forms, quizzes and questionnaires of all types easily and efficiently. By taking the quiz, the reader will be able to see how their preconceptions fare against those of students, on matters regarding their purchased textbooks for educational purposes.
Learning resource type
⇒ Did you know ⇒ Activity – “Did you know” Questions
Learning Object Content

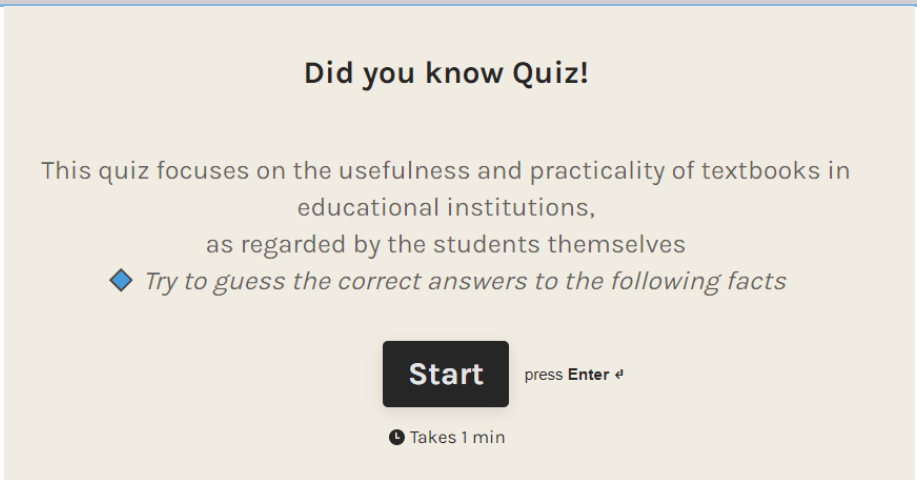


Figure 1. Typeform “Did you know?” Quiz

Source: https://35fxaiphctq.typeform.com/to/yA1QnfcT

Technical type
Application – Interactive Software
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
5

Learning Unit 2 Title
Categories of Digital Content

Learning Object 2.1 Title

Webpages/Online Tools as Digital Content

Learning Object Description/Introduction

Through studying this learning object, the reader will become knowledgeable of some webpages/online tools available out there, for him/her as a teacher to create a more entertaining, engaging and interactive educational experience for both himself and his students.

Learning resource type

- ⇒ Narrative Text (theory)
- ⇒ Demonstration
- ⇒ Example

Learning Object Content

The first category of digital content that we will be exploring is webpages and online tools. It is worth noting that this category does not translate to "digital content that can be found online", i.e., it is not digital content that could exist locally on a device, but we choose to host it online instead. Rather, the very utility of this content depends on it being available online, for example, interactive webpages that anyone with an Internet Browser can access, or any software on the cloud that is not required to occupy physical memory and processing power on a user's device.

Perhaps the most famous platform belonging to this category is Mentimeter. Mentimeter helps increase interactivity and fun in the classroom, by providing various ways in which the teacher and students can share opinions, views, and thoughts (Lund University, 2020). For example, the teacher can create a poll, on which students get to vote by visiting a common link with their mobile phones or laptops/tablets, completely anonymous. Voting results can be shown in real time, or not until everyone is ready. The correct answer may be shown directly, or the teacher can wait and let students discuss the result with a peer in the classroom/in a breakout session. Then the teacher many let them vote again, since perhaps the voting has changed because of the discussion. Here is an introductory video to Mentimeter:

Mentimeter. (2019, February 1). What is Mentimeter? [Video]. YouTube. https://www.youtube.com/watch?v=UrFdN-HQF6I

There are so many ways to use Mentimeter. You can create open questions without a correct answer. The students could be divided into groups and write short answers/posts - almost as on a pinboard, anonymous as well. You can thereafter use the posts as a base for follow-up discussions. Another useful way of using Mentimeter is to let your students ask anonymous questions, before or during your lecture. Below is an educational video on how to create an interactive quiz using Mentimeter:

FILM, VIDEO

Mentimeter. (2020, June 30). Create an Interactive Mentimeter Quiz [Video]. YouTube. https://www.youtube.com/watch?v=CsasywVt6E8

Mimeo Digital is yet another useful online platform for educational purposes: it can serve as a repository for educational content, for both teachers and students (Mimeo Digital, 2021). Mimeo packs a bunch of innovative features, such as ROI analytics per piece of content, note taking and sharing by both teachers and students, and adjusting access to uploaded content based on certain conditions.

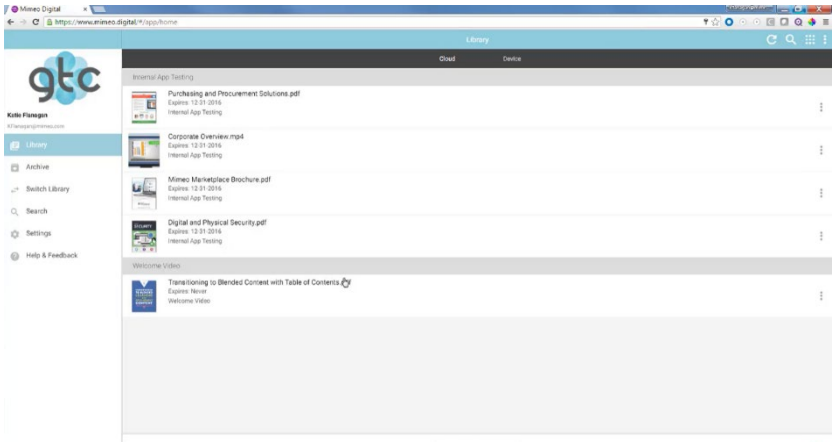


Figure 2. Mimeo Digital Dashboard

Source: https://www.mimeo.com/platform/mimeo-digital/

The latter conditions include whether a file will be available for download or not, limiting the time a file is available for viewing, and watermarking documents so that screenshots for illicit sharing is not possible. These functionalities are especially useful in the case of books that are only provided for free to institutions, or in the case of research papers that are only accessible for free for the duration of a research project. Adobe Digital Editions, for example, is a necessary application for students who want to borrow a book from the digital library of certain universities, like TU Delft.

Technical type

Text

– Document
– Hypertext

Image

– Image

Streaming media

– Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.2 Title
Mobile Applications as Digital Content
Learning Object Description/Introduction
Through studying this learning object, the reader will become knowledgeable of some mobile applications available out there, for him/her as a teacher to create a more fun and interactive educational experience for both himself and his students.
Learning resource type
Select the one applied from the list (and delete the others) ⇒ Narrative Text (theory) ⇒ Demonstration
Learning Object Content
As the use of technology evolves in education, an extensive range of new smart devices and digital applications is becoming available to academics. A less explored, and yet quite promising, area of digital content is mobile applications. In this section, we will be overviewing four such applications, indicating what each has to offer to the table. The applications to be examined are Pear Deck, Padlet, Google Classroom and Edpuzzle (EdTech, 2020) (Educational App Store, 2020). Pear Deck is an add-on that can enhance a standard Google Slides presentation by adding interactive components to it: a multiple choice/short answer question can be added, and the prompt for answering will only appear on the students' screen, leaving the teacher's screen as is. Pear Deck allows the teacher to view student responses instantly, giving them real-time insight from formative assessments, i.e., to be able to see students thinking in real-time and organise themselves based on the aggregate responses of the whole class. Furthermore, special Pop-up Prompts notify the teacher of certain events and guide the feedback process for both teacher and student during their interaction. Pear Deck is also available as an add-in for Microsoft Teams.

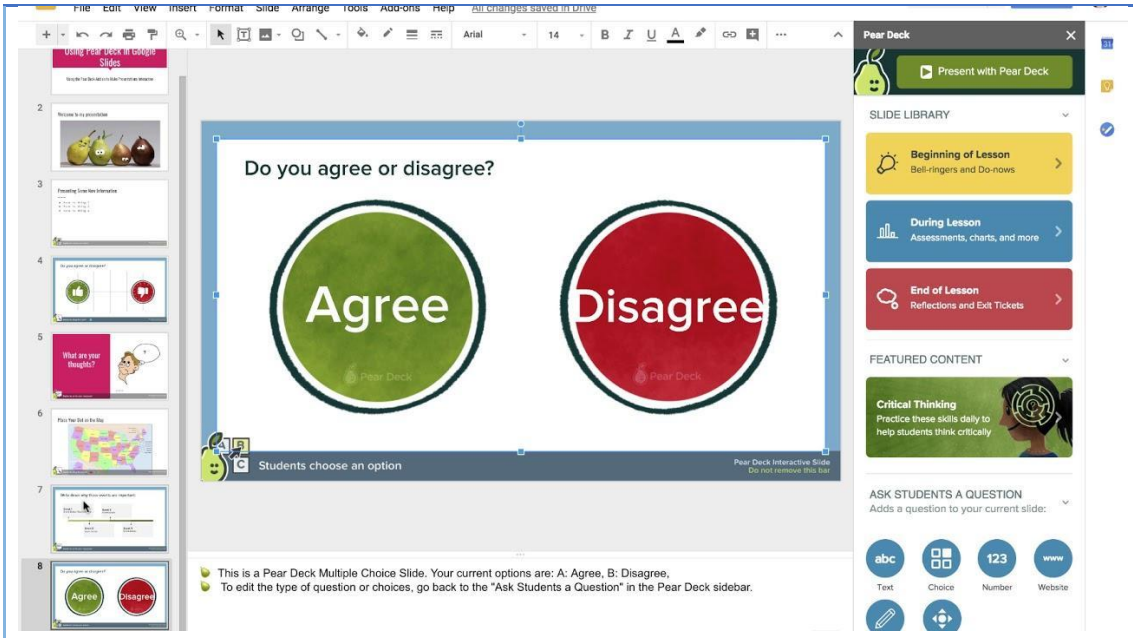


Figure 3. Getting Started with Pear Deck to Make Your Google Slides Presentations Interactive

Source: https://www.youtube.com/watch?v=9PJgsa-fnmA

Google Classroom is a software package that includes all the famous tools that we have been using all along: Gmail, Google Drive, Google Calendar etc. Its revolutionary aspect is the fact that it integrates these tools in such a way, as to ensure efficient collaboration and organisation in the digital classroom setting. For example, the students can chat in Google Meet, while simultaneously and collaboratively working on their Google Docs document, and exchanging larger files through Google Drive. They can fill up a Google Form that the teacher prepared to collect opinions, or visit a website he/she quickly set-up using Google Sites. Moreover, Google Classroom integrates with various student information systems, as well as websites such as Discovery Education, Curiosity.com and the American Museum of Natural History. Overall, Google Classroom is targeted for teachers and students in all age groups.

FILM, VIDEO

Teacher's Tech. (2020, March 30). How to Use Google Classroom - Tutorial for Beginners [Video]. YouTube. https://www.youtube.com/watch?v=pl-tBjAM9g4

Padlet is an application that allows a teacher to create different, fun environments of interaction between him/her and the students, based on his preferences. For instance, a Wall is a brick-like layout where the teacher can create a question and all answers from students will be stacked brick-wise next to each other. A Canvas is a layout that allows for interconnectivity between elements, thus making it easy to relate concepts to one another in real-time. A Stream layout follows the way the posts of a Facebook user are presented on his profile screen, which allows for students to anonymously imitate social media behaviours without needing to utilize a true social-media platform in-person. Many more layouts are available, each for a different occasion. Padlet

is available on iOS (iPhone, iPad, iPod Touch), Android, and Kindle devices. The following video is quite informative of Padlet and its services:

FILM, VIDEO

Pocketful of Primary. (2020, March 30). Padlet Tutorial for Teachers + 8 Ways to Use With Students [Video]. YouTube. https://www.youtube.com/watch?v=x9IQVofS43I

Edpuzzle is a tool that allows you to take any Youtube video available out there and integrate questions within that video, which can only be viewed during the video playback, and need to be answered before the viewer can proceed with watching the rest of the video. This is an amazing way for the teacher to ensure that a student will be paying attention to the contents of the video, and for the students to be encouraged towards engaging that video with more enthusiasm. Edpuzzle is available for Android and IOS devices, and it is also available as a Youtube extension.

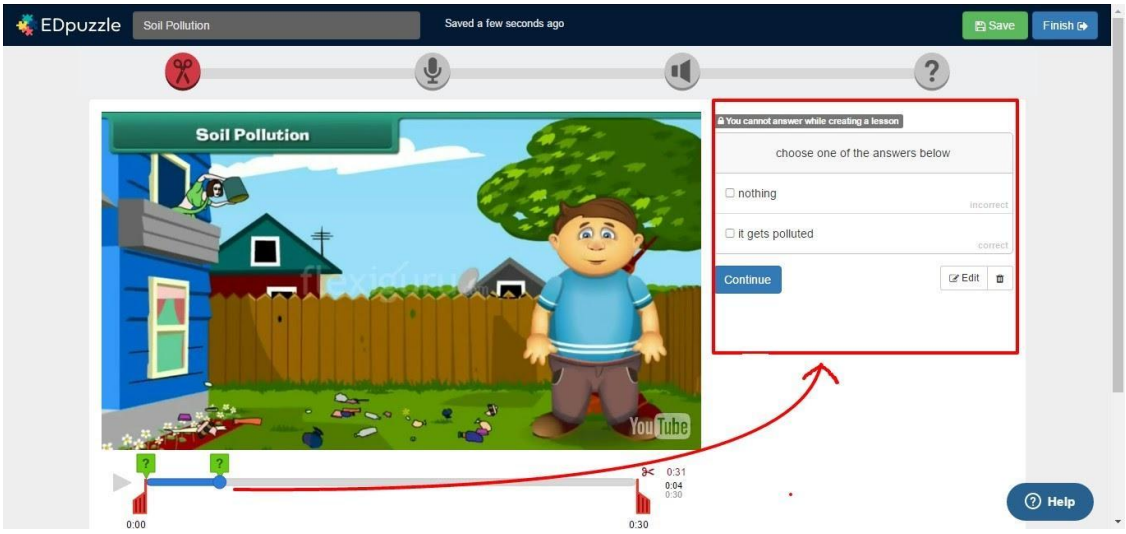


Figure 4. EdPuzzle Website

Source: https://blogs.umass.edu/onlinetools/assessment-centered-tools/edpuzzle/

Technical type

Text

– Document
– Hypertext

Image

– Image

Streaming media

– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 2.3 Title
Online courses and educational videos as Digital Content
Learning Object Description/Introduction
Through studying this learning object, the reader will become knowledgeable of some online course networks and educational video networks available out there, where interested students can visit and gain knowledge on all kinds of desired topics.
Learning resource type
⇒ Narrative Text (theory) ⇒ Activity – Concept mapping
Learning Object Content
At first sight, it might seem an odd choice to place online courses in the same category of digital content as educational videos. However, the two are so interconnected as methods of learning, that the correlation is quite easy to identify: most online courses will include multiple educational videos as part of them, before jumping back to the interactive part of the course, and all educational videos are, in essence, a short course on a specific topic, presented through the combination of video and audio mediums. With the amount of such educational content on the web, it is nowadays possible for teachers to go without textbooks and rely solely on digital content. However, it is important to find trustworthy sources that will provide valuable content. Listed below are 10 sources of online courses and educational videos that are going to prove useful (Thetechedvocate, 2018). 1. **Coursera** is a platform offering online courses covering a variety of subjects, including the ability to view lectures and non-graded materials for free. Coursera collaborates with 200+ leading universities and companies, making it a great complement to the opportunity of knowledge acquisition these institutions already provide.

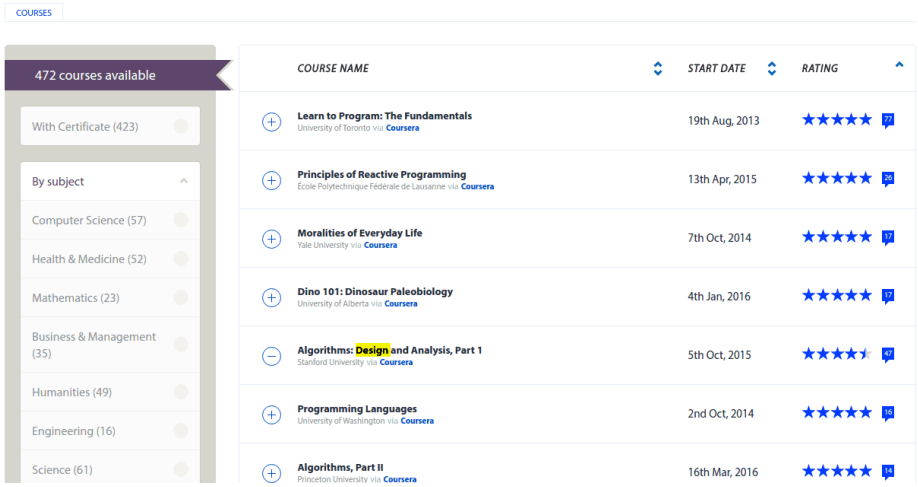


Figure 5. Coursera Main Website

Source: https://www.coursera.org/

2. **Crash Course** is also an online course hosting platform, which is mostly targeting high school student audiences or AP student audiences.
3. **C-SPAN** Classroom provides videos on current issues, as well as video archives for history lessons. Additionally, the site provides lesson plans and resources for teachers. Unlike the aforementioned platforms, it is far less on the side of academic education, and more on the side of being an all-around news platform.
4. **Discovery Education** is a platform that provides digital textbooks for math, science, and social studies, as well as a digital streaming service for online content. Given the reputation of the long-established Discovery Channel, it excels in subjects such as past dinosaur life.
5. The **History Channel Classroom** site includes relevant videos, lesson plans, and study guides.
6. The **International Children's Digital Library** is a digital collection of e-books that holds 4619 books in 59 languages, making it accessible to students from around the world. It also has apps that students may use outside of the classroom.
7. **Khan Academy** offers free online courses and content that has been developed by experts in their fields for education purposes. It places special emphasis on teaching math for all age groups and levels of expertise.
8. Social studies, geography, and science classrooms can benefit greatly from **National Geographic Education's** digital content, which includes videos, images, lessons, activities, games, and more.
9. **Wonderopolis** is a site that is common core and STEM-aligned, as well as engaging for students with a wonder of the day. It includes videos that answer fascinating questions for children and grownups alike, such as "What is a sonic boom?" and "How fast is the speed of light?"
10. **Brain Pop** has over 1000 animated videos for students in K-12, covering a multitude of subjects, as well as lesson plans and supplemental materials. It is the perfect tool to teach about many different aspects of life in an exciting and captivating way. It also allows for the creation of custom quizzes, movies, maps and many more!

In the following mapping exercise, the reader must select each type of education objective presented on the left and map it with the appropriate company on the right that offers the desired type of education objective.

Question template for Mapping Questions	
Mapping Left	**Mapping Right**
Target: High school children	Crash Course
University-level and professional education	Coursera
Daily news/updates	C-SPAN
Education on dinosaurs	Discovery Education
Education on historical events	History Channel Classroom
Existing books for children, in digital form	International Children's Digital Library
Education on math for various levels	Khan Academy
Education on matters of geography	National Geographic Education
Education on fun and strange facts	Wonderopolis
Target: K-12	Brain Pop

Technical type

Text

– Document

Image

– Image

Application

– Mapping Exercise

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.4 Title

Interactive Games as Digital Content

Learning Object Description/Introduction

Through studying this learning object, the reader will become knowledgeable on how to utilise interactive games of some interactive games that can be used or created for a fun experience in the classroom.

Learning resource type

⇒ Narrative Text (theory)

Learning Object Content

Interactive games are their own, a separate category of digital content. Contrary to webpages and online tools, they do not necessarily exist on the web, and unlike mobile applications, they are not restricted to mobile devices. What makes them unique is the entertainment factor, which happens to be one of the best implicit tools for absorbing information efficiently. For example, the well known game Assassin's Creed, with its detailed and historically accurate depiction of cities from ancient civilizations, has been used to teach students about these civilizations, through exploring the game's digital world (TheGamer, 2021).

An excellent webpage for creating interactive, digital games is h5p. It is the open-source tool that has been adopted in this project as part of the toolkit (IO3) since it does not simply allow creating games, but practically provides an extensive set of capabilities for creating different content types based on the needs of the course. In the simplest of cases, it allows the creation of crossword puzzles, drag-and-drop games, arithmetic quizzes, find-the-hotspot games and many more. Some of the most impressive applications include videos with branching choices (i.e., this supports the creation of business management scenarios as part of the toolkit – see IO3), where the selection of one choice results in a different story path than the choice of another, as well as task-based presentations where the presentation only proceeds after the completion of relevant tasks by the user. The reader can find at the following link the complete list of digital content types that can be supported by H5P and a clear description of each specific content type:

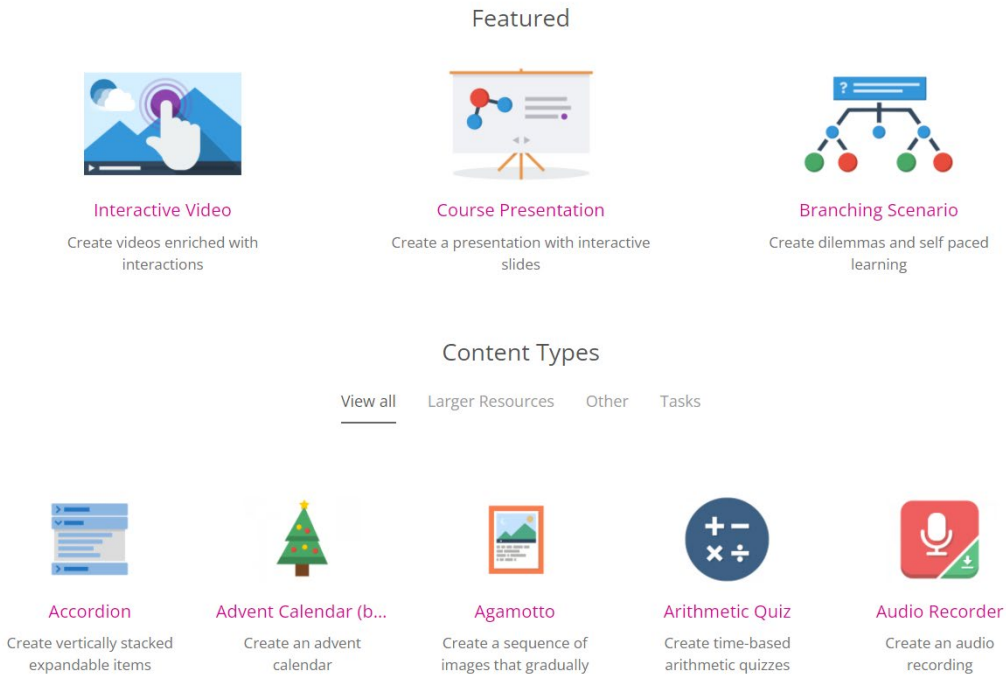


Figure 6. h5p Dashboard

Source: https://h5p.org/content-types-and-applications

Considering which game to implement based on the desired educational content, is an important step of the digital content creation process through h5p. Note that in the context of the project the e-learning platform offers the H5P Moodle plugin for creating different content types. While there are not any strict rules or guidelines to achieve this mapping, the following heuristics could prove of help:

- When teaching about important figures and places, where recalling the correct names is of importance, consider using a crossword puzzle. Crossword puzzles force the user to write the answer down, while helping him by providing single letters at the intersections. A "find-the-words" puzzle is also a great choice, where names can be identified on the grid through careful observation.
- If visual attention to detail is required regarding objects within a landscape, consider using a "find-the-hotspot" game. A student will be more capable of remembering objects within an area if he was required to look for and identify them through the game.
- If the goal is to create a correlation between events and people, perhaps a "drag-and-drop" game could be utilized: a lot of people recall information by visualization in their heads, so a direct correlation of picture to information would help that visualization.

Technical type
Text – Document Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.5 Title
Selecting the appropriate Digital Content for your scenario
Learning Object Description/Introduction
In this Learning Object, the reader will examine the appropriate ways to go about selecting his/her digital content, whether that translates to hiring a third party to do that for him, or just attempting to create his own digital content from scratch.
Learning resource type
⇒ Narrative Text (theory) ⇒ Guidelines

⇒ Good Practice

Learning Object Content

When selecting the kind of digital content to be used for your educational purposes, it is of utmost importance to consider the nature of the topic, and the way it would be most effectively delivered. During Learning Object 2.3, we presented a correlation between education objectives and the education service providers, making it easier for a teacher to choose the appropriate content for their needs. In Learning Object 2.4, we presented a set of heuristics through which the appropriate "h5g.org" interactive game could be chosen. However, sometimes this correlation between objective and service/tool is not so easy to establish, given the possibility that the needs themselves are not sufficiently clear or clarified.

CETRIX is a leading manufacturer of mobile computing devices and educational equipment, and its School Digital Transformation Solution program aims to help with the aforementioned issue (CETRIX, n.d.). Through the program, CETRIX helps schools connect to certain of its partners, and get the tools necessary for full use of the content for their teachings on the web. After assessment of the school's needs, they connect the school to the partner with software, content and services that suits the school's needs most.

Moving away from the idea of selecting your Digital Content from an existing service provider or source, there is also the alternative of creating your own digital content from scratch. Before this process of creation begins, however, the first step is identifying what kind of digital content would be most useful and effective for the kind of information you are trying to propagate. A useful approach is to imagine the form that the content would take if it was not digital, and then decide which kind of digital form best translates from the non-digital content. The table below lists four categories of products, and in each category there are forms of products that are digital and forms that are not.

Table 1. Forms of products per category

Written Products	**Presentation Products**	**Technological Products**	**Media Products**
Research report	Speech	Computer database	Audio recording
Narrative	Debate	Computer graphic	Slide show
Letter	Play	Computer program	Video
Poster	Song/lyric	Web site	Drawing
Brief	Musical piece	Graphic presentation	Painting
Proposal	Dance	Flow chart	Collage
Poem	Oral report		Sculpture
Outline	Panel discussion		Map

Brochure	Dramatic re-enactment		Scrapbook
Autobiography	Newscast		Oral history
Essay	Discussion		Photo album
Book review	Data display (e.g., chart)		
Report	Exhibition of products		
Editorial			
Script			

Source: https://www.youtube.com/watch?v=iuqliy3bZsM

The table can be used to, first, identify the available product forms that information can take, and then decide which of the digital forms would best translate from the default non-digital form. For example, a literary work of art, such as a poem, can be presented in text, as an audio recording, or as a song/musical piece, with the latter being more memorable to young children on average. Another example would be presenting a debate/exchange of ideas, which can take place as a written script, an audio recording, a panel discussion, a theatrical play where ideas are implicitly exchanged, a dramatic re-enactment of the ideas within a play/story etc.

Technical type

Text

– Document
– Table

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

10

Learning Object 2.6 Title

Creating good Digital Content

Learning Object Description/Introduction

In this Learning Object, some guidelines will be provided as to make digital content as informative, entertaining, captivating, effective and intriguing as possible.

Learning resource type

⇒ Narrative Text (theory)
⇒ Guidelines

Learning Object Content

When creating Digital Content, it is sometimes the case that you select an appropriate, generic solution for your needs, and adapt it to the details of your specific scenario. For example, when teaching about concepts that relate to each other, a mapping mini-game seems an appropriate choice, which can then be adjusted to the details of the concepts that need to be learned. However, in other cases you may wish to create your Digital Content from scratch, using a completely novel and custom approach. In such cases, it is important to have a set of guidelines to guide you through that process, that make sure the resulting approach is effective and entertaining enough to keep the audience captivated. Below is a set of recommended guidelines (NextThought, 2018):

1. **First create an intellectual need for information and skills**
   Often enough, people start creating their digital content around the objectives that need to be learned by their audience. While this is a natural approach, it often fails to engage the audience enough with the general subject, to the point that they would first want themselves to learn about the target objectives.

   A solution to this problem is to create content that encourages reflection and creates a personal context about the information for the user. It's easier to get learners invested by asking "why?", instead of "what?".

   Example: An educational video with the title "How does electricity work?" VS a video with the title "How long will it take for a light bulb at the other side of the earth, to turn on?"

2. **Design learning content on a trajectory of informal to formal**
   Formality is good, because it translates to accuracy, and less chances of misinterpretation. However, being too formal when exploring a subject can make the experience for the learner daunting and boring. Instead, a better approach is to start abstractly, from hypothetical scenarios, and then incrementally build your way to more details and formality.

   Example: Instead of formally stating that A->B and B->C entails that A->C, present an example such as "If it rains today, I'll take an umbrella. If I take an umbrella, I won't get wet. Therefore, if it rains today, I won't get wet".

3. **Maintain a constant view of the Big Picture**
   Remember to never lose the association between digital content that has been broken down into smaller, digestible pieces, and the Big Picture.

4. **Design learning content to foster collaboration and conversation**
   When designing content, try to make sure that each piece of content stimulates interaction between the audience members, in the form of either collaboration, conflicting opinions, inquiry etc. It is much better to have one slide that will keep the audience occupied for 10 minutes, than 10 slides that will each occupy the audience for a minute each.

5. **Take advantage of and test apperceptive mass**
   Before designing certain content, make sure you know your audience beforehand, and you know their levels of apperceptive mass. Apperceptive mass is the whole of a person's previous experience that is used in understanding a new percept or idea. By having an idea of your audience in this way, you can not only avoid redundant and already-known

information, but you can also use that previous knowledge as a founding block on top of which to build the digital content you intend to.

6. **Make it easy to interact and play**
   Did you know that most people do not mind a task becoming impossibly difficult, if the difficulty is incremented gradually and they felt comfortable confronting the task in the first place? On the contrary, they are intrigued by such a challenge. This is the reason why interactive content is supposed to be easy enough, at least at first, to allow learners to become engaged with it, and then proceed to introduce new layers of complexity. Additionally, such a task must encourage exploration and innovation, as that makes it even more attractive to the learner's eyes.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
5

Learning Object 2.7 Title
An interactive video on how to create good digital content.
Learning Object Description/Introduction
An interactive quiz that allows assessing understanding on how to create good digital content through an interactive video.
Learning resource type
– H5P Content
Learning Objective Content
[to be developed in IO3 and included in IO4 platform]
Technical type
Application – OLMEdu toolkit - H5P tool - Interactive Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Unit 3
Protecting personal data and privacy

Learning Object 3.1 Title
Activity (diagnostic assessment)
Learning Object Description/Introduction
Open-ended questions are given in this learning object to assess the reader's previous knowledge on protecting personal data and privacy. After submitting your answer, move on to the next learning object 3.2 for checking your response.
Learning resource type
Activity – Question
Learning Objective Content
Answer the following questions: - List 3 Principles of Personal Data Protection. - Are you aware of the Security Risks of Personal Data in Online Education Platforms? Provide a short description of the risks you are aware of. - List up to 4 ways/techniques for complying with data protection issues and GDPR.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
25 minutes

Learning Object 3.2
Personal data and their categories (data, privacy, categories)
Learning Object Description/Introduction
With this learning object the reader will acquire knowledge on the personal data definition, categories in online education platforms, the lifecycle of online personal data and personal data privacy.
Learning resource type
⇒ Narrative Text (theory)

Learning Objective Content

Personal data

Personal data according to Cambridge dictionary is information held on computers that relates only to you, and that you do not want everyone to know.

More information is also provided by European Commission on What is personal data?

Categories of personal data

There are various classifications of personal data made by countries or international organizations. It is true that most are quite similar. Huang et al. (2020) combined different characteristics and commonalities of various classification methods as shown in the following table.

Table 2. Categories of personal data

Category	Examples
Basic information	Name, age, place of birth, date of birth, gender, gender identity, preferences, proclivities, personal photos, race, color, national or ethnic origin
Identification	Government-issued identification, driver's license, passport, health IDs, Social Insurance Numbers (SIN), Social Security Numbers (SSN), PIN numbers
Biometrics	Genes, fingerprints, voice prints, palm prints, auricles, irises, facial features
Authenticating	Passwords, PIN, system account, IP address, email address, security answer, personal digital certificates
Medical and Health	Physical and mental health, drug test results, disabilities, family or individual health history, health records, blood type, DNA code, medical history, medical device logs, prescriptions, and health insurance coverage
Professional	Job titles, salary, work history, school attended, education history, employee files, employment history, evaluations, references, interviews, employer data, certifications, disciplinary actions
Financial	Cars, houses, apartments, personal possessions, purchases, sales, credit, income, loan records, transactions, taxes, purchases and spending habits, credit records, credit scores, credit standing, credit capacity, physical assets, and virtual goods
Communication	Telephone recordings, voice mail, emails, SMS, phone calls, IM and social, network post, physical address, telephone number

Contact	Contact lists, friends, connections, acquaintances, associations, group membership, email address
Browsing history	Media produced, consumed, and shared: in-text, audio, photo, video, and other forms of media; Real-world and online context, activity, interests, and behavior: records of location, time, clicks, searches, browser histories and calendar data, purchases activity, online shopping, social network profile information and the like
Device	Hardware serial number, software list, IP address, Mac address, browser fingerprint
Location	Country, GPS coordinates, room number, longitude and latitude

Personal Data in Online Education Platforms

UNESCO (2020) mentions that the data collected by online education platforms consists primarily personal data, which it mainly concerns:

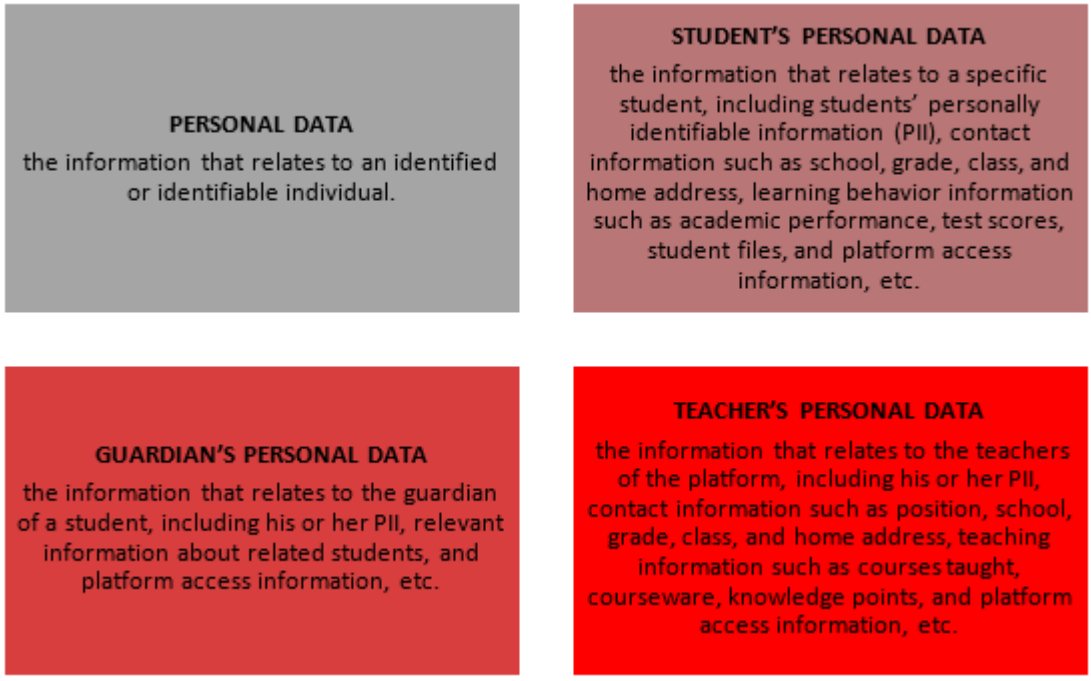


Figure 7. Categories of personal data collected by online education platforms

Source: UNESCO Institute for Information Technologies in Education (UNESCO, 2020)

Lifecycle of online personal data

According to the Personal Data Security Technical Guide for Online Education Platforms published by the UNESCO Institute for Information Technologies in Education (UNESCO, 2020), data lifecycle includes the 5 stages shown in the following graph.

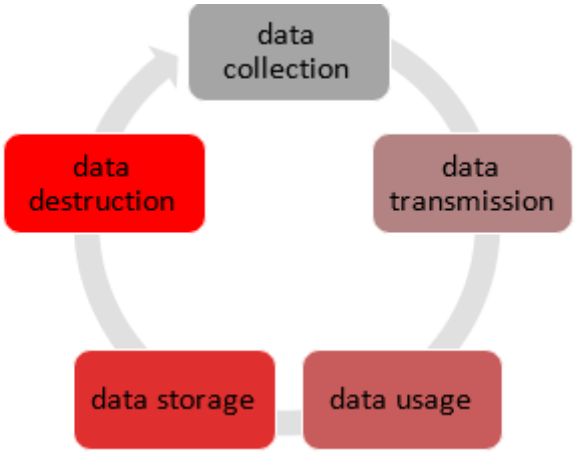


Figure 8. The 5 stages of the data life cycle

Source: UNESCO Institute for Information Technologies in Education (UNESCO, 2020)

Student data and privacy

Contrary to the belief that students in higher education who have grown up using digital technologies ("digital natives") have little concern for the privacy of their data, it has been found that:

a) they care about their data privacy, and their concern is increasing,
b) they want to protect information on their personal lives and their academic or professional prospects, but they prioritize the latter,
c) they expect boundaries between their personal and academic lives and want colleges and universities to use their data predominantly for educational purposes,
d) they care more about protecting immutable identifiers, such as biometric information, in higher education contexts, and
e) they have greater confidence in educational institutions and the government to protect their privacy than they do in technology companies (Park and Vance, 2012).

Here you can find the specific article Data Privacy in Higher Education: Yes, Students Care

Personal data privacy

Nowadays in most cases people are aware of the importance of protecting their data. After the covid-19 pandemic and the vast inclusion of the Internet in education basic data literacy including data privacy and protection is vital.

According to Huang et al. (2020) privacy:

a) can be found wherever data is collected, stored, or used,
b) refers to authorized access (who has it and who defines it) and
c) is focused on the use and governance of personal data – things like putting policies in place to ensure that users' personal information is being collected, shared and used in appropriate ways.

Data protection according to David Flaherty (1989) is an aspect of privacy, which involves *"the collection, use, and dissemination of personal information"*. This concept forms the foundation for fair information practices used by governments globally (Huang et al., 2020)

Technical type

Text

– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 3.3 Title

More information about the Personal data and their categories (data, privacy, categories)

Learning Object Description/Introduction

Do you feel that as an educator you may need to acquire more knowledge on the content of the Personal data and their categories (data, privacy, categories)? If so, read the following articles and watch the following video.

Learning resource type

– Further Reading

Learning Objective Content

Data Literacy, Privacy and Protection in Higher Education (video)

Personal data security technical guide for online education platforms

Technical type
Text – Hypertext Image – Icon
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 3.4
Security Risks of Personal Data in Online Education Platforms
Learning Object Description/Introduction
Following this content, you will become aware of the personal data risks in online learning.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content
There are plenty of risks and threats associated with the employed technologies, process management and user operations in the online education platforms (UNESCO, 2020). Security issues may emerge as a consequence like thefts and integrity violations of personal data, unauthorized data destruction, and impersonation fraud, which further brings reputational damage, mental injury and financial loss to platform users (UNESCO, 2020). The security risks for the personal data related to online education platforms mainly are related to the following three aspects:

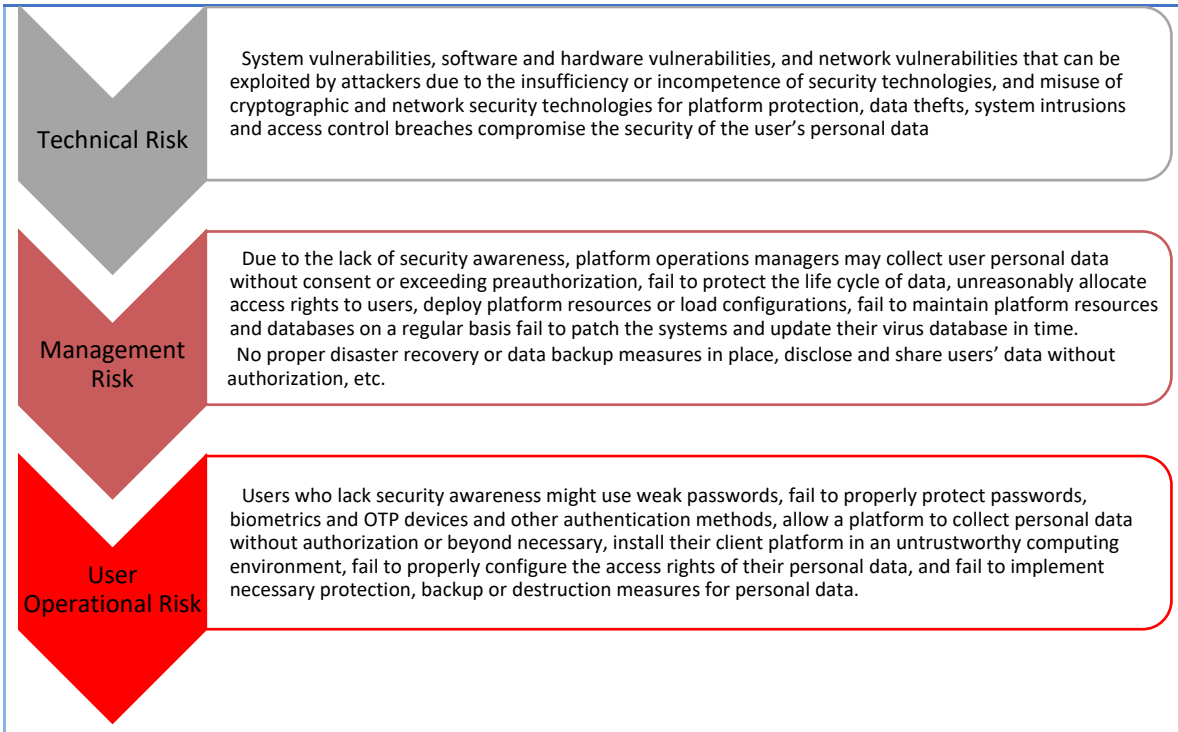


Figure 9. Aspects of security risks for personal data

Source: UNESCO Institute for Information Technologies in Education (UNESCO, 2020)

Due to the unprecedented COVID-19 pandemic the world is shifting to the new digital era. This entails new increased system challenges and priorities, more real-time decision making, online staff training, continuity risks, and the biggest one is security risks. (Khan, N. A., Brohi, S. N., & Zaman, N. (2020). As it is characteristically mentioned in their paper, ''the use of technology is bringing more issues and threats in terms of cybersecurity. Organizations will have to deal with the growing security demands emerging from the increased risk of cyber-attacks. They must also be mindful of the difficulties created by the need to balance sensitive health information and privacy issues of people who may have been infected with them''. This clearly states that there is an extremely high risk in the case of online communication platforms. Zoom, for instance, is a platform that has seen it's popularity rising suddenly is facing an enormous backlash in its settings although it was also utilized by security professionals, privacy advocates, lawmakers, etc. Major security providers, such as the FBI warned continuously that Zoom's default settings are not safe. The above-mentioned cyber threats and privacy issues might cause unfavourable situations and it is required to be mitigated and avoided as much as possible.

Technical type
Text – Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 3.5
Handling personal data and privacy issues in online education
Learning Object Description/Introduction
Following this content, the reader will become aware of the techniques and ways to handle personal data and privacy issues in online education.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content

Technical solutions

UNESCO (2020) proposed the data security protection technologies that online education platforms should take from the following aspects:

Figure 10. Aspects of data security protection technologies

Source: UNESCO Institute for Information Technologies in Education (UNESCO, 2020)

For more information on these techniques see:

1) Personal data security technical guide for online education platforms Report of UNESCO (2020)

2) ENISA, European Union Agency for Cybersecurity - The European Cyber Security Challenge: Lessons Learned report https://www.enisa.europa.eu/publications/the-european-cyber-security-challenge-lessons-learned-report

3) ENISA, European Union Agency for Cybersecurity - ECSC 2020 Analysis Report

https://www.enisa.europa.eu/publications/ecsc-2020-analysis-report

4) ENISA, European Union Agency for Cybersecurity - Risk Management Standards

https://www.enisa.europa.eu/publications/risk-management-standards

Various techniques and TIPS that can be used by Higher Education Staff in online education

How to create strong password

- ✔ use at least eight characters or more
- ✔ mix of four different types of characters: upper/lower case letters, numbers and special characters like */"&
- ✔ If you only have one special character in your password don't make it the first or last character in your password i.e. aGdQl01@
- ✔ It shouldn't be a name or word in any language in the dictionary
- ✔ It shouldn't include any part of your name, address or date of birth You can keep a hint of your password but don't include any related services or websites linked to it
- ✔ Use a different password for every service or website.

How to generate a strong password with Google Chrome or iOS?

When you are creating online accounts, there are some rules such as "password must be at least 8 characters", "password must contain at least one upper letter" and so on. You can let google chrome or iPhone create strong passwords for many of your accounts, or you can create your own passwords. Generate a password with Google Chrome to get the latest official operating instructions, visit:

https://support.google.com/chrome/answer/7570435?co=GENIE.Platform%3DiOS&hl=en&oco=0

How to use password management tools

Password management tools, or password vaults, are a great way to organize your passwords. They store your passwords securely, and many provide a way to back up your passwords and synchronize them across multiple systems. Below we have a list of the best free password managers out there. All of these services offer fantastic features, so if you want to find out more about any of the

services below, click the links to the provider's website or scroll below this list for a summary of what makes each service great. (Endorsement not implied)

- ✔ Keepass - An excellent free password manager
- ✔ Bitwarden - An open-source password manager built to be user-friendly
- ✔ Password Safe - Keeping you safe, one password at a time
- ✔ LastPass - The free tier doesn't skimp too much from its premium service
- ✔ RoboForm - Highly-featured and easy to use

How to protect privacy when Navigating Learning Platforms

A learning management system (LMS) is typically a web-based software application for the administration, documentation, tracking, reporting, automation and delivery of educational content as part of courses, training programs, or learning and development programs. – Ellis, Ryann K. (2009), Field Guide to Learning Management, ASTD Learning Circuits, archived from the original on 24 August 2014, retrieved 5 July 2012

Digital learning management systems recommended by UNESCO:

- ✔ Moodle – Community-driven and globally-supported open learning platform.
- ✔ CenturyTech – Personal learning pathways with micro-lessons to address gaps in knowledge, challenge students and promote long-term memory retention.
- ✔ ClassDojo – Connects teachers with students and parents to build classroom communities.
- ✔ Edmodo – Tools and resources to manage classrooms and engage students remotely, offering a variety of languages.
- ✔ Edraak – Arabic language online education with resources for school learners and teachers.
- ✔ EkStep – Open learning platform with a collection of learning resources to support literacy and numeracy.
- ✔ Google Classroom – Helps classes connect remotely, communicate and stay organized.
- ✔ Nafham – Arabic language online learning platform hosting educational video lessons that correspond with Egyptian and Syrian curricula.
- ✔ Paper Airplanes – Matches individuals with personal tutors for 12-16 week sessions conducted via video conferencing platforms, available in English and Turkish.
- ✔ Schoology – Tools to support instruction, learning, grading, collaboration and assessment.
- ✔ Seesaw – Enables the creation of collaborative and sharable digital learning portfolios and learning resources.
- ✔ Skooler – Tools to turn Microsoft Office software into an education platform.

How to stay safe while Learning with Social Networking Service

A social network is a social structure made up of a set of social actors (such as individuals or organizations), sets of dyadic ties, and other social interactions between actors. The social network perspective provides a set of methods for analyzing the structure of whole social entities as well as a variety of theories explaining the patterns observed in these structures. – Wasserman, Stanley; Faust, Katherine (1994). “Social Network Analysis in the Social and Behavioral Sciences”.

Social Network Analysis: Methods and Applications. Cambridge University Press. pp. 1–27. ISBN 9780521387071. A social networking service (also social networking site or social media) is an online platform that people use to build social networks or social relationships with other people who share similar personal or career interests, activities, backgrounds or real-life connections. For example, using Edmodo social networking service there are actions that can be performed to protect or clear personal data or user-generated content.

While and after finishing online learning, the user should notice and understand the data generated, and decide whether to delete the data or not. If the user decides to delete the data, the following presents how to do this in one of the online platforms, i.e., Edmodo.

How to clear Personal Data after Learning Online / delete user-generated content?

1) Online learning platform – Edmodo If you are a student, you can delete a post by following these steps: a) Hover over the post or reply and click the "Post Settings" icon that appears in the top right corner of the post. b) Click "Delete Post" or "Delete Reply." c) Click "OK" to confirm.
2) If you are a teacher, you can delete a post or a comment on a post by following these steps: To delete a post: a) Locate the post that you would like to delete b) Click the more button just to the right of the post to open the popup menu c) Select Delete Post d) Click Delete to confirm
3) To delete a comment on a post: a) Locate the comment that you would like to delete b) Click the downward arrow just to the right of the comment to open the popup menu c) Select Delete Comment d) Click Delete to confirm

For more information about other platforms on how to clear data after learning online see: "Chapter 7 Clearing Personal Data after Learning Online" – Source: https://iite.unesco.org/wp-content/uploads/2020/06/Personal-Data-and-Privacy-Protection-in-Online-Learning-Guidance-for-Students-Teachers-and-Parents-V1.0.pdf

These techniques and TIPS that can be used by Higher Education Staff in online education are described in detail in Huang, R.H., Liu, D.J., Zhu, L.X., Chen, H.Y., Yang, J.F., Tlili, A., Fang, H.G., Wang, S.F. (2020). Personal Data and Privacy Protection in Online Learning: Guidance for Students, Teachers and Parents. Beijing: Smart Learning Institute of Beijing Normal University.

Technical type

Text

– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

Learning Object 3.6 Title

Principles of data protection

Learning Object Description/Introduction

The United Nations UN High-level Committee on Management developed specific principles to offer the basic framework for the processing of personal data. The following content sheds light on these principles.

Learning resource type

- Narrative Text (theory)

Learning Objective Content

Principles of Personal Data Protection according to United Nations High-level Committee on Management

Principle	**Description**
FAIR AND LEGITIMATE PROCESSING:	The Online Education Platform should process personal data in a fair manner, in accordance with the applicable international and regional mandates and governing instruments and on the basis of any of the following: (i) the consent of the data subject; (ii) the best interests of the data subject, consistent with the mandates of the United Nations and educational industry concerned; (iii) the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract; or (iv) any other legal basis specifically identified by international or regional laws, regulations and contractual clauses.
PURPOSE SPECIFICATION	Personal data should be processed for specified purposes, which are consistent with the mandates of the Online Education Platform operators concerned and take into account the balancing of relevant rights, freedoms and interests. Personal data should not be processed in ways that are incompatible with such purposes.
PROPORTIONALITY AND NECESSITY	The processing of personal data should be relevant, limited and adequate to what is necessary in relation to the specified purposes of personal data processing.
RETENTION	Personal data should only be retained for the time that is necessary for the specified purposes.
ACCURACY	Personal data should be accurate and, where necessary, up to date to fulfill the specified purposes.

CONFIDENTIALITY	Personal data should be processed with due regard to confidentiality.
SECURITY	Appropriate organizational, administrative, physical and technical safeguards and procedures should be implemented to protect the security of personal data, including against or from unauthorized or accidental access, damage, loss or other risks presented by data processing.
TRANSPARENCY	Processing of personal data should be carried out with transparency to the data subjects, as appropriate and whenever possible. This should include, for example, provision of information about the processing of their personal data as well as information on how to request access, verification, rectification, and/or deletion of that personal data, insofar as the specified purpose 10 for which personal data is processed is not frustrated.
TRANSFERS	In carrying out its mandated activities, an Online Education Platform may transfer personal data to a third party, provided that, under the circumstances, the Online Education Platform operator satisfies itself that the third party affords appropriate protection for the personal data.
ACCOUNTABILITY	The Online Education Platform operators should have adequate policies and mechanisms in place to adhere to these Principles.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30 minutes

Learning Unit 4 Title
Copyrights, GDPR and licences

Learning Object 4.1
Defining and applying Copyrights and GDPR
Learning Object Description/Introduction
Following this content you will become familiar with *Copyrights and GDPR concepts and become able to handle related issues.*
Learning resource type

⇒ Narrative Text (theory)

⇒ Presentation

Copyrights

Definition of Copyrights: Copyright is one of the main types of intellectual property. It allows the copyright owner to protect against others copying or reproducing their work. Copyright arises automatically when a work that qualifies for protection is created. The work must be original, meaning it needs to originate with the author, who will have used some judgement or skill in its creation. (Copyright Licensing Agency, 2022). Another definition of Copyrights by Peter Loshin , 2022 '' Copyright is a legal term describing ownership of control of the rights to the use and distribution of certain works of creative expression, including books, video, motion pictures, musical compositions and computer programs. Historically, copyright law has been enacted to balance the desire of cultures to use and reuse creative works - thus creating "derivative work" -- against the rights of authors of art, literature, music and the like to monetize their work by controlling who can make and sell copies of the work.'' Another concept that should be explored is the fair use: Fair use can be defined as ''an affirmative defense that can be raised in response to claims by a copyright owner that a person is infringing a copyright. Fair use permits a party to use a copyrighted work without the copyright owner's permission for purposes such as criticism, comment, news reporting, teaching, scholarship, or research.'' (Copyright Alliance, 2022). When it comes to copyrights in online teaching, HES who implement online courses are not as flexible in copywriting as those who are teaching face-to-face courses. Although it is much easier to incorporate text in the traditional classroom environment since there is a shift in online teaching, further precautions must be considered by HES when creating an online course.

Watch the video Webinar: Copyright in Online Teaching and Learning to see several considerations related to copyright in teaching and learning online. You will also be able to identify your rights as creators of online course content.

Source: https://www.youtube.com/watch?v=tdkGA9rvJOo

Fair Use

Follow the video Renee Hobbs - Copyright Clarity: How Fair Use Supports Digital Learning to see how fair use can support digital learning.

Source: Renee Hobbs - Copyright Clarity: How Fair Use Supports Digital Learninghttps://www.youtube.com/watch?v=M7OUftHrOzI

Copyright Law and Fair Use

Copyright law addresses the protection of the expression of an idea, rather than an idea itself. Thus, tangible expressions such as books and videos are protected under copyright.

Copyright prohibits any other person from using the original author's work without authorization or permission. However, in certain situations, copyright law permits the use of a copyrighted work without the need for obtaining the permission of the author of the work. This is the doctrine of fair use, referred to as the doctrine of fair dealing in India (though the two concepts are not purely identical, highlighting their differences would be outside the discussion in the present article). To constitute fair use, one must bear in mind the purpose and nature of the work for which the copyrighted work is used for as well as the amount of the work used.

How Copyright Issues Can Be Tackled

Certain material may only be available in the form of secondary sources. Given that commercial or even unauthorized usage of such material may bring about legal action, universities as well as the professors should consider the following to help prevent any infringement of copyright. These were suggested by Intepat in the relevant article Copyright Issues In Online Education

GDPR

Defining GDPR.

''The General Data Protection Regulation (GDPR) is a legal framework that sets guidelines for the collection and processing of personal information from individuals who live in the European Union (EU). Since the Regulation applies regardless of where websites are based, it must be heeded by all sites that attract European visitors, even if they don't specifically market goods or services to EU residents.'' (Jake Frankenfield, 2022).

GDPR creates a uniform European legal framework, giving people who reside in Europe rights over data.

The key changes affecting education include:

Source: Microsoft (2018)

Enhanced personal privacy rights

GDPR strengthens data protection for individuals, including students, within the EU by ensuring they have the right to:

- ✔ Access data and correct inaccuracies
- ✔ Erase data
- ✔ Consent or Object to processing of their information
- ✔ Download/Transfer their data

Increased duty for documenting processes and protecting data

Educational institutions that process personal data will need to show clear evidence of compliance.

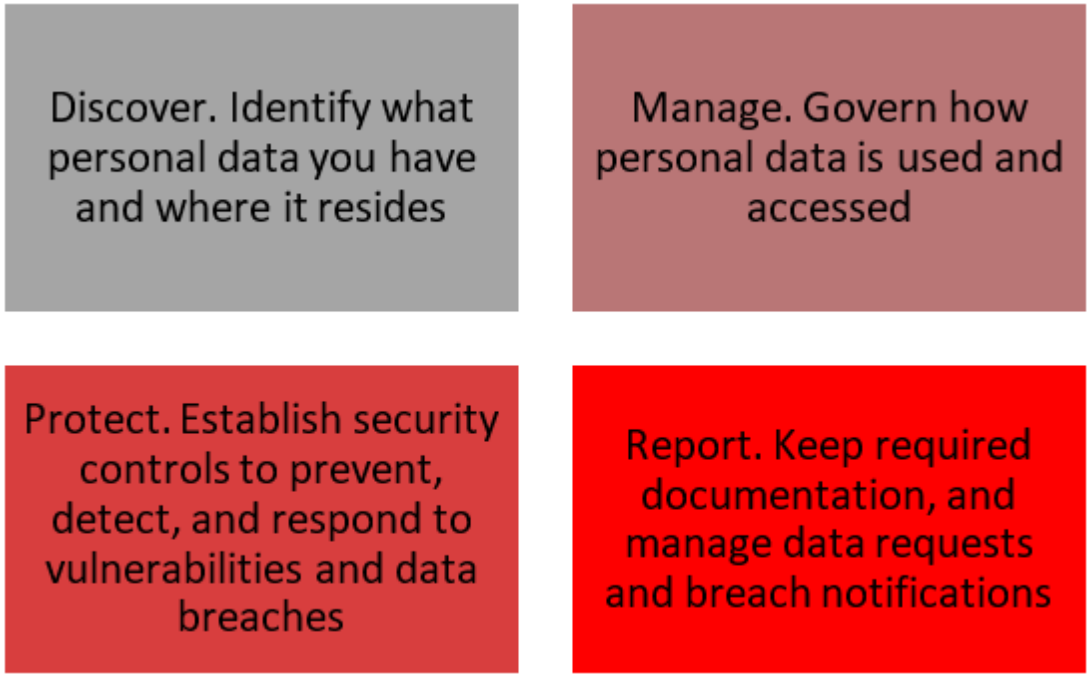
Mandatory data breach reporting

Educational institutions are required to report data breaches within 72 hours.

Significant penalties for non-compliance

Educational institutions risk potential fines if they fail to respond. To be compliant, it is important to consider several measures to protect personal data and to be cautious when handling it.

GDPR implementation steps



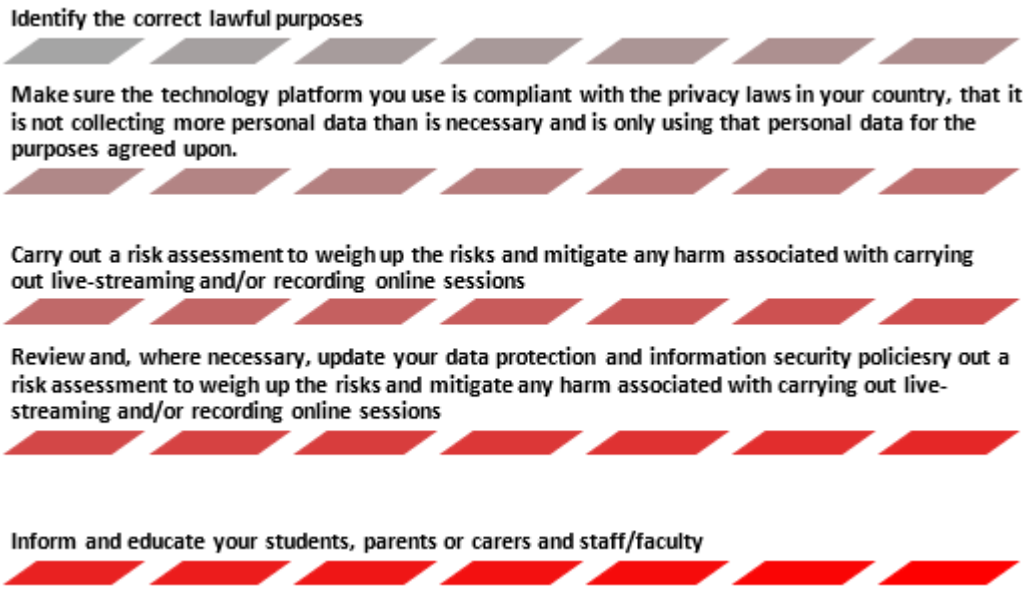
Source: Data protection and privacy implications of online and remote learning

GDPR and online education

How can we ensure that our online learning platforms comply with data protection requirements and uphold the privacy rights of individuals?

Read the article Data protection and privacy implications of online and remote learning to find more information on how to ensure that our online learning platforms comply with data protection requirements and uphold the privacy rights of individuals.

Also, iubenda is an online service that you can make use of to get your documents and make your site or app compliant in minutes. Source: https://www.iubenda.com/en/



Source: Orchison, Rigg & Rigg (2020) https://www.cois.org/about-cis/perspectives-blog/blog-post/~board/perspectives-blog/post/data-protection-and-privacy-implications-of-online-and-remote-learning

Technical type
Text – Document Streaming media – VideoImage
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
90

Learning Object 4.2 Title
Activity
Learning Object Description/Introduction
This activity will enable to check your knowledge on how to handle copyright issues in Moodle
Learning resource type
Activity

- Case Study
- Activity for practice
- Question

Learning Objective Content

Read the case of ST GEORGE'S University of London LIBRARY BLOG entitled "Moodle and copyrighted material" and respond to the following quiz.

1. The scanning of printed material into electronic form for the purposes of private study or non-commercial research may be regarded as 'fair dealing'.
    a. True (correct)
    b. False
2. For the use of images and multimedia in presentations in Moodle there is no need to check if they are copyright free or permitted by the rights holder.
    a. True
    b. False (correct)
3. If you wish to direct students to other web-based materials, you can link to other websites.
    a. True (correct)
    b. False
4. If you wish to use an image from a website you must make sure that you have permission from the copyright holder to do so.
    a. True (correct)
    b. False

Technical type

Text

- Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20 minutes

Learning Object 4.3 Title

More information about GDPR

Learning Object Description/Introduction

Do you feel that as an educator you may need to acquire more knowledge on the content of the GDPR? If so, read the following report, links and watch the following videos. You can also find relevant available courses and training events**.**

Learning resource type

- Further Reading

Learning Objective Content

More information on **GDPR for education** can be found here

Source: https://pulse.microsoft.com/uploads/prod/2018/03/WorkProductivity_GDPRforEducation_KickStartGuide.pdf

GDPR and lecture recording – guidance note case

FAQs on video conferencing remote learning and data protection

Related links

The EU website about GDPR Source: https://ec.europa.eu/info/law/law-topic/data-protection/reform/what-does-general-data-protection-regulation-gdpr-govern_en

EU General Data Protection Regulation (GDPR) Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0679

GDPR and training: How to organize GDPR compliant online events

Source: https://www.youtube.com/watch?v=UPK6yXW9NC0

Data protection dos and don'ts for synchronous and asynchronous recording

Source: https://www.dmu.ac.uk/academic/centre-academic-innovation/staff-support-for-remote-teaching/data-protection-guidelines.aspx

Videos

Putting Data Protection into Practice: GDPR and the DARIAH ELDAH Consent Form Wizard Configure

Source: https://www.youtube.com/watch?v=eAKhI0qde2w

Available courses and training events

Source: https://www.derby.ac.uk/short-courses-cpd/online/free-courses/gdpr-data-protection-officer-skills/

Source: https://sshopencloud.eu/training/training-events

Technical type

Text

– Hypertext
Image

– Icon
Streaming media

– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 4.4 Title
Activity – how to handle online recordings in Education.
Learning Object Description/Introduction
This activity will enable you to check your knowledge on how to handle data protection issued regarding recording in online education.
Learning resource type
Activity – Case Study – Activity for practice – Question
Learning Objective Content
First, read the Division of General Counsel, Governance and Compliance regarding Online Teaching and Data Protection uploaded in the University of Success website. Imagine that you are aiming to provide lectures in a mix of online and face-to-face learning. You are requested to record your lectures. List the actions that you will take for protecting data according to the policies that you can see in this case.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20 minutes

Learning Object 4.5

Defining and applying licences

Learning Object Description/Introduction

Following this content, you will become familiar with *licences concept and become able to handle related issues*

Learning resource type

- ⇒ Narrative Text (theory)
- ⇒ Presentation

A licence agreement is a legal arrangement between the creator/depositor of the data set and the data repository, signifying what a user is allowed to do with the data. Licensing could also be applied to software, soundtracks, models, and other type of contents, it could useful to extend the definition, and then highlighting the case of datasets. A licensing agreement is a contract between two parties (the licensor and licensee) in which the licensor grants the licensee the right to use the brand name, trademark, patented technology, or ability to produce and sell goods owned by the licensor. In other words, a licensing agreement grants the licensee the ability to use intellectual property owned by the licensor. Licensing agreements are commonly used by the licensor to commercialize their intellectual property. (CFI, 2021)

Creative Commons licences

The main attributes of using Creative Commons (2017) licences for the licensing of data, datasets, and databases (Korn and Oppenheim, 2011) are:

- ✔ The ease of use of the licences;
- ✔ The widespread adoption of the licences;
- ✔ Their flexibility;
- ✔ Their availability in human-readable and machine-readable forms allowing both researchers and computers to immediately know what they are allowed to do with your data;
- ✔ The chance that your data are reused.

Different licenses are presented in the picture below

	PUBLIC DOMAIN	PUBLIC DOMAIN	BY	BY SA	BY NC	BY ND	BY NC SA	BY NC ND
PUBLIC DOMAIN	✓	✓	✓	✓	✓	✗	✓	✗
PUBLIC DOMAIN	✓	✓	✓	✓	✓	✗	✓	✗
BY	✓	✓	✓	✓	✓	✗	✓	✗
BY SA	✓	✓	✓	✓	✗	✗	✗	✗
BY NC	✓	✓	✓	✗	✓	✗	✓	✗
BY ND	✗	✗	✗	✗	✗	✗	✗	✗
BY NC SA	✓	✓	✓	✗	✓	✗	✓	✗
BY NC ND	✗	✗	✗	✗	✗	✗	✗	✗

Source: **Consortium of European Social Science Data Archives**

There are circumstances in which CC0 is inappropriate, due to specific risks that might arise for the licensor and perhaps subsequently also for any users. E.g. when:

- ✔ Datasets containing (sensitive) personal information are deposited for which consent has not been cleared;
- ✔ Permission of the copyright holder has not been sought;
- ✔ The rights holders are unknown or cannot be traced (orphan works).

In these cases, licences that place 'some' restrictions upon the user, such as those with an "ND" (No derivatives) and/or "NC" (Non-Commercial) might be more appropriate.

Creative Common Licence implications in online education

Information on how to put a Creative Commons License in Your Moodle course, how to find Creative Commons Images on Flickr for Use in Moodle and how to search YouTube for videos with creative commons licence can be found in the following videos.

How to Put a Creative Commons License in Your Moodle course - https://www.youtube.com/watch?v=2Ol_6zir57s

Finding Creative Commons Images on Flickr for Use in Moodle - https://www.youtube.com/watch?v=yOznXLjIVEo

How to search youtube for videos with creative commons licence - https://www.youtube.com/watch?v=RG7c83sw6gk

Technical type

Text

– Document

Streaming media

– Video

– Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 4.6 Title

More information about the EU Data protection and online privacy

Learning Object Description/Introduction

Do you feel that as an educator you may need to acquire more knowledge on the content of the EU Data protection and online privacy? If so, you can find more information in the following links.

Learning resource type

– Further Reading

Learning Objective Content

Your Europe - Data protection and online privacy

Council of Europe - Protection of personal data and privacy

EUR-Lex Access to European Union Law

Technical type

Text

– Hypertext

Image

– Icon

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60 minutes

Learning Object 4.7 Title
Activity for practice – how to use Creative Commons Licenses.
Learning Object Description/Introduction
This activity will familiarize you with the use of Creative Commons Licenses.
Learning resource type
Activity – Question
Learning Objective Content
Select up to 3 sources that use Creative Commons Licenses and report what license is represented by each relevant icon. To find out whether you responded correctly please go to license chooser tool
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
15 minutes

Conclusion of the module
In the course of this module, we have presented how digital content can be utilized in education. We provided the definition for digital content, along with other details such as its usefulness, necessity in today's world and the hindrances that obscure its application. The above were complemented by a "Did you know" quiz. Next, we presented three different categories of digital content: webpages/online tools, mobile applications, and online courses/educational videos. For each category, we explained the attributes that make certain digital content belong to it, and provided examples of such applications that can be utilized for education. In the category of courses and educational videos, a concept mapping quiz was provided to test the gained knowledge. We also presented a fourth category, interactive games, which provides the reader with a wide toolset for creating many different games and puzzles. Then, this module examined the ways in which the appropriate digital content can be selected, per scenario, and provided guidelines/good practises for creating quality digital content. These ways and

practises were then put into puzzles and quizzes, that the reader can tackle in the summative assessment of this module. By now, we hope that the answers to the following questions are clear:

- How can I make what I am teaching more exciting, intriguing, and interactive?
- How can I ensure that all my students have easy and affordable access to the content I am teaching them about?
- How can I modernize my teaching methods through a variety of digital methods available?

Finally, the module addressed issues related to data protection and privacy, principles, relevant security risks, copyrights, GDPR and licences definitions and applications.

Conclusion type

- Text

Summative Assessment of the module

https://thalissite.h5p.com/content/1291545648214042597

https://thalissite.h5p.com/content/1291545681465095437

1. Can you recall the Principles of Personal Data Protection? Then, make the crossing accordingly.

. ACCOUNTABILITY	The Online Education Platform should process personal data in a fair manner, in accordance with the applicable international and regional mandates and governing instruments and on the basis of any of the following: (i) the consent of the data subject; (ii) the best interests of the data subject, consistent with the mandates of the United Nations and educational industry concerned; (iii) the performance of a contract to which the data subject is party or in order to take steps at the request of the data subject prior to entering into a contract; or (iv) any other legal basis specifically identified by international or regional laws, regulations and contractual clauses. (b)
	The Online Education Platform operators should have adequate policies and mechanisms in place to adhere to these Principles (a)
b. FAIR AND LEGITIMATE PROCESSING	In carrying out its mandated activities, an Online Education Platform may transfer personal data to a third party, provided that, under the circumstances, the Online Education Platform operator satisfies itself that the third party affords appropriate protection for the personal data.
	Personal data should be accurate and, where necessary, up to date to fulfill the specified purposes (c)

c. ACCURACY	The processing of personal data should be relevant, limited and adequate to what is necessary in relation to the specified purposes of personal data processing.
	Personal data should be processed with due regard to confidentiality.

Question template for Multiple Choice Questions	
No.	0.
Question (stem)	Creative Commons licenses are inappropriate when the rights holders are unknown or cannot be traced (orphan works).
Possible answers	● True ● False
Correct answer	True
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Assessment type

- Multiple Choice Questions (single or multiple correct answers)
- Drag the words
- Matrix

Technical Type

- Text
- Document

Workload

240

Number of questions in the assessment object

2

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Module 7: Online feedback, assessment, and monitoring

Module Number
7
Module Title
Online feedback, assessment, and monitoring
Short Description / Motivation text
Why is assessment necessary in the learning process? What is the value of providing feedback to my students in a continuous basis for achieving their desired learning objectives? How can I use online tools for monitoring my students' learning process? Where and how can I use polling process in my teaching? Assessment and evaluation are integral parts of any learning process, as they determine whether the goals of education are being met. Assessment affects decisions about grades, placement, advancement, instructional needs, curriculum, etc. Assessment inspires us to ask questions such as: - Are we teaching what we think we are teaching? - Are students learning what they are supposed to be learning? - Is there a way to teach the subject better, thereby promoting better learning? By the end of this module, you will attain the knowledge and skills for effectively organizing and implementing online assessment in Higher Education as part of initial and summative assessment purposes, but also for effectively providing online feedback and monitoring students' behaviour and learning progress, as part of formative assessment purposes. In addition, monitoring and polling processes will be presented along with practical examples and tools.
Keywords
Online feedback, assessment, monitoring, polling
Learning Outcomes
Knowledge After the successful completion of this unit learners will: - Become knowledgeable of different assessment methods (e.g., summative, formative, authentic assessment) that can be applied in online learning environments. - Become knowledgeable of different assessment activities that can be applied in online learning environments, accounting also for their reliability and validity. - Become familiar with the variety of online assessment tools. - Be aware of how to prepare online assessments for their students. - Be familiar with monitoring and polling processes. **Skills**

After the successful completion of this unit learners will be able to:

- Select and apply assessment methods in an online classroom.
- Use the appropriate tools to implementing different assessment activities online (e.g., providing written feedback to their students).
- Monitor the learning process and check their students' progress.
- Implement polling activities.

Competences

After the successful completion of this unit learners will

- Be competent to design and set up online assessment activities, accounting for their validity and reliability.
- Be competent to use the appropriate tools to implementing different assessment activities online (e.g., providing written feedback to their students).
- Be competent in implementing the adequate monitoring strategies so as to diminish the isolation of their students.
- Be competent to implement polling activities.
- Be competent to select the appropriate assessment methods for online assessment.

Language

English

Training Content

Learning Unit 1 Title

Assessment methods

Learning Object 1.1 Title

Activity (diagnostic assessment)

Learning Object Description/Introduction

You will be given with an open-ended question about your previous knowledge on assessment methods and activities. After submitting your answer, move on to section 1.2. for checking your response.

Learning resource type

⇒ Activity
  - Question

Learning Objective Content

Answer the following questions:

- What is the difference between assessment and evaluation?

- List up to 3 assessment methods that you have implemented in your class.
- List up to 3 assessment activities that you have implemented in your class.

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

15

Learning Object 1.2 Title

Assessment vs evaluation

Learning Object Description/Introduction

In this section we will explore what assessment is about, what is the difference between assessment and evaluation in any educational sector.

Learning resource type

Narrative Text (theory)

Learning Objective Content

An important aspect of this module is to firstly establish an understanding between the terms “assessment” and “evaluation” or “measurement” of achievements, as in many cases teachers seem to use these terms as synonyms. For instance, it happens that a teacher administers an exam (or a quiz) and says that s/he “assessed” the students. Others, use the term “assessment” without taking into consideration and the term “evaluation” or “measurement”, but rather merely relying on the qualitative data and their impressions on how their students’ progress in the class.

Assessment is a systematic process of determining the achievement of teaching objectives and results because of quantitative measurements, accompanied with qualitative descriptions and teachers’ personal judgments. Assessment processes are ought to provide useful feedback for the improvement of both the teaching and the learning processes. In simple terms, we could say that assessment is:

Assessment = Measurement/ evaluation + qualitative descriptions + teachers’ personal judgments

Evaluation refers to the numerical evaluation of specific features/ characteristics of learners (objects, persons, events) based on a measurement unit. For example, one student got 18 out of 20 in a test. Evaluation (or measurement) in education has some disadvantages compared to measurement in the physical world, as the features of the objects are functionally defined, the measuring instruments do not have a high degree of accuracy and sensitivity, the unit of measurement is not fixed, and the measurement error is large. Common mistakes made during the evaluation process are the halo effect and the Pygmalion effect.

The “halo effect” is a cognitive process in which the general view we have of a person determines the opinion we form about his character and particular characteristics. Thus, we may have the view that someone is “nice” and believe that because that person is nice, s/he is also “smart”.

The Pygmalion phenomenon concerns the fact that the teacher's expectations can determine the expected learning outcome for students. In other words, when a teacher has high expectations of a student, then the student's performance seems to increase.

Assessment is a systematic process of determining the achievement of teaching objectives and results because of quantitative measurements, accompanied with qualitative descriptions and teachers’ personal judgments.	**Evaluation** refers to the numerical evaluation of specific features/ characteristics of learners (objects, persons, events) based on a measurement unit.

The following table (retrieved from Apple & Krumsieg, 1998) compares assessment and evaluation on several important dimensions.

Table 1. Assessment Vs Evaluation (Apple & Krumsieg, 1998)

Dimension	**Assessment**	**Evaluation**
Timing	Formative	Summative
Focus of measurement	Process-oriented	Product-oriented
Relationship between administrator and recipient	Reflective	Prescriptive
Findings and uses	Diagnostic	Judgmental
Modifiability of criteria, measures	Flexible	Fixed
Standards of measurement	Absolute (individual)	Comparative
Relation between objects of Assessment/Evaluation	Cooperative	Competitive

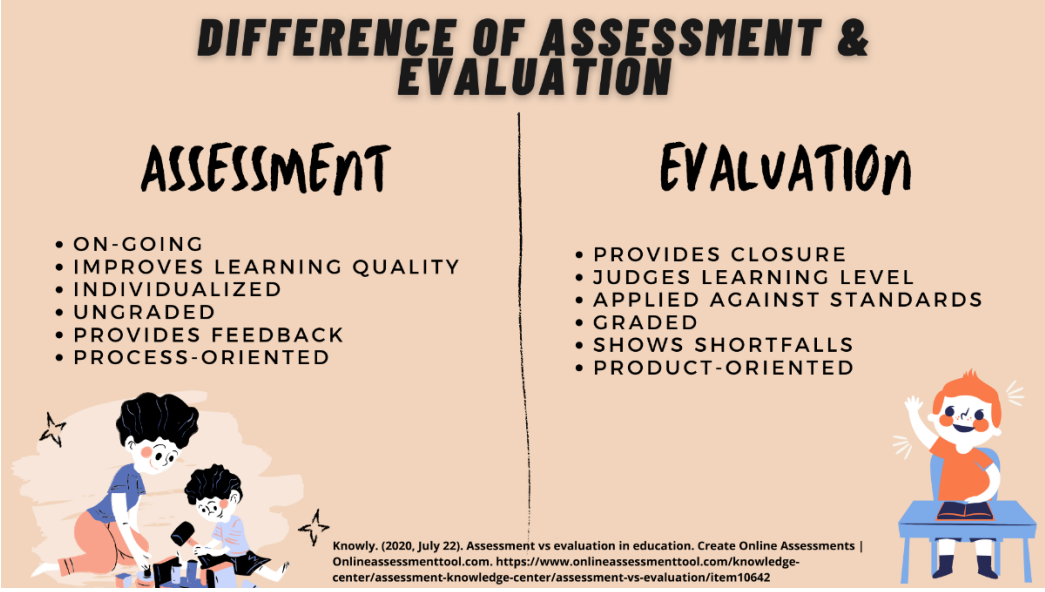

Fig. 1. Difference of Assessment and Evaluation. Source: Knowly (2020, July 22). Assessment vs evaluation in education. Create Online Assessments | Onlineassessmenttool.com.

Technical type
Text – Document – Image – Image
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 1.3. Title
Further reading for “Assessment vs evaluation"
Learning Object Description/Introduction
Further reading for “Assessment vs evaluation"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading:

If you want to read more about the philosophy and logic of assessment, and a conceptual model for assessment study the following book. You may focus on chapters 1-2, 3 and 7.

Astin, A. W. (2012). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education*. Rowman & Littlefield Publishers. You can access the book online here: Assessment for Excellence: The Philosophy and Practice of Assessment and ... - Alexander W. Astin, anthony lising antonio - Google Books

Read the following article to understand better the difference between measurement, assessment and evaluation:

Kizlik, B. (2012). Measurement, assessment, and evaluation in education. You can access the paper here: http://www.adprima.com/measurement.htm

A review of articles published between 2006 and 2013, focusing on assessment in higher education, since the introduction of the Bologna process, is the subject of the following paper.

Pereira, D., Flores, M. A., & Niklasson, L. (2016). Assessment revisited: a review of research in Assessment and Evaluation in Higher Education. *Assessment & Evaluation in Higher Education, 41*(7), 1008-1032.

Technical type

Text
– Text
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

100

Learning Object 1.4 Title

Types of Assessment Methods

Learning Object Description/Introduction

In this section we will get introduced into different assessment methods which will be further explicated in the sections that follow.

Learning resource type

Narrative Text (theory)

Learning Objective Content

Assessment is generally an important part of any educational practice and is not limited to the results of evaluations and measurements (e.g., the grades of an exam), as explicated in the previous learning object, but also includes qualitative descriptions, as well as personal assessments and judgments based on facts and observations. Assessment presupposes the determination of the expected learning outcomes and aims to determine the extent to which the

teaching objectives have been achieved. Assessment can also be used for different purposes, such as decisions about the teaching methods/ strategies applied, selection of learners, placement, or categorization of learners, for educational administration, for counselling purposes and for research purposes.

There are different types of assessment however each of which serves different purposes and needs in the learning practice and teaching. The following scheme illustrates some of those terms as representing dichotomous poles (McAlpine, 2002), in addition to other terms that exist such as initial, diagnostic assessment, authentic, portfolio-based assessment, performance-based assessment etc.

Formative	⟷	Summative
Informal	⟷	Formal
Continuous	⟷	Final

Formative and summative assessment can be further discussed into further sub-categories, including formal assessment, informal assessment, performance-based assessment, portfolio assessment, authentic assessment etc.

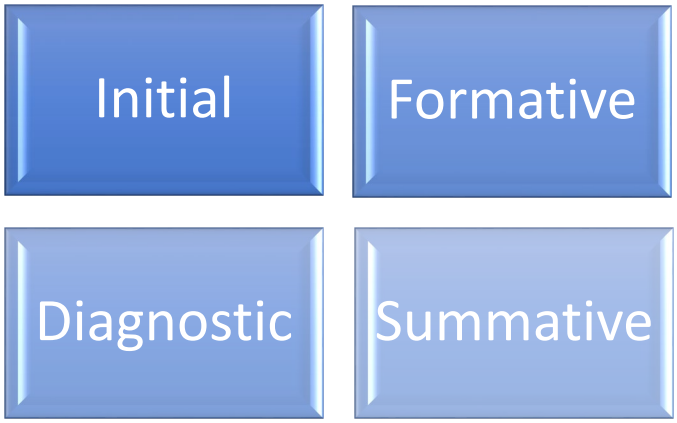

Fig. 2. Types of assessment methods

Initial assessment: aims to investigate whether students possess the knowledge and skills necessary to attend the new material, a new class etc. Initial assessment typically takes place at the beginning of a learning process, a learning unit, or an academic year, in order to investigate whether students possess the knowledge and skills necessary to attend the new material, a new class etc. Initial assessment can be conducted through:

- online or paper-based tests for measuring a learner's level of attainment to a specific skill, competence, or content knowledge (pre-tests)
- readiness tests

- aptitude tests
- observations or discussions in the class and/or during your first online meetings (or through forum channels) for getting to know your learners, their background, aims and aspirations

Diagnostic assessment: to investigate the deeper causes of student's weakness problems (learning difficulties). Diagnostic assessment also helps to identify specific learning strengths and needs. It usually takes place at the beginning of a course but also during the course when needed and when the need arises. Diagnostic assessment can be conducted through:

- the use of diagnostic assessment tools (online or paper-based)
- one-to-one conversations (learner-instructor)
- observations of learner's behaviour
- analysis of a learner's artifacts (e.g., a piece of free writing)

Formative/ Continuous assessment: aims to support students' learning by providing feedback to the learners on their work and learning progress, but also to provide feedback to the instructor on the effectiveness of his/her teaching. Thus, formative assessment results to the provision of feedback to both the student and the teacher and can contribute both to enhancing students' learning but also to improving the teacher's teaching practices, as it can serve as a form of quality control of teaching. Feedback can be provided by the instructor to the students, by students to their peers, and by the students to the instructor. As defined by Bloom (1969), the purpose of formative assessment is: "*to provide feedback and correctives at each stage in the teaching learning process"* (Bloom, 1969, p. 48). As defined by Black and Wiliam (1998), formative assessment refers to any type of assessment, conducted by the teacher or a learner and providing feedback that the learner can use to improve his/her own learning. Concluding, formative assessment aims to have an impact on learning (e.g., by guiding the adaptation of teaching strategies / accents to meet the real needs of students). The ability to collect information and data is an integral part of this process. That is way, formative assessment is data driven. It is a continuous and informal process that unfolds, while the course is in progress. Formative assessment can be conducted through:

- assessment conducted by the teachers resulting to the provision of written (quantitative and qualitative) feedback on learners' artifacts (that could be anything, such as an assignment, a presentation, a project, a report etc.)
- peer assessment resulting to peer feedback exchange form improving learners' artifacts (that could be anything, such as an assignment, a presentation, a project, a report etc.)
- self-assessment
- interactions on the fly
- open and structured classroom dialogues (e.g., a debate)

Final/ summative assessment is intended to provide a score/ grade against some standard or benchmark. Summative assessment is primarily used to make decisions for grading, passing of failing a course, for classifying students and to determine readiness for progression. It focuses on the ex-post measurement of student performance and development, and it typically occurs at the end of an educational activity or a course. In addition to the above, summative assessment is used to communicate students' abilities to external stakeholders, e.g., administrators, employers,

universities. Summative assessment is useful a form for recording learning achievements and for evaluating the impact of a teaching intervention. It happens at the end of the learning process and there is no intention (or possibility) to use this information to support learning. Summative assessment can be conducted through:

- exams, quizzes, questionnaires
- standardized tests
- students' assignments (e.g., a final project)

Other categories

Formal assessment is a data-driven assessment method of evaluating students, with well-defined grading parameters, standards, or benchmarks. Formal assessments produce results that have a significant impact on a learner's progress and can be used to making decisions such as whether a student is eligible to complete a specific course, or whether an individual is eligible to enter a programme at the university. Most formal assessments are summative in nature and thus tend to be associated with increased stress for the students. High reliability and validity of tools and instruments that are used for formal assessment are essential, due to their decision-making role and impact.

Informal assessment occurs when the instructor tests learners' knowledge using no standard criteria or well-defined grading parameters. It could also be characterized as unplanned, happening spontaneously during a course delivery (e.g., interactions-on-the-fly). Informal assessment activities are most often used to provide formative feedback to the learners. As such, it tends to be less stressful to the learners. Interactions on the fly is an example of informal assessment.

Authentic assessment is the best way to evaluate how your learners would be able to use the knowledge, the skills, and the competences that they have acquired during the course, in real life scenarios and applications. It usually includes a task for learners to perform and a rubric by which their performance on the task should be evaluated.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30 minutes

Learning Object 1.5. Title
Further reading for "Types of Assessment Methods"
Learning Object Description/Introduction
Further reading for "Types of Assessment Methods"

Learning resource type
⇒ Further reading
Learning Objective Content
Further reading Harlen, W., & James, M. (1997). Assessment and learning: differences and relationships between formative and summative assessment. Assessment in education: *Principles, policy & practice, 4*(3), 365-379. McAlpine, M. (2002). Principles of assessment. Glasgow: University of Glasgow, Robert Clark Center for Technological Education. Available at: DrJJ-Measure-assess-evaluate-ADPRIMA-n-more-17052012-with-cover-page-v2.pdf (caacentre.ac.uk)
Technical type
Text – Text – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 1.6 Title
Practical examples of different types of assessment
Learning Object Description/Introduction
In this section you will get familiarised with different assessment methods as applied in online learning environments, through practical examples, tips and best practices.
Learning resource type
Example
Learning Objective Content
Watch the following video that provides 14 top examples of different types of assessment in education. Key types of assessment methods - Initial & Diagnostic assessment (pre-course test) - Formative assessment (brainstorming, peer assessment, self-assessment etc). - Summative assessment (PARCC, midterms, final exams, unit tests, pro IECTS, etc.) - Formal assessment (standardised tests such as the SAT) - Informal assessment (classroom discussions, interactions on the fly)

- Performance-based assessment (portfolio, projects)
- Authentic assessment

Video
Teaching in Education. (2016, December 18). Assessment in Education: Top 14 Examples [Video]. YouTube. https://www.youtube.com/watch?v=zTkQjH-_97c

Technical type

Streaming media
– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

15 minutes

Learning Object 1.7. Title

Activity

Learning Object Description/Introduction

Respond to a question and discuss in the forum.

Learning resource type

⇒ Activity
– Reflective based activity

Learning Objective Content

Self-assessment, self-reflection and asynchronous discussion in the forum, answer to the single question 'To which one of the above-mentioned assessment methods are you already familiar? Provide one example from your own teaching'. Learners post their answers in the forum and can discuss upon them.

Technical type

Application
– Forum discussion

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30 minutes

Learning Unit 2 Title

Assessment Activities

Learning Object 2.1 Title
Initial and diagnostic assessment – narrative text
Learning Object Description/Introduction
In this section we will first try to differentiate between the two types of assessment, and then provide some practical examples as applied in online learning environments.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content

Reflective question: Is diagnostic assessment carried out at the beginning of a course or session, as initial assessment?

In this section we will first try to further differentiate between the two types of assessment, and then provide some practical examples as applied in online learning environments.

As already described earlier, ***initial assessment*** can help you identify your students' level of attainment in relation to specific knowledge and skills which are essential in order for them to study a new course (or teaching unit). The purpose of the initial assessment is to inform the teacher about the level of knowledge and interests of the students on which the course relies on.

Specifically, it aims to provide information in relation to:

- Whether the learners have the knowledge and the skills and competences that are required in order to attend the new course/unit.
- To which degree the learners' interests, their habits and their personal characteristics advocate into one teaching methods over another

Necessary information to answer the above-mentioned points is given by readiness tests, aptitude tests, pre-tests and various types of observations. Initial assessment is taking place at the beginning of a course or a learning unit or a session. This will allow time to deal with any issues that might arise.

If a student continues to fail with all the instrumental and teaching methods used during classroom teaching, then a more detailed diagnosis of the condition that she or he has should be made, just as diagnosis is undertaken in medicine. Formative assessment and continuous evaluation help to identify such problematic cases. ***Diagnostic assessment*** aims to investigate the deeper causes of a student's weakness and learning problems, given that those problems could not be resolved during teaching. Specific tests as well as a variety of observations are used in diagnostic assessment. Serious learning disabilities may require specialist or specialist services integrated for this purpose. Therefore, the main purpose of diagnostic evaluation is to determine the causes that inhibit learning and to establish a plan for the treatment of the causes.

There are many different types of tests that can be used for initial and diagnostic assessment. Some organizations design and use their own tests, others purchase and use widely available standardized tests.

Check for examples and more information about initial assessment here: Initial assessment | Excellence Gateway - Toolkits

Check for examples and more information about diagnostic assessment here: Diagnostic Assessment: Meaning, Examples, and Types - Harappa

Technical type

Text
– Document
– Hyperlinks

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

15

Learning Object 2.2 Title

Initial and diagnostic assessment – good practices

Learning Object Description/Introduction

Good practices for initial and diagnostic assessment

Learning resource type

⇒ Good Practice

Learning Objective Content

The manner in which you will implement test and quizzes will be according to your students' needs and your university's procedures. However, you should not overload your students with too many formal tests before they even start the course with you.

You do not always have to use tests for initial assessment, but you can rather just ask questions to your learners at the beginning of the course (or a new teaching unit) (on the fly-interactions) during a teleconferencing session. For instance, at the beginning of one of your online sessions you could ask *'does anyone have any experience of this and that?'* Students' responses could then promote a discussion to ascertain prior knowledge and understanding of specific concepts.

However, when it comes to diagnostic assessment, you are advised to consult specialist or specialist services that are available at your institution, on how to further proceed with the thorough examination and treatment of deeper learning problems that a learner might encounter.

Technical type

Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
15

Learning Object 2.3 Title
Further reading for “Initial and diagnostic assessment"
Learning Object Description/Introduction
Further reading for “Initial and diagnostic assessment"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Assessment resources including case studies and examples of free writing activities: http://sflip.excellencegateway.org.uk/sflresources/assessmentresources.aspx • Check for examples and more information about initial assessment here: Initial assessment | Excellence Gateway - Toolkits • Check for examples and more information about diagnostic assessment here: Diagnostic Assessment: Meaning, Examples, and Types - Harappa • QIA (2008): *Initial and Diagnostic Assessment: a learner centred process*. Website: Homepage | Excellence Gateway
Technical type
Text – Document – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
80

Learning Object 2.4 Title
Summative assessment – narrative text
Learning Object Description/Introduction

In this section you will better understand what summative assessment is.

Learning resource type

⇒ Narrative Text (theory)

Learning Objective Content

As already introduced in the previous sections, summative assessment occurs at the end of a learning unit, a course, or term and is most associated with final projects, standardized tests, or district benchmarks. It is designed to determine the extent of the achievement of the learning objectives and is used for grading and awarding certificates of achievement. In summative assessment, achievement tests made based on the learning and teaching objectives, evaluation of the students' work (e.g., assignments) and evaluations-judgments of the teacher on the whole performance of the student are used. Although the main purpose of summative assessment is to grade students and award a certificate, it also provides information about the suitability of the course objectives and the effectiveness of teaching. High reliability and validity of the tests that you administer for summative assessment purposes are important.

The results of a measuring instrument (in this case a summative assessment test) are reliable if in repeated measurements of a specific characteristic of the learners, and under the same conditions, they give the same results. Reliability is the stability of the results and the degree of confidence we can have in the fact that the results of a test reflect the real ability of the students.

Ways to measure the degree of reliability of results include:

- Re-administration method of the same test for the calculation of the Pearson's r correlation coefficient
- Alternate form reliability method that is the administration of equivalent tests that measure the same characteristics, and then the calculation of the Pearson's r correlation coefficient
- Internal consistency reliability method, with the calculation of the Kuder Richardson Formula or Coefficient alpha (the latter is the most commonly used index)

Interrater reliability

For open-ended questions, where there is more than one judge or grader, the credibility of the judges must also be taken into account. To calculate interrater reliability, the different judges score the same questions separately and the scores are correlated with each other. In this way control is exercised to avoid cases where some judges are lenient while others are stricter. Cohen's Kappa coefficient is calculated for measuring interrater reliability.

Validity refers to the degree of achievement of the purpose for which the measuring instrument (e.g., a test) was made. That is, if a test actually measures what we want it to measure. A measuring instrument has a high degree of validity when it measures the actual differences of individuals in the characteristic for which it is constructed. A condition for validity is reliability.

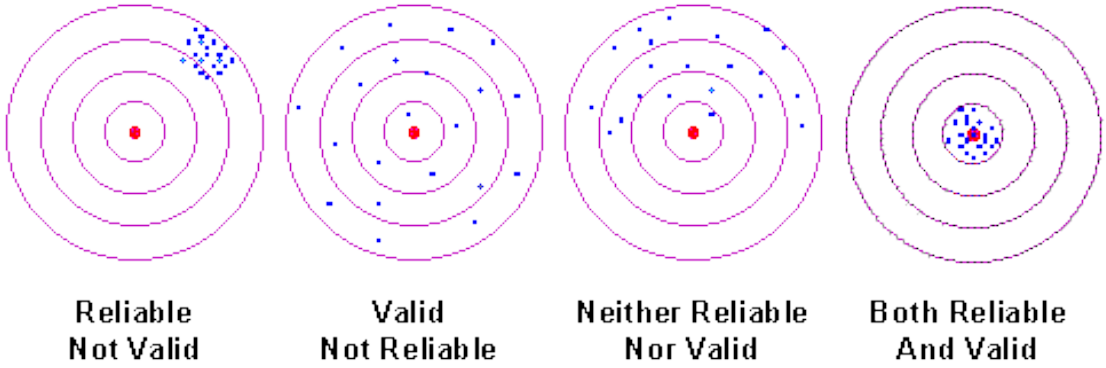

Fig. 3. Validity and reliability

How to invigilate exams in online learning environments?

Final exams taking place in Learning Management Systems (LMS) and online platforms can be e-invigilated and monitored by software for remote electronic surveillance (e.g., Proctorio). You should consult your institutions about the rules and policies that apply in terms of how the exams can be invigilated in the online learning environment that you are using.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
10

Learning Object 2.5 Title
Summative assessment – examples
Learning Object Description/Introduction
In this section you can study summative assessment examples.
Learning resource type
⇒ Examples
Learning Objective Content

Examples of summative assessment include:

- Final exams (that you can create yourself according to the learning objectives of your course/module/unit)
- Student assignments (e.g., final projects, portfolios)
- Achievement tests, e.g., SAT

- Standardized tests, e.g., PISA test

Follow the hyperlinks given about and find out more about SAT and PISA tests.

Most LMS (e.g., Moodle, Backboard) have features that allow the creation of tests and quizzes, that can be used for summative assessment purposes, for evaluating students' understanding of material, at the end of a learning unit/ a session/ or the entire course. A wide range of questions can be created and administered within a specific layout and order, while the provisions of different kinds of feedback is possible based on how a student performs on the quiz (e.g., numeric feedback/ score, qualitative feedback).

You can check in the link provided below different quiz question types that are available in Moodle: Quiz Question Types in Moodle | UMass Amherst Information Technology | UMass Amherst

Technical type
Text – Hyperlinks
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.6 Title
Summative assessment – limitations and good practices
Learning Object Description/Introduction
Good practices to consider while implementing summative assessment.
Learning resource type
⇒ Good Practices
Learning Objective Content

There are some perceived disadvantages of summative assessment, that you may wish to encounter. Summative assessment may:

- Not accurately reflect learning (all dimensions, including the cognitive, behavioural, and psychomotor)
- Impose extra stress and anxiety to your learners
- Result in a lack for motivation for the learners
- Be inauthentic
- Biased grading (applied in open questions tests)
- For tests/quizzes, it may lack reliability and validity if you have created the test and you are not familiar with the creation of fair tests/quizzes.

While you cannot avoid some disadvantages of summative assessment, you can still follow tips and strategies that can accommodate your students' learning styles and at the same time overcome some of the barriers that summative assessment has.

- First, safeguard that your tests demonstrate high validity and reliability
- Design clear questions that really measure in a valid manner the expected learning outcomes. Use the type of language and terminology used during your lectures and your course content in general. This will help keep your summative assessment tests aligned with the material you have covered.
- In order to provide unbiased grades and feedback to your students, try blind grading, especially when grading open-ended questions.
- Explore the possibilities that technology offer to make the assessment implementation more engaging and fun. For instance, gamified quizzes, interaction with chatbots, etc. can work towards this end (check below Learning Object 3.6, Kahoot is a game-based assessment tool).
- Try to make the assessment authentic, by connecting it with real-world situations. Also, when developing test questions, use culturally relevant and industry-relevant (especially for management education) word problems to illustrate a subject's true relevance and application to the real world.

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Object 2.7. Title

Further reading for "Summative assessment"

Learning Object Description/Introduction

Further reading for "Summative assessment"

Learning resource type

⇒ Further reading

Learning Objective Content

Further reading

- Find out more about achievement tests: The Purpose of Achievement Tests (verywellmind.com)
- Find out more about standardized tests: EXPLAINED: What Are Standardized Tests and Why Do We Need Them? (edpost.com)

• Find out more about reliability and validity: Reliability and Validity (uni.edu)
Technical type
Text – Hyperlinks
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.8. Title
Formative assessment – narrative text
Learning Object Description/Introduction
In this section you will better understand what formative assessment is.
Learning resource type
⇒ Narrative Text (theory)
Learning Objective Content
The application of formative assessment activities has received great attention the past few years, especially in online environments, given the nature of online learning environments that lack physical presence, immediate response and interaction among the learners and the teacher. Formative assessment may include various types of activities; an indicative list of such activities is given below: ▪ Quizzes ▪ Flashcards ▪ Student self-evaluation ▪ Peer assessment ▪ Interactions-on-the fly (during classroom discussions in online meetings) ▪ Brainstorming ▪ Concept mapping (using digital online tools) ▪ Sticky note response to question on board (online tools are available as well for this activity) ▪ Mastery checklist of concepts/standards from previous grade ▪ Presentations of students work ▪ Classroom structured dialogues (e.g., debates) Formative assessment allows teachers to continuously collect data on student learning and then adjust instruction when need and offer appropriate support to the students. In online learning

environments, formative assessment is essential both for the students to understand their learning progress and for the teacher so as to monitor student learning and identify students who may need additional support. It is recommended that teachers administer at least three formative assessment activities throughout the academic semester, if not on a weekly basis.

In the sections that follows you will find some more details about four particular formative assessment activities:

- Peer assessment
- Interaction on the fly
- Written feedback
- Open and structured classroom dialogues, e.g., debates

Self and Peer assessment

Self- and peer-assessment describes formative assessment which is conducted by the learner him/herself or by student peers. In both self-and peer-assessment, it is of central importance that the goal of a task and the assessment criteria are understood well by the students (Sadler, 1989; Black et al., 2003). Peer assessment has been conceptualized as the active involvement of the students in the assessment process, with the provision of written and/or oral feedback to peers, based on specific assessment criteria. Peer-feedback is seen as particularly powerful since "students may accept criticisms of their work from one another that they would not take seriously if the remarks were offered by a teacher. Peer work is also valuable because the interchange will be in language that students themselves naturally use […]" (Black et al., 2004, p. 14). Research results have shown that students benefit from the peer assessment method, not only because of receiving feedback from peers but also because of the experience of adopting the role of the assessor (Tsivitanidou, et al., 2018).

There are multiple ways to implement peer assessment in an online learning environment. Some of those are listed below:

- Use forums and ask your students to discuss a given question and provide feedback to each other on their given answers
- Ask your students to assess the work of other students (it could be a presentation, an assignment, a report etc.) either individually or in groups. Define the pairs of assessors and assesses in advance. Students may either present their work to the rest of the class via teleconferencing and received feedback from them either orally or in written. Alternatively, you can use features provided by an LMS that you are using, for allowing students to exchange their work and provide written feedback to each other. Read more about LMS in module 4.
- Use other digital tools which are available on the web for implementing peer assessment in your class. One of those is peer grade (Peergrade - engaging student peer review), an online tool that allows you to implement very easily online peer assessment in your class.

Table 2. Requirements, advantages, and disadvantages of peer assessment

Requirements	Advantages	Disadvantages
Assessment criteria provision.	Students' greater awareness of their potential (contributes to	Time consuming for the teacher

	the development of self-assessment skills)	
Students need to undertake the role of the assessor and the assessee.	Possibility of self-regulation of their learning	Students may not trust their classmates' feedback
Mentoring and training students for peer assessment	Improvement of communication and collaboration skills Active student involvement	

Interactions on-the-fly

It is a non-formal formative evaluation of learners. This type of assessment can not be planned in advance but takes place spontaneously when the teacher recognizes good opportunities for feedback. On-the-fly formative assessment arises when a "teachable moment" unexpectedly occurs. This assessment occurs spontaneously during a session (Ruiz-Primo & Furtak, 2007), that could be also an online session as part of online teaching and learning. The following cycle illustrates typically steps that take place during on-the-fly discussions.

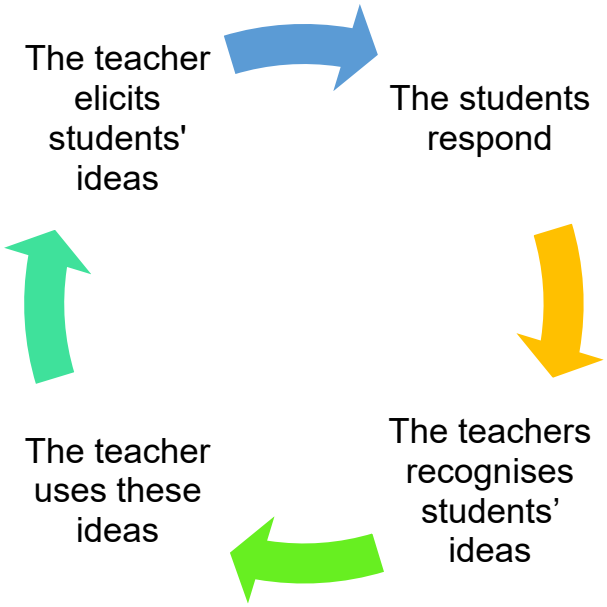

Table 3. Requirements, advantages, and disadvantages of interactions on-the-fly

Requirements	Advantages	Disadvantages
Good background knowledge of the instructor in the subject	Immediate response to the needs of students	Possible difficulty handling issues that may arise
Good communication skills for the instructor	Student' active involvement	
Flexibility in the session		

Written feedback

This includes the evaluation and provision of written feedback on the work of the learners. Unlike the above method, this method is not performed spontaneously but in programmed situations. It includes the collection and utilization of data through the provision of written comments by the teacher (or peers), which reflect the quality of the specific assessed work. At the same time, what needs to be done next is pointed out in an informed way, in order to improve the parameters of the learning environment. Written feedback may result to:

- Adaptation of the teaching practice and the accents of the teaching in order to address more effectively the needs of the learners.
- Identify weaknesses in learners' comprehension and identify points for focusing effort.

Characteristics of written feedback

Interaction with the learner

- Teacher feedback and student feedback as part of the written feedback cycle

Personalization

- Depending on the level of understanding of the student, the teacher
- Provides personalized feedback according to the needs of the learner
- Suggests the next step that each student can take

Reflection

- Students study the received comments and provide answers and improvements

Timing

- Time consuming process (teacher): The process of written feedback requires a lot of time.
- Response time (student): The teacher gives students specific time to respond to their comments.

Written feedback in online learning environments

All LMS support the provision of written feedback to assignments or artifacts in general that the students submit in the platform. Written feedback, in the form of qualitative comments, can be either provided while grading and providing a score, or directly to the document/artefact being assessed via Turnitin. Interestingly, feedback via such online platforms can be provided not only in the form of text, but also in audio or video formats. Watch the following video to get a glimpse on how this can be done.

Kaceli TechTraining. (2019, April 04). Grading Papers and Providing Feedback via Audio or Video in Moodle [Video]. YouTube. https://www.youtube.com/watch?v=m-DpAyFGJjg

Open and structured classroom dialogues

Dialogue or discussion between teacher and student or between students, governed by specific rules and criteria that shape the context in which dialogue will take place (examples: Socratic dialogues, debate …).

Both open and structured classrooms discussions can be initiated with the provision of authentic questions provided by the instructor (Stewart et al., 1995; Black et al., 2003). As the students start to respond and a classroom discussion takes places, the instructor can get insights into students' understanding of specific concepts. Before initiating such discussions, it is important to establish common rules of communication that everyone has to follow (Stewart et al., 1995; Black et al., 2004).

Varieties of structured dialogues (non-exhaustive list)

- Socratic dialogues (Polite & Adams, 1997; Pihlgren, 2007)
- Teacher-Student Assessment Dialogue
- Debates

Table 4. Requirements, advantages, and disadvantages of structured dialogues

Requirements	Advantages	Disadvantages
Authentic questions for reflection that stimulate dialogue.	The teacher can observe students' behavior and collect data for formative assessment purposes	Time consuming
Formulation of specific rules and criteria.	Provision of feedback by students with the use of a rubric.	If good organization is missing, structured dialogues might become chaotic in online learning environments
Students should be aware of the process.	Enhancement of communication and collaboration skills	
Formulation of supportive questions by the teacher.	Active student involvement	
Availability of time for students to respond to feedback.	Deepening understanding	

Technical type

Text
– Document
Streaming media
– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.9. Title
Further reading for “Formative assessment"
Learning Object Description/Introduction
Further reading for “Formative assessment".
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading • Bennett, R. E. (2011). Formative assessment: A critical review. *Assessment in education: principles, policy & practice, 18*(1), 5-25. • Black, P., Harrison, C., & Lee, C. (2003). *Assessment for learning: Putting it into practice*. McGraw-Hill Education (UK). • Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2004). Working inside the black box: Assessment for learning in the classroom. *Phi delta kappan*, *86*(1), 8-21. • Pihlgren A. (2007). The Features of Socratic Seminar. Linkoping University Electronic press, 159–165. • Polite, V. C., & Adams, A. H. (1997). Critical thinking and values clarification through Socratic seminars. *Urban Education*, 32, 256–278. • Ruiz-Primo, M. A., & Furtak, E. M. (2007). Exploring teachers' informal formative assessment practices and students' understanding in the context of scientific inquiry. *Journal of research in science teaching*, *44*(1), 57-84. • Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional science*, *18*(2), 119-144. • Stewart, J., Milt Th., (1995). "Dialogic Listening: Sculpting Mutual Meanings," in *Bridges Not Walls*, ed. John Stewart, 6th edition, New York: McGraw- Hill, 184-201. • Thum, Y.M., Tarasawa, B., Hegedus, A., Yun, X., Bowe, B. (2015). Keep learning on Track. A Case-study of Formative Assessment Practice and its Impact on Learning in Meridian School District. https://files.eric.ed.gov/fulltext/ED567844.pdf (accessed January 17, 2022). • Tsivitanidou, O. E., Constantinou, C. P., Labudde, P., Rönnebeck, S., & Ropohl, M. (2018). Reciprocal peer assessment as a learning tool for secondary school students in modeling-based learning. *European Journal of Psychology of Education, 33*(1), 51-73.
Technical type
Text – Document – Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Object 2.10. Title
Authentic assessment – narrative text
Learning Object Description/Introduction
In this section you will better understand what authentic assessment is.
Learning resource type
⇒ Narrative Text (theory) ⇒ Good Practice
Learning Objective Content
Authentic evaluation requires higher order thinking skills (presupposes the use of critical and innovative thinking to solve open problems) and must be: - realistic (includes real-world activities, scenarios, situations and problems) - applicable (need to deal with the subject matter instead of copying the knowledge taught in the class) - transparent (there is information from the beginning about the context in which the evaluation, the audience to which it will respond, and the criteria for their successful performance) - interdisciplinary (challenges the learners to use interdisciplinary knowledge and various skills to complete their work) - formative (allows practice, source study, and feedback exchange)

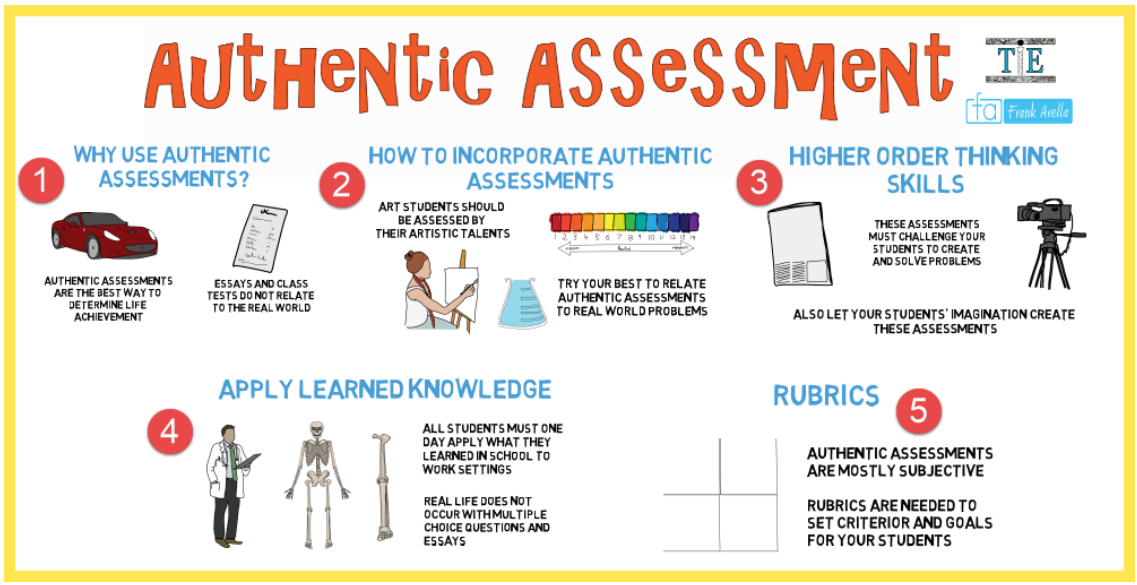

Fig. 4. Key elements of the authentic assessment

FILM, VIDEO

TIVOLA DRAKE. (2017, October 12). Authentic Assessment Video [Video]. YouTube. https://www.youtube.com/watch?v=b-85QM_DYBY

Technical type
Text – Document Image – Image Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 2.11. Title
Authentic assessment – examples
Learning Object Description/Introduction
In this section you will study examples and available toolkits for authentic assessments.
Learning resource type
⇒ Examples

Learning Objective Content
Authentic assessment toolbox: Authentic Assessment Toolbox Home Page (noctrl.edu)
Technical type
Text – Hypertext
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.12. Title
Further reading for “Authentic assessment"
Learning Object Description/Introduction
Further reading for “Authentic assessment"
Learning resource type
⇒ Further reading
Learning Objective Content
Further reading: • Green, J. (1998). Authentic assessment: Constructing the way forward for all students. *Education Canada, 38*(3), 8-12. • Darling-Hammond, L., & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and teacher education*, *16*(5-6), 523-545.
Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
40

Learning Object 2.13. Title
An interactive presentation for “Assessment activities”

Learning Object Description/Introduction
A summary of learning unit 2 “Assessment activities” through an interactive presentation.
Learning resource type
– H5P Content
Learning Objective Content
[to be developed in IO4]
Technical type
Application – H5P Interactive Presentation
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Object 2.14 Title
Scenario-based activity case study
Learning Object Description/Introduction
You are provided with a specific scenario – case of a class, for which you are asked to design an assessment activity after having chosen the appropriate assessment method.
Learning resource type
⇒ Activity – Scenario-based activity case study – Self-assessment
Learning Objective Content
You are having a class of freshmen, teaching “Introduction to Management” on the specific topic “Defining Management” and you need to check your students’ prior knowledge for the key concepts of the course. What type of assessment method will you choose? Design an assessment activity that fits the scenario. Provide information about the specific learning objectives of a unit that you will choose. Describe the main characteristics of your students. Then, submit your work as an assignment in the platform. Use **the rubric** provided to assess your own assignment at the end. Rubric.

	1: not completely satisfied, 4: satisfied	**Justify your score**

Assessment Criteria	1	2	3	4	Written feedback
The assessment method is appropriate					
The assessment activity is addressing the learning objectives					
The application of the assessment activity is clear					
The assessment activity is appropriate for the target group					

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Unit 3 Title

Online assessment tools and processes

Learning Object 3.1. Title

Introduction to online assessment tools and processes

Learning Object Description/Introduction

In this section you will be introduced to assessment tools and processes. Specific examples and activities with online assessment tools follow in the next sections.

Learning resource type

⇒ Narrative Text

Learning Objective Content

Instructors may be more familiar with tools and processes that include assessment of student progress in the physical classroom, such as, paper tests, quizzes, and classroom discussions. However, online assessment tools nowadays provide numerous possibilities for teachers to provide the same level of feedback for targeted online learning, while most of them are user friendly and easy to use.

LMS (e.g., Moodle, Blackboard, ATutor) offer a variety of possibilities and features that can be used for conducting online assessment activities. Apart from those, there are additional outsource online tools, that you can use, independently of the LMS or platform that your institutions is

offering for use, such as Socrative, Google Forms, and Kahoot. Those tools can be used for the creation of quizzes most preferably for formative assessment purposes. They also allow flexibility for written questions, video chat, and spot-questions, while providing features such as instant grading, graphs, spreadsheet results delivery, and quick, automatic grade-sharing with students.

In the sections that follow you can get a better understanding of online tools that can be used for online assessment in your course(s).

Technical type

Text
– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

10

Learning Object 3.2. Title

Assessment tools in LMS

Learning Object Description/Introduction

In this section you will be introduced to assessment tools and process that are available in LMS.

Learning resource type

⇒ Narrative text

Learning Objective Content

Learning Management Systems offer numerous tools and activities that you can use and incorporate respectively in your courses, many of those serving assessment purposes as well. Depending on the LMS that your institution is supporting (e.g., Moodle, Blackboard), you may have to devote some time to explore those features. In this learning object you will be introduced to an indicative (non-exhausting) list of such features and activities provided in Moodle is given below, along with suggestions on how and when to use those activities for assessment purposes (check Table 5).

Table 5. Online tools and activities in Moodle and examples of their use for assessment

Tool/Feature/Activity	Example of use	Learn more
Discussion forum	This feature allows the conduction of forum discussions among the course participants. It can be used for: - Fostering collaboration among students	Forum activity - MoodleDocs

		- Deepen understanding - The provision of direct feedback from either the students or the teacher, serving formative assessment (debates, peer assessment, written feedback)		
	Chat	The chat tool allows the synchronous communication among course participants. The chat tool can be used for: - Ideas and experience exchange, as part of discussions - Discussions on specific concepts/ topics - Can be used for formative assessment, in a more informal way (e.g., provision of feedback to students that was not planned). You can create several chat conversations within the same course. There is also a possibility of rating/ grading the messages exchanged via the chat tool.	Chat activity - MoodleDocs	
	Assignment	The assignments allow the instructor to define	Assignment activity - MoodleDocs	

		an activity that requires from students to prepare digital content (of any form) and submit it to the relevant field to be defined by the instructor through the course platform. Common assignments include: bibliographic reviews, essays, reports, exercises, etc. This activity can be used: - For summative assessment at the end of the course or a learning unit, for the provision of a grade. - Has the potential for feedback provisions (qualitative comments) from the teacher, and can be used for formative assessment purposes as well.		
	Wiki	Wiki is a tool that allows the collective creation of webpages. It is essentially a website that allows the user to add or edit data. Participants (the students and the instructor) can import files, make corrections, and generally work together to create pages. The students can	Wiki activity - MoodleDocs	

		edit existing material and add new ones. Al the participants can track the editing history of a page. If groups are defined in the lesson, there should be the corresponding number of wikis. Wikis can be used for: - Fostering collaboration in the class - For formative assessment and the provision of feedback by the teacher (written feedback) but also by the students (peer feedback).		
	Quiz	You can create short quizzes using a variety of different types of questions, such as, multiple choice questions, dichotomous questions (true/false), short answer questions, etc. A quiz can be used for assessing students' learning progress and it can be used repetitively at the end of each learning unit with the possibility of automatic grading and multiple submission (depends on the settings chosen by the teacher). The questions (created by the teacher) are stored in a database from which they can be retrieved and reused.	Quiz activity - MoodleDocs	

H5P	H5P has already been introduced in Module 3. H5P is a tool that allows the creation of rich interactive content, such as interactive videos and presentations. H5P can be used for supporting instructional models such as the flipped classroom approach and blended learning. H5P can be used in the class for formative assessment purposes.	H5P activity - MoodleDocs H5P – Create and Share Rich HTML5 Content and Applications

To add these activities (and many more) in your course, you need to be first in an "edit mode" and then, click on the option "add an activity or resource" (see figure 5). Several options that are available in your LMS will appear in a new window (see figure 6). Click on the activity or resource that you wish to add in your course. The links provided in Table 5 provide further information on how to use the specific tools/ activities presented above.

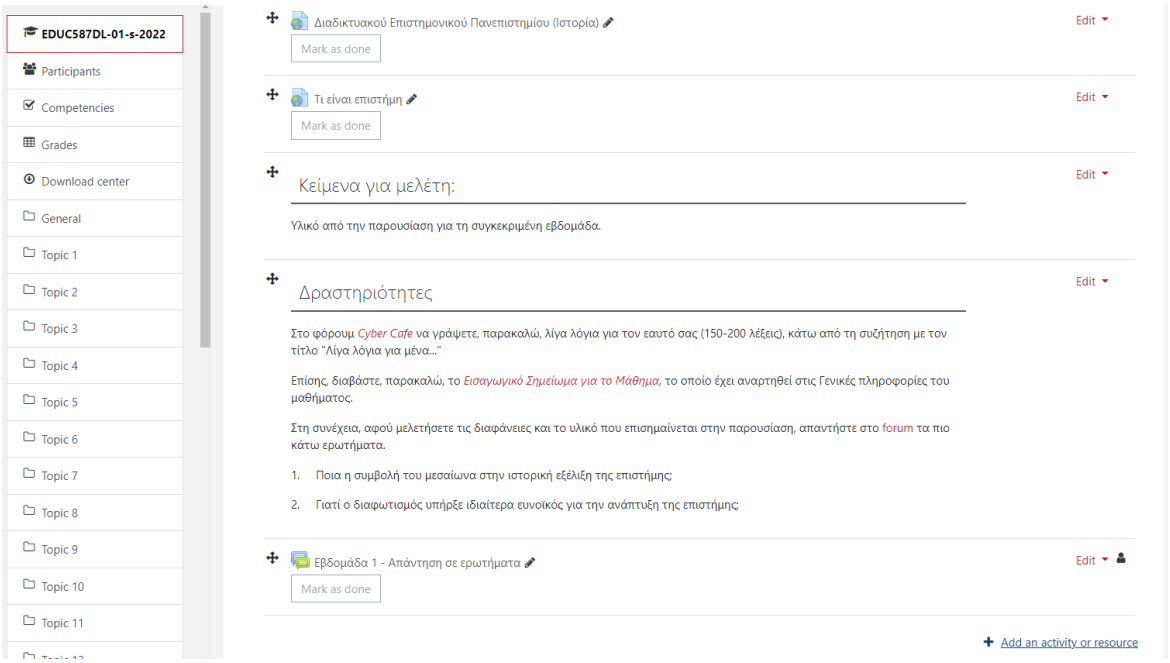

Fig. 5. Add an activity or resource – example in Moodle

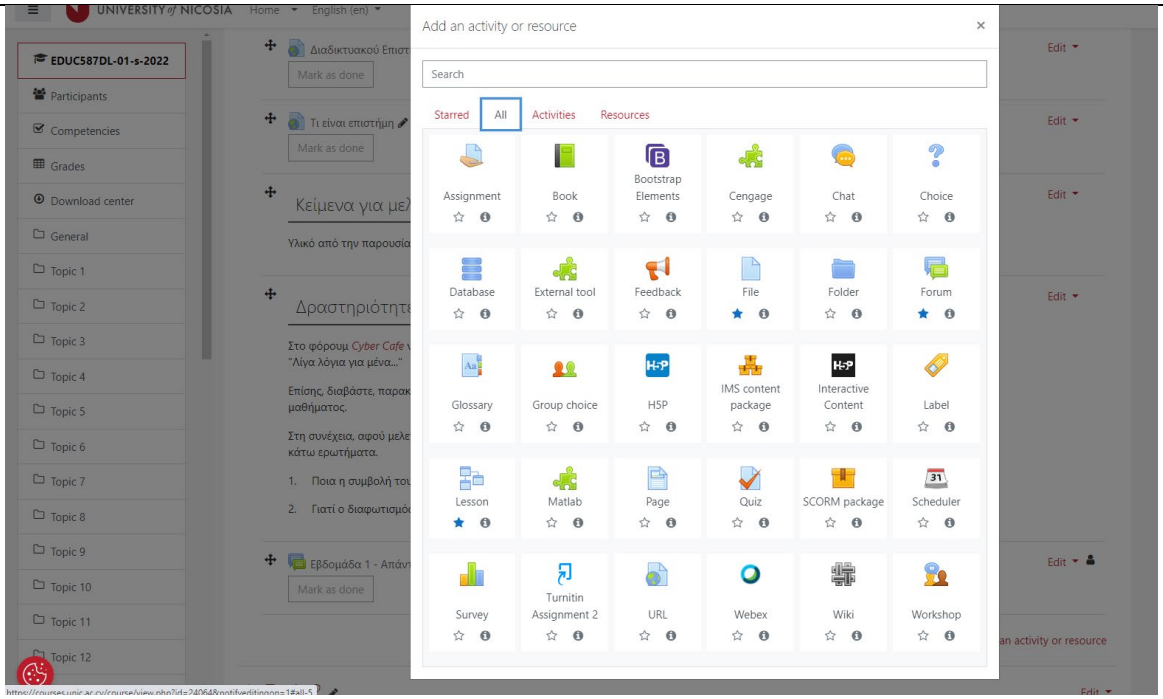

Fig. 6. Select an activity or resource – example in Moodle

Technical type
Text – Document – Hypertext Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 3.3. Title
Socrative - quizzes and questions with real-time grading
Learning Object Description/Introduction
In this section you will be introduced to Socrative, one of the top-rated online assessment tools
Learning resource type
⇒ Demonstration (video)
Learning Objective Content
Socrative is a standalone interactive digital tool that allows you to design and deliver your own quizzes, grade your students, and assess on-the-fly. Thus, it can be used for conducting:

- initial assessment (at the beginning of your course), for assessing your students' prior knowledge in a specific topic
- formative assessment (during the course), for assessing your students' understanding of certain concepts, topics etc.

Data such as students' responses to your questions, as well as class counts to see who is logged in, can be retrieved from the teachers' account dashboard.

The website for accessing the tool: https://www.socrative.com/

Watch the following video that explains the main features of Socrative.

Socrative. (2022). Socrative and Socrative Pro Overview [Video]. YouTube. https://www.socrative.com/#play-video

Technical type

Text
– Document
– Hypertext
Streaming media
– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Object 3.4. Title

Activity - build your own quiz on Socrative

Learning Object Description/Introduction

In this activity you will practice the use of Socrative, by creating your own quiz. You can choose a specific topic from your courses and a specific cohort of students, with whom you will test the quiz.

First, download the app from the following website: https://www.socrative.com/ and create your own teacher account.

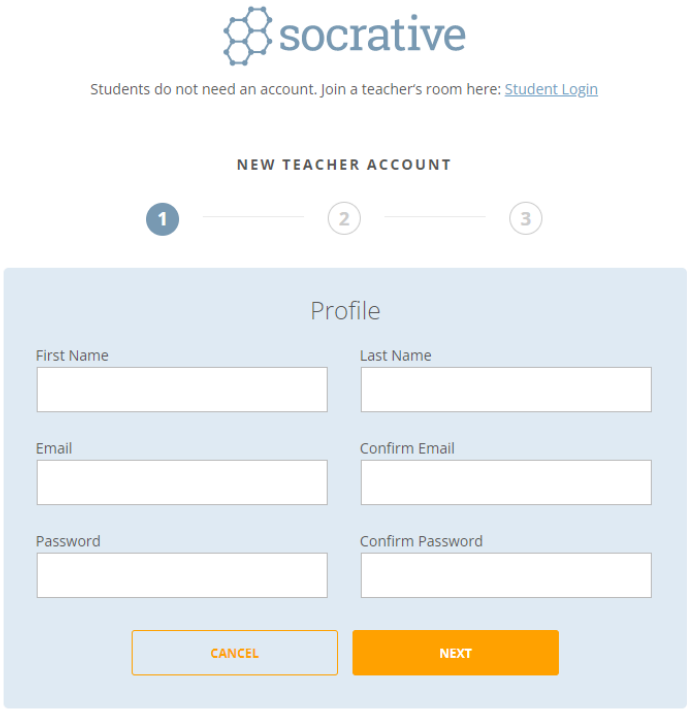

Fig. 7. Creating an account in Socrative

Tip: you can sign up for free, provided specific features that you can use.

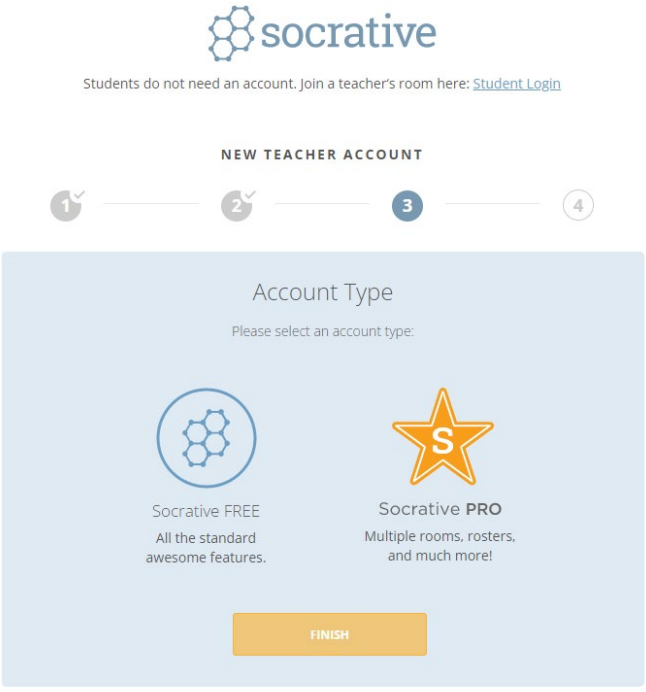

Fig. 8. Choose an account type

To create a new quiz in Socrative, go to **Quizzes** in the top menu, then click **Add** on the right.

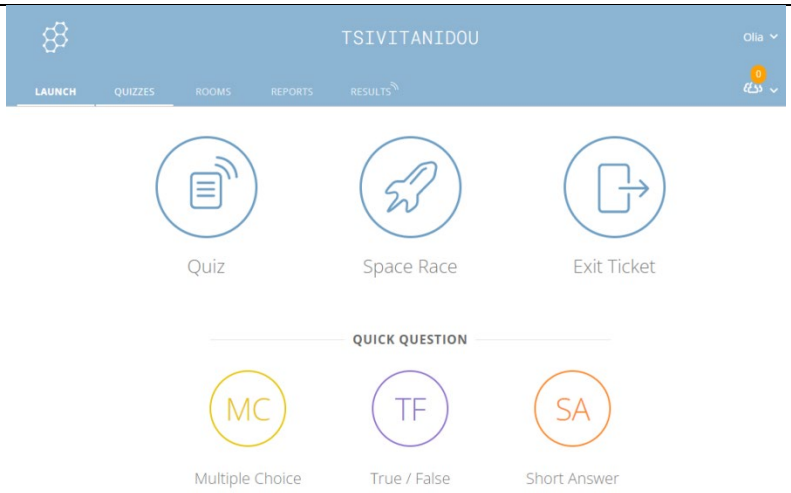

Fig. 9. Available features

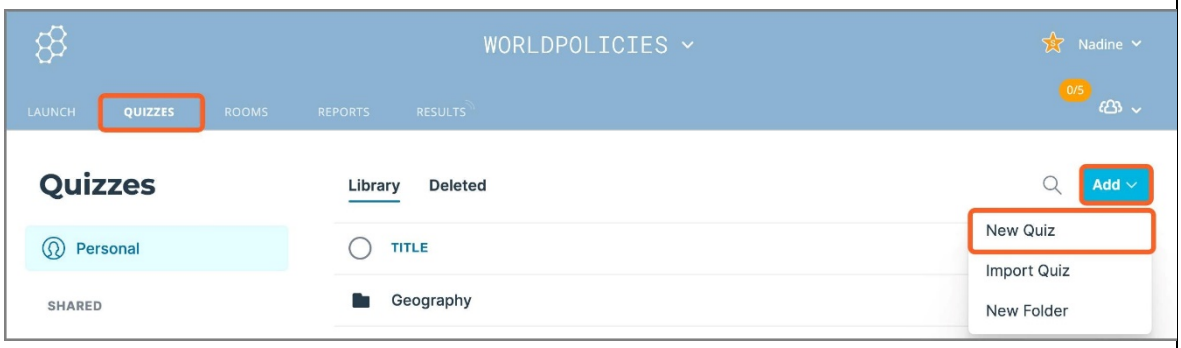

Fig. 10. Creating a new quiz. Source: https://www.socrative.com/

You can then enter a name for the quiz and start adding questions.

Note: You can have up to 5 quizzes in your quiz list at one time. Upgrade to Pro for unlimited quiz creation!

Create your quiz by following the detailed instructions which are provided here: Create A New Quiz | Socrative Support

Once you finish with the quiz, test it with your students. Then, share your thoughts about the usefulness of the tool and your overall experience in the forum.

Learning resource type

⇒ Activity
- Activity for practice
- Forum (discussion)

Technical type

Application
- Interactive Software
- Forum

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
90

Learning Object 3.5. Title
Google forms
Learning Object Description/Introduction
In this section you will be introduced to Google forms, and how they can be used for online assessment.
Learning resource type
⇒ Guidelines ⇒ Demonstration
Learning Objective Content
Google forms is an open access online tools that can be used by anyone (having a Gmail account). Google forms can be used by instructors and students, for the creation, delivery, and completion of quizzes. It allows you to create multiple-choice quizzes or short answer quizzes and make an easy answer key with point assignments for each question. Google makes it easy for students to answer questions by clicking a drop-down, typing a fast text answer etc. Teachers can view graphs and summaries of students' responses, but also individual responses per student. Watch the following video that provides an indicative example on how to create a Google Doc.   FILM, VIDEO Google help (2013, January 30). A tour of Google Forms [Video]. YouTube. https://www.youtube.com/watch?v=xEY10Ub-k-U
Technical type
Text – Document – Hypertext Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 3.6. Title

Activity - build your own quiz on Google Forms
Learning Object Description/Introduction
In this activity you will practice the use of Google forms, by creating your own quiz. You can choose a specific topic from your courses and a specific cohort of students, with whom you will test the quiz. Create your quiz by following the detailed instructions which are provided here: Create and mark quizzes with Google Forms - Docs Editors Help Once you finish with the quiz, test it with your students. Then, share your thoughts about the usefulness of the tool and your overall experience in the forum.
Learning resource type
⇒ Activity – Activity for practice – Forum (discussion)
Technical type
Application – Interactive Software – Forum
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
90

Learning Object 3.7. Title
Kahoot - game-based assessment tool
Learning Object Description/Introduction
In this section you will be introduced to Kahoot, and how it can be used for game-based assessment.
Learning resource type
⇒ Guidelines ⇒ Demonstration
Learning Objective Content
Kahoot is an online tool that follows a game-based approach to learning and assessment. It allows you to either choose among readymade games/quizzes for using them in your class or create your own games/quizzes (your own “kahoots”) in an easy and user-friendly way. Different types of questions can be used such as multiple choice or true/false questions; questions can be also directly retrieved from a spreadsheet. The games are timed and scored, with point scales set up

by the teacher. Kahoot can be used for formative assessment and initial assessment purposes as well.

More information: https://kahoot.com/

Watch the following video that explains what Kahoot is.

FILM, VIDEO

Kahoot! (2018, September 27). What is Kahoot!? [Video]. YouTube. https://www.youtube.com/watch?v=7XzfWHdDS9Q

Technical type

Text
– Document
– Hypertext
Streaming media
– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Object 3.8. Title

Activity - build your own game-based quiz in Kahoot

Learning Object Description/Introduction

In this activity you will practice the use of Kahoot, by creating your own game-based quiz. You can choose a specific topic from your courses and a specific cohort of students, with whom you will test the quiz.

You first need to sign up, following the link: https://kahoot.com/ then click on **sign up** on the top right of your screen. Select the teacher account. Describe then your workplace (e.g., choose Higher Education).

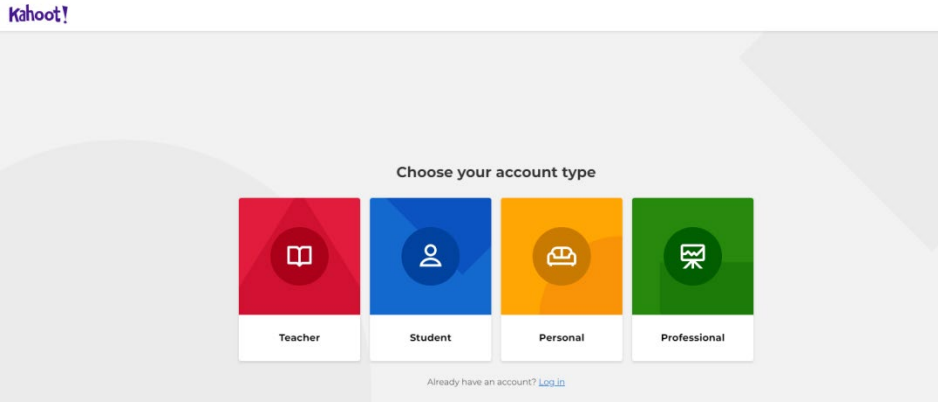

Fig. 11. Creating an account in Kahoot

Then, click on **create a new Kahoot** and choose a template that better suits you.

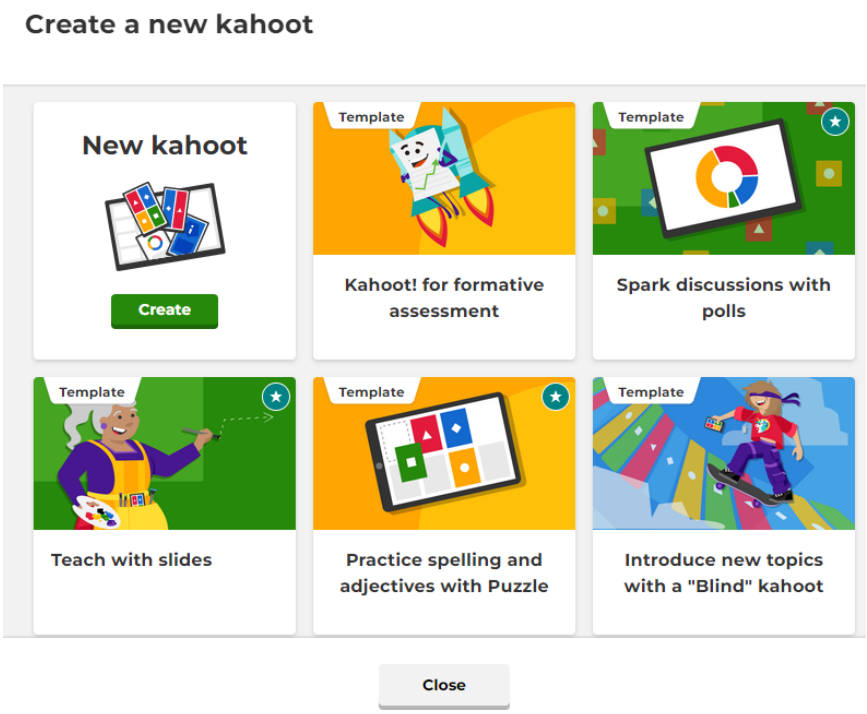

Fig. 12. Creating a new Kahoot – choose a template

For instance, if you choose the second option, **Kahoot! For formative assessment,** you can start building your quiz by specifying the question type, the time limit, the points to be assigned to each correct answer, the answer options and image reveal. You may start adding questions for creating your first gamed-based quiz.

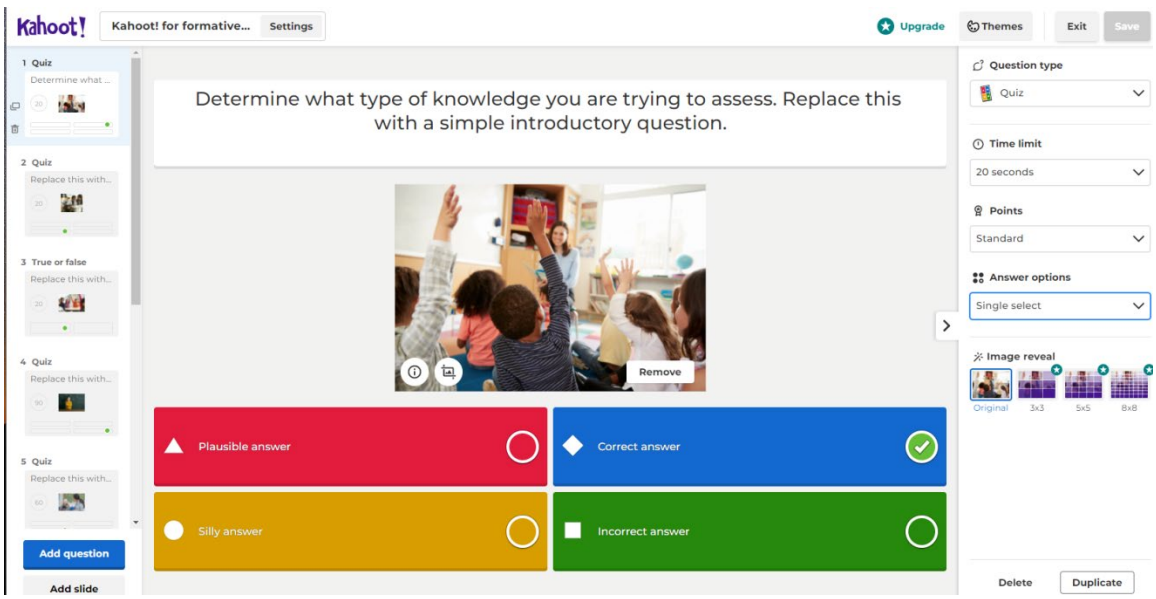

Fig. 13. Creating a quiz.

Create your quiz by following the detailed instructions which are provided here: Getting started with Kahoot! - user guide

Once you finish with the quiz, test it with your students. Then, share your thoughts about the usefulness of the tool and your overall experience in the forum.

Learning resource type

⇒ Activity
- Activity for practice
- Forum (discussion)

Technical type

Application
– Interactive Software
– Forum

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

90

Learning Object 3.9 Title

Scenario-based activity case study

Learning Object Description/Introduction

You are provided with a specific scenario – case of a collaborative activity, for which you are asked to design an assessment activity, choosing the most appropriate online tools and methods/activities.

Learning resource type

⇒ Activity
- Scenario-based activity case study
- Self-assessment

Learning Objective Content

In module 1, learning object 3.6, you were introduced to a Practical activity for collaborative online teaching in the field of Management Education.

The activity description is given again below:

Assume that your next lesson is about the strategic implications of Corporate Social Responsibility in modern businesses, which you intend to teach to your students online.

- What collaborative activity would you include in this teaching content?

- Justify your option by describing in brief why and how the proposed collaborative activity is expected to enhance your students' online learning process.

Indicative response could be:

"Proposed collaborative activity and justification:

As an instructor in the Management field, I would create small groups of students (3-4 individuals) and assign tasks to them about identifying major thematic categories of Corporate Social Responsibility (CSR), which modern businesses can consider when developing a strategic CSR plan. For instance, a group will focus on the environmental aspect, another group on the social aspect regarding human rights, another on health and safety, another on the marketplace and workplace, etc. After finishing their work in small groups, students could present to each other their perspective (delegates may occur for each group) and make proposals for including their work within a main strategic CSR plan according to the impact that this will have for a business. To do so, all small groups can work together and finalize the strategic CSR plan.

This collaboration activity is anticipated to make online learning more attractive for students. They are expected to engage more, since it involves critical thinking about current issues, negotiating, socializing in small groups, and the chance to make a presentation for a subject that they will study and be confident to explain to their peers."

If you have already completed this activity, you are now asked to think about how you intend to assess your students' knowledge, skills, and competences on the topic about the strategic implications of Corporate Social Responsibility in modern businesses. In this activity you are asked to:

- Specify the most appropriate assessment method
- Describe the assessment activity that you would apply
- Specify the online assessment tools that you would use to this end**.**

Submit your work as an assignment in the platform.

Indicative response could be:

- Specify the most appropriate assessment method: formative assessment
- Describe the assessment activity that you would apply: A peer assessment activity could take place. Each group prepares and delivers a short presentation to the rest of the students. During those presentations, the students use specific assessment criteria for assessing their peers' presentation. The criteria can be created by the students themselves or co-created with your support, or you can simply provide the assessment criteria to the students, if the students are novices in the peer assessor role. The students can provide their feedback comments to their peers in written, along with their scores in the assessment criteria. You can use a 5-point Likert scale for the scoring. Alternatively, each group can send its presentation to another group via an online platform, and exchange feedback with the use of online tools.
- Specify the online assessment tools that you would use to this end: During a web conferencing session, you can create a group collaborative space (check learning object 2.1 in Module 5) which allows students to work together on a group assignment by creating web conferencing sessions or rooms where students can be moderators. Upon completing their assignment, you can create a new group collaborative space, in which

two groups can participate and exchange feedback. The use of open documents (e.g., google forms or google files) can be also used here, so that the students can provide feedback to their peers, in the role of the peer assessors, and share this feedback to the peer assesses. Alternatively, you can use tools such as peer grade (learn more here: Peergrade - engaging student peer review).

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 4 Title
Monitoring and polling processes

Learning Object 4.1. Title
Mentimeter
Learning Object Description/Introduction
In this section you will be introduced to Mentimeter, and how they can be used for monitoring, polling processes, but also online assessment.
Learning resource type
⇒ Demonstration (video)
Learning Objective Content
Mentimeter is a standalone online assessment tool that can be used for polling, formative assessment, and other activities (e.g., ice breaking, delivering interactive workshops). It allows you to: - "Build interactive presentations by adding questions, polls, quizzes, slides, images, etc. - Actively engage your students. Your students can use their mobile devises or laptops to connect to the presentation where they can answer questions. You can visualize their responses in real-time to create a fun and interactive experience. - Follow up on students' responses. Once your Mentimeter presentation is over, you can share and export your results for further analysis and even compare data over time to measure the progress of your students." Read more information here: Audience Engagement Platform - Features - Mentimeter

Watch the following videos which explain what is mentimeter and how it can be used for conducting an online classroom quiz.

FILM, VIDEO

Mentimeter (2019, February 01). What is Mentimeter? [Video]. YouTube. https://www.youtube.com/watch?v=UrFdN-HQF6I

FILM, VIDEO

Modular Classroom (2020, July 02). How to Use Mentimeter for Online Classroom Quiz? A Step by Step Guide [Video]. YouTube. https://www.youtube.com/watch?v=hNf-wQWlRlY

Technical type

Text
– Document
– Hypertext
Streaming media
– Video
Application
– Interactive Software

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Object 4.2. Title

Activity - build on interactive presentation using Mentimeter

Learning Object Description/Introduction

In this activity you will practice the use of Mentimeter, by creating your interactive presentation. You can choose a specific topic from your courses and a specific cohort of students. Include in your interactive presentation a word cloud activity and a quiz.

Create the interactive presentations by following the detailed instructions which are provided in the links that follow:

- Audience Engagement Platform - Features - Mentimeter
- Create Word Clouds for Free - Live & Interactive - Mentimeter
- Free Quiz Maker: Create a Live & Interactive Quiz - Mentimeter

Once you finish with the assignment, deliver your presentation to your students and test with them the word cloud and quiz activities. Then, share your thoughts about the usefulness of the tool and your overall experience in the forum.

Learning resource type

⇒ Activity
- Activity for practice
- Forum (discussion)

Technical type

Application
- Interactive Software
- Forum

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

90

Learning Unit 5 Title

Good practices of assessment procedures in online environments

Learning Object 5.1 Title

Effective online assessment

Learning Object Description/Introduction

In this section you will be provided with some tips on how to ensure effective online assessment.

Learning resource type

⇒ Narrative Text (theory)

Learning Objective Content

Assessment processes have been widely facilitated by the use of technology the past decades, via the creation of numerous virtual learning environments, learning management systems but also standalone applications. The mere use and integration of such technologies in the class however do not safeguard an effective implementation of online assessment; they require a foundation of solid pedagogical underpinnings and the use of an appropriate instructional and pedagogical design (also check Module 1).

Alignment of assessment activities with course objectives

First, it is essential that the assessment activities that you intend to incorporate in your course are in alignment with the course objectives, and the expected learning outcomes. As a first step reflect on the following questions:

- What kind of initial assessment activities will I incorporate in my class? How am I going to use this type of information for adjusting my teaching methods and the learning material to by students' needs, prior knowledge, and background?
- What kind of formative assessment activities will I incorporate in my class? How frequently will those be implemented? What are the key points or milestones of the course in which

there is a need and added value to incorporate a formative assessment activity? Are the assessment criteria provided and clearly explained to the students?

- What kind of summative assessment activities will I incorporate in my class? How will I ensure that students' attained knowledge, skills and competences are being measured?

It is essential thus to consider a variety of tools that are available (some of those have been presented in this module) and choose that better serve your students' needs and your course objectives. In addition, it is important to adhere to your institution's guidelines on the types of assessment activities that you are allowed to use and on the ratios of those activities in their final score. For instance, some according to the rules of some institutions, the final exam (summative assessment) should correspond to a certain percentage, e.g., 60% of students' final grade.

Personalization

Online tools and features allow you to provide personalized feedback to your students. Personalized and immediate feedback is an important element in formative assessment methods, such as written feedback by the instructor. Chatbots is also another emerging technology in the field of education. Chatbots may interact with your students through short conversations for assessment purposes. You may also explore this possibility as well.

Learning analytics

Data gathered through LMS and learning platforms (e.g., gradebooks providing information such as bar-graphs of grade distribution, time spent in each task per student and other data) offer a wide perspective of delving into the learning analytics field, an emerging field in which sophisticated analytic tools are used to facilitate and support learning and education. Even though learning analytics was not part of this module's focus, you could further explore this area. Find out more about learning analytics by reading the following sources:

Elias, T. (2011). Learning analytics. *Learning*, 1-22.
citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.456.7092&rep=rep1&type=pdf

Accessibility and inclusiveness

It is essential to make sure that the course activities, including the assessment activities, are accessible to all students and inclusive. Take care of the particular needs of your students, including potential disabilities, their native language, culture, background so as to make your activities inclusive to all. Accessibility is an important another aspect. When integrating additional online tools in your course, apart from the platform that your institution is offering, you should secure that all students have access to those. Also, the requirements of your assessment activities should not exclude anyone not having access to specific tools and software.

Technical type
Text – Document
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20 minutes

Conclusion of the module

Assessment is an integral part of the learning and teaching process. In this module you have learned about different assessment methods that exist, i.e., initial, diagnostic, formative, summative assessment, and what purpose each one of the aforementioned methods serves. There are many different assessment activities that you can design and implement with your students in an online learning environment, for performing initial, diagnostic, formative, or summative assessment. The advancement in ICT has facilitated online teaching and learning, as well as assessment activities that can be embedded in your curriculum and be delivered through a variety of online tools. Monitoring and polling processes are also essential in online environments, for tracking learners' progress, but also for increasing the levels of interaction among learners and the educator. Even though technology can facilitate the conduction of assessment and monitoring procedures in online learning environments to a great extent, effective online assessment yet requires a foundation of solid pedagogical underpinnings. Below we summarize the main types of assessment methods, assessment activities and digital tools examples that you can use, based on the purpose of the assessment.

Table 6. Assessment methods summary

Assessment method	Assessment activities	Digital tools examples	When	Why
Initial	Interactions on the fly (classroom discussion), short quiz, test, questions etc.	Forum discussions, teleconferencing discussions, quizzes that you can create in an LMS (e.g., Moodle), Kahoot, Socrative, etc	At the beginning of a course/ learning unit/ semester	To measure a learner's level of attainment to a specific skill, competence, or content knowledge
Diagnostic	One-to-one conversations, use of diagnostic assessment tools (online or paper-based), analysis of given work/exercise	diagnostic assessment tools (online or paper-based) (based on the learning problem that has been identified)	At any time of the course/ learning unit/ semester	To investigate the deeper causes of student's weakness problems
Formative/ continuous	Interactions on the fly (classroom discussion), peer assessment,	Forum discussions for peer feedback exchange, quizzes that you can create in an LMS (e.g., Moodle),	During the course/ learning unit/ semester	To support students' learning by providing feedback to the learners on

		self-assessment, short quiz, project, student assignment, portfolio, etc.	Kahoot, Socrative, concept map tools, presentations and use of rubrics for self- , peer- or teacher evaluation, Peer grade tool		their work and learning progress, but also to provide information on the effectiveness of teaching.
	Summative	Quizzes, final exams, midterm exams, standardised tests, student assignment, project etc.	Quizzes and midterm/final exams that you can create in an LMS (e.g., Moodle), achievement tests, standardized tests, Kahoot, Socrative, etc.	At the end of a course/ learning unit/ semester	Is intended to provide a score. It is used primarily to make decisions for grading or determine readiness for progression

Conclusion type
Choose from the list – Text – Infographic

Summative Assessment of the module [make sure that the questions address all the learning outcomes]. Automated feedback is provided by the platform.
Assessment type
– Multiple Choice Questions (single or multiple correct answers)
Technical Type
– Text
Workload
20 minutes
Number of questions in the assessment object
6

Question template for Multiple Choice Questions	
No.	1
Question (stem)	In a student cohort you have indications that one of your students is facing particular learning difficulties. Which one of the following assessment methods you need to apply in order to identity the potential learning disability that may exist?
Possible answers	a) Formative assessment b) Diagnostic assessment c) Initial assessment d) Authentic assessment
Correct answer	b) Diagnostic assessment
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	2
Question (stem)	Which of the following purposes does formative assessment serve? Please select which applies
Possible answers	a) Providing feedback to the learner b) Offering a certification of achievement/ completion of a course c) Providing feedback to the teacher d) Informing instructional design d) Informing the teacher about learners' prior knowledge
Correct answer	a) Providing feedback to the learner c) Providing feedback to the teacher d) Informing instructional design
Response to correct answer	-

Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	3
Question (stem)	You wish to assess your learners' competences and skills, in a specific topic in Management Education, with an application of a real - based scenario. Which one of the following assessment types is the most appropriate to this end?
Possible answers	a) Standardised test b) Final exam c) Authentic assessment e.g., project
Correct answer	c) Authentic assessment e.g., project
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	4
Question (stem)	Is diagnostic assessment always carried out at the beginning of a course or session, as initial assessment?
Possible answers	a) Yes b) No
Correct answer	b) No

Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	5
Question (stem)	Which of the following technological tools can be used for the creation of interactive online quizzes?
Possible answers	a) Kahoot b) Google Forms c) Poll Everywhere d) Typeform
Correct answer	a) Kahoot
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

Question template for Multiple Choice Questions	
No.	6
Question (stem)	Which of the following technological tools can be used for the creation of online polls?
Possible answers	a) Kahoot b) Mentimeter c) Google Forms

	d) Coggle
Correct answer	b) Mentimeter
Response to correct answer	-
Response to wrong answer(s)	-
Times the question can be taken	1
Is the question part of a test?	No

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Module 8: Digital reality in management education

Module Number

8

Module Title

Digital Reality in Management Education

Short Description / Motivation text

This module focuses on Digital Reality (DR) and the way it can be utilized in education. Starting off, the reader will be introduced to Digital Reality, its various definitions and all the elements that compose it as an ecosystem. This will aid him/her in classifying various applications in the correct category, based on which element of the ecosystem represents each application the most.

Next, each element of the DR ecosystem is described, and examples of relevant applications are given: We examine Augmented Reality and the way in which overlaying information and 3D objects assist in learning and productive work. We examine Virtual Reality and the benefits it offers, including an increase in productivity, memory retention, mental health, and readiness for an anticipated event. The presentation moves on to Mixed Reality, with its most popular application: holograms. Finally, we discuss 360° images and video, which is arguably the easiest application of DR for an amateur or individual to create.

The next part of this module is perhaps the most important and useful for the reader. It explores a variety of sources that can aid the reader in creating his own DR content. These sources include software tools, enterprises, courses, tutorials and more.

The module concludes by first suggesting some good practises for when creating/applying DR, and then proceeds to specify the enablers of DR, challenges in its application, and related sources of knowledge.

A set of exercises that test the knowledge gained by the reader, from previous learning objects, constitutes the “icing on the cake” of this module.

By the end of this module, we hope that the answers to the following questions will be clear:

- How can I make what I am teaching more exciting, intriguing, and interactive?
- How do I go about creating immersive experiences for my students, so that they learn efficiently and effortlessly? When and how do I invoke each of their senses?
- How can certain aspects of the current educational system be altered, given the opportunities offered by Digital Reality?

Keywords

Digital Reality, Augmented, Virtual, smartglasses, holograms, VR games

Learning Outcomes

Knowledge

After the successful completion of this unit learners will:

- Identify and critically assess Digital Reality technologies level of immersive experience.

- List and discuss Digital Reality technologies: 360° videos, Virtual, Augmented and Mixed Reality.
- Recognize and explain how each technology can be used in online learning.
- Discuss critically good practices of Digital Reality used for educational purposes.
- Identify and evaluate when and how to use Digital Reality technologies and tools in ME.
- Learn how to design and develop Digital Reality content for developing management, problem solving and soft skills in ME.

Skills

After the successful completion of this unit learners will be able to:

- Use a variety of Digital Reality technologies in ME, and to create content
- Apply Digital Reality in practice for designing scenarios in ME

Competences

After the successful completion of this unit learners will be competent to:

- Evaluate when and how to use Digital Reality technologies in ME
- Identify and use the appropriate Digital Reality tools for different courses.
- Digitize education management scenarios using a Digital Reality tool.
- Design scenarios for online simulations that support practice and reflection and facilitates actionable learning experiences

Language
English
Training Content

Learning Unit 1 Title
Digital Reality: Definition and Introduction

Learning Object 1.1 Title
Definition and surrounding concepts
Learning Object Description/Introduction
In this Learning Object, you will be introduced to Digital Reality, its various definitions and all the elements that compose it as an ecosystem. By the end of it, you will be able to classify different applications in the right category, based on which element of the ecosystem they represent the most.
Learning resource type
⇒ Narrative Text (theory) ⇒ Activity – Concept mapping
Learning Object Content

The term "Digital Reality" (DR) is relatively new, and has been coined by organisations such as Deloitte, IEEE and William Blaire. Deloitte defines Digital Reality as the spectrum of technologies that inhere in Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR), 360° video, and immersive experience, enabling the simulation of reality in various ways (Deloitte, 2018). William Blaire complements the term by suggesting that DR is where the virtual and physical worlds are becoming interconnected (William Blaire, n.d.), that is, it is the intermediate stage between the physical world and the metaverse, the ultimate Digital Reality. Finally, IEEE (IEEE, n.d.) stresses the fact that DR is achieved by pushing already-developed digitalized extensions of reality, such as AR and VR, to the next level, by leveraging the advances of technology such as sensors, actuators, Artificial Intelligence (AI), and Machine Learning (ML).

DR can be viewed as an ecosystem that encompasses various of the aforementioned sub-systems and concepts. Below you can see Deloitte's depiction of this ecosystem:

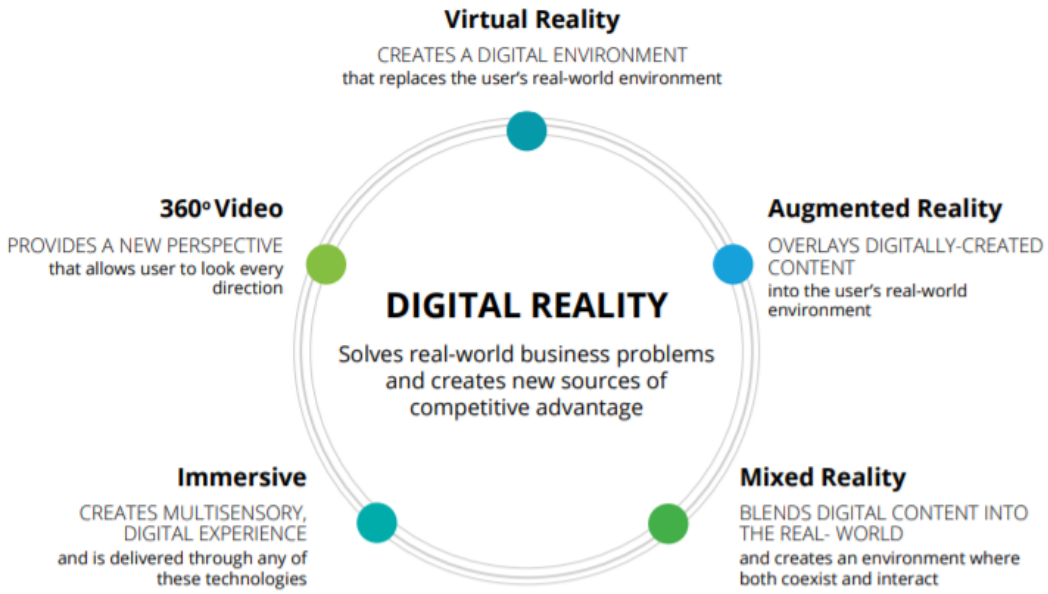


Figure 1. The Digital Reality Ecosystem

Source: https://www2.deloitte.com/content/dam/insights/us/articles/4426_Digital-reality-primer/DI_Digital%20Reality_Primer.pdf

The depicted ecosystem provides a good opportunity to briefly describe each element of it, and explain its distinction from the other elements:

- **Augmented Reality** *overlays* contextual information on the actual physical environment users see, thus combining digital components and experiences with real life.
- **Virtual Reality** enables users to *immerse themselves in artificial surroundings* that portray actual places or imaginary worlds.
- **Mixed Reality** brings together the virtual and real worlds to *generate new environments in which both digital and physical objects—and their data—can coexist and interact with one another*. The evergrowing Internet of Things (IoT) trend is an evident example of MR.

- **Immersive** refers to the *multisensory, digital experience that is delivered through* the technologies and advances of VR, AR and MR. Its primary characteristic is the occupation of multiple sensory experiences for the user, like touch and smell, thus blurring the lines between the real and the artificial.
- **360° video** provides a *new perspective that allows users to look in every direction*. This is achieved by shooting with an omnidirectional camera or a collection of cameras. This unique, unprecedented and innovative kind of experience is what allowed 360° video to establish itself as a separate element from all the others.
- Although not included in the above ecosystem, **Digital Twins** can definitely be considered yet another element of the DR ecosystem (IEEE, n.d.). A digital twin is *a digital replica of an existing physical system or entity, that is extremely detailed and aims to react and behave in the same way as the original system does*. The latter aim justifies the utility of a digital twin as a means of predicting events and experimenting with scenarios before they have a chance of taking place in the real world. The Digital Twins element is still in its infancy stages, with pioneering companies utilizing it the most.

In the Learning Units that follow, we will get a chance to see some sample technologies and applications for each of the above elements.

The following is an exercise to test your understanding of the various concepts within the Digital Reality ecosystem.

Question template for Mapping Questions	
Mapping Left	**Mapping Right**
Virtual Reality	Immersion in artificial surroundings that portray actual places or imaginary worlds
Augmented Reality	Overlaying of contextual information on the actual physical environment
Mixed Reality	Generation of new environments in which both digital and physical objects can coexist and interact with one another
Immersive experience	Multisensory, digital experience that is delivered through the technologies and advances of VR, AR and MR
360° video	Allows users to look in every direction
Digital Twins	A digital replica of an existing physical system or entity, that is extremely detailed and aims to react and behave in the same way as the original system does

Technical type

Text

– Document

Image

– Image

Activity

– Mapping Exercise

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
30

Learning Unit 2 Title
The Digital Reality ecosystem: an in-depth examination of each element

Learning Object 2.1 Title
Augmented Reality

Learning Object Description/Introduction

In this Learning Object, the reader will learn about Augmented Reality, and the different kinds of applications that belong to that category. These include AR-guided training, training using a 3D model, AR smartglasses and statues augmented with speech and expressivity.

Learning resource type

⇒ Narrative Text (theory)
⇒ Presentation

Learning Object Content

Augmented Reality (AR) refers to the technology that overlays contextual information on the actual physical environment users see, thus combining digital components and experiences with real life. It is extensively used in both entertainment and education/training. Let us present some scenarios where AR is utilized for educational/training purposes.

1. In Dublin, the capital of Ireland, tourists can visit the infamous “Talking Statues” (Our Public Service, n.d.). These statues, depicting figures like James Joyce and Molly Malone, have a QR code that can be scanned with a phone, after which a call is received from, supposedly, the depicted figure itself. The figure talks a bit about him/herself in a poetic manner, providing a more fulfilling experience to the tourist eager to learn more about it. Below are some videos presenting the experience:

visitdublin. (2018, August 20). Visit Dublin Talking Statues [Video]. YouTube. https://www.youtube.com/watch?v=8vMHlNisxGc

FILM, VIDEO

ABLE Travel & Photo. (2021, May 13). James Joyce Talking Statues Dublin [Video]. YouTube. https://www.youtube.com/watch?v=nrEn4V0qy00

This kind of AR technology can be utilized, for example, in books that teach about historical figures: the average student would be much more capable of remembering the details behind a certain figure's story if parts of that **story were to be narrated, in a captivating way, by the figure itself.**

Figure 2. Statue of James Joyce. North Earl Street. Dublin. Ireland.

Source: https://www.alamy.com/stock-photo/irish-statue-statues-ireland.html

An alternative approach in the same context is Denver International Airport's "Chatty Gargoyle". The speaker, in this case, is not a pre-recorded actor, but a live person, while the facial expressions of the gargoyle are so realistic that it is almost impossible for bystanders not to initiate conversation with it:

FILM, VIDEO

DenversAirport. (2019, February 28). Chatty Gargoyle at Denver International Airport [Video]. YouTube. https://www.youtube.com/watch?v=fKVOtx7Blfk

2. In manufacturing, **training of personnel** on new practices or machinery can take advantage of "Just-In-Time" training (Our Public Service. n.d.). Under this type of training, a person's AR-enabled visor brings up relevant training material on its screen, based on the part of the machine that the person is being focused on. This technology can also be used to transfer expert advice, for example, a paramedic wearing an AR enabled visor can call for expert opinion. Using the images picked up from the AR enabled visor, specialists back in the hospital can ask the paramedic to manipulate the patient so they can essentially examine the patient for themselves and offer relevant advice.

3. Ford, BMW and Volkswagen use AR and VR to improve how they design cars. This is achieved, in part, because **AR and VR make analysing and implementing 3D models much easier**, since they adapt to the three-dimensional way our brain perceives reality. This argument is presented beautifully by Florian Radke in the following TedTalk, where he gives a demonstration of a complex 3D construct, broken down and analyzed through the use of AR:

FILM, VIDEO

TEDx Talks. (2017, April 19). How Augmented Reality Will Change Education Completely | Florian Radke | TEDxGateway [Video]. YouTube. https://www.youtube.com/watch?v=5AjxGqzqQ54

A real-life example of AR used for 3D modelling purposes took place in St Mary's Hospital in London, where surgeons were able to model a patient's actual leg including the vascular anatomy, thus enabling them to perform complex surgery without perforating any veins or arteries (Our Public Service, n.d.).

Figure 3. AR 3D model

Source: https://blogs.sw.siemens.com/thought-leadership/2021/10/06/application-model-based-systems-engineering/

4. As of late, smart watches have become quite popular as they provided users with an easier way of checking their messages, notifications and other basic tasks that originally occurred using smartphones. The next step, however, in this process of technological progression, is AR smartglasses. AR smartglasses are more practical and casually wearable devices, since anything we would like to see is directly projected to our retina (Artlabs, 2021). Focals by North is a great example of such a technology, and its main purpose is making all the simple, every-day tasks achievable as effortlessly as possible. For instance, you can scroll through messages, navigation etc. using a mini joystick attached to your finger or respond to emails by invoking the built-in Alexa virtual assistant. The Vuzix Next Generation Smart Glasses, on the other hand, are designed to mirror information from paired iPhones or Android-compatible smartphones, while offering comfortable utilities such as noise-cancelling microphones, stereo speakers and gesture-based touch controls.

Figure 4. Smart-glasses and projection

Source: https://next.reality.news/news/inside-future-smartglasses-vuzix-ceo-paul-travers-what-2021-holds-for-ar-wearables-0384196/

In the context of the classroom, while we are indeed at quite the premature stage to expect children to have such devices available, many interesting scenarios can play out with just one such device per classroom. For example, **the teacher may be able to have the answers of students appear in real-time on her smartglasses**, making interaction faster and more efficient, or he/she can pass the smartglasses around the classroom to **allow children to experience a 3D breakdown and analysis of any object** through AR.

Technical type
Text – Document Image – Image Streaming media

– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

60

Learning Object 2.2 Title

Virtual Reality

Learning Object Description/Introduction

In this Learning Object, the reader will learn about Virtual Reality, and its various benefits and applications. Benefits include an increase in productivity, memory retention, mental health and readiness for an anticipated event. The corresponding applications are virtual simulations of training environments, soothing experiences and simulations of upcoming events.

Learning resource type

⇒ Narrative Text (theory)
⇒ Presentation

Learning Object Content

Virtual Reality (VR) enables users to fully immerse themselves in artificial surroundings that portray actual places or imaginary worlds. It is often a more immersive experience than Augmented or Mixed Reality because your primary senses of sight and hearing are completely occupied by the digital world, intentionally blocking perceptions of the physical world. As a result, VR offers an innovative and exciting experience that improves retention and recall (compared to classroom or reading), as we explain in the next section.

The NFL, NBA and US Olympic Ski Team, all use VR to train for competition. This is because VR has been proven to increase performance in certain aspects of training. When we achieve "presence" in VR, i.e., when we truly become immersed in the virtual experience through our mind and senses, our brains become better at encoding memories: a study from the University of Maryland shows that there is about a 9% improvement in memory accuracy when learning through VR, compared to flat screens; a study done by STRIVR, a VR start-up, shows that our recall and response times improve by 12%. Hence, **VR can be very useful in education and training, not only because it offers a memorable training experience (retention and recall benefits), but also an immersive one, with attractive representations of the material being taught. These benefits could prove especially useful for children with learning disabilities.** Regarding the latter argument, imagine learning about a historical event, such as a war, not through a book, but by being on the actual battlefield, examining the weapons, armour, formations used etc. An attempt at creating such an environment was made through the "Contested Memories – The Battle of Mount Street Bridge" project, a project aiming to present information about that battle in as an immersive VR experience as possible. Below is the project's website:

https://mountstreet1916.ie/

Figure 5. Working using VR

Source: https://www.build-review.com/virtual-reality-the-ultimate-safety-and-training-technology/

VR can also help relieve stress and anxiety. As such, it can be used in healthcare to treat patients that show these symptoms, such as patients with phobias, PTSD, cognitive impairments and so much more. For example, the "body transfer illusion" is a notorious illusion where a person, after having experienced the same things happen to a body part of his and to a fake body part, starts to actually experience things that have only happened to the fake body part, like tingling and pain. It is quite easy then to see how **a patient can then be tricked through VR to, at least temporarily, experience soothing and relaxing feelings that are artificially created for his benefit**. Furthermore, through VR, **a patient can be made to view himself from a third-person perspective**. This capability is important, because it has been proven that examining ourselves "through another person's eyes" can help us better assess situations and make better life decisions. Self-counselling of this form has been put in practise at the University of Barcelona, where VR allowed the user to iteratively switch roles between patient and psychotherapist in his own therapy session. In the following TedTalk, you can hear about all these examples of VR practicality and applicability we mentioned above:

FILM, VIDEO

TEDx Talks. (2018, November 21). Can Virtual Reality Change Your Mind? | Thong Nguyen | TEDxMinneapolis [Video]. YouTube. https://www.youtube.com/watch?v=eFHj8OVC1_s

In education, VR can be used to **invoke feelings and responses that would emerge in a real-life situation, as a process of psychological training for what is about to follow.** A great application of the latter approach is the "Your Life – Your Choice" VR experience launched at the Castleknock

Community College: a VR headset shows a unique seven-minute simulated experience of a road traffic accident, with the viewer being fully immersed as a front-seat passenger in the crash scenario (Fingal County Council, 2020). The simulated crash highlights the impact of driver distraction, speed, mobile phone use and shows why wearing seat belts is so important for all passengers. Students also witness, from the passenger seat, the immediate aftermath of a serious accident from when the first responders (ambulance, fire services etc.) first arrive on the scene.

Technical type

Text

– Document
– Hypertext

Image

– Image

Streaming media

– Video

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

30

Learning Object 2.3 Title

Mixed Reality

Learning Object Description/Introduction

In this Learning Object, the concept of Mixed Reality is defined, and presented through the most popular application of it: holograms.

Learning resource type

⇒ Narrative Text (theory)
⇒ Presentation

Learning Object Content

Mixed Reality (MR) may be hard to distinguish from AR and VR because it is not a separate entity from those two, but rather a fusion of them: it is what happens when the virtual and real worlds come together to generate a new environment in which both digital and physical objects coexist and interact with one another. Microsoft offers a nice distinction between MR and AR (Microsoft, 2021): while AR is focused on overlaying digital objects in the real world, MR occurs when those objects are integrated within the real world as if they were physically present, and may interact with other entities of both the digital and physical world. One of the best examples of MR are holograms.

Put simply, holograms are generated three-dimensional images, which, apart from evoking feelings of excitement to the observer, hold promise for other purposes as well. They can be used for **realistic remote teaching**, where students can view and interpret the bodily expressions of their teacher, just like in real-life, through his hologram. They can be utilized to enrich the classroom experience, **adding virtual objects to the classroom**. Overall, they promise a future in which remote collaboration may be richer and far more immersive than videoconferencing alone.

Figure 6. Hologram

Source: https://virtualongroup.com/3d-holographic-projection-holographic-stage/

Although holograms as a technology is still at a premature level, there are quite a few indications that we are progressing fast towards embedding them in various parts of our lives (EdTech, 2021). In 2012, a hologram of Tupac Shakur performed at the Coachella music festival, using the centuries-old Pepper's Ghost technique. In 2018, Imperial College Business School in London brought holographic speakers to its "Women in Tech: The Inside Story" event. About a year ago, Professor Steve Limberg of the University of Texas at Austin taught his executive MBA students as a live, 3D image. Furthermore, a company by the name of Litiholo offers hologram kits to any individual who wants to learn how to make his own hologram. These hologram kits have been used by many K–12 schools, colleges, and organizations for educational purposes. Last May, we witnessed Google announce Project Starline, which allows two people, each sitting in a specially equipped booth, can sit "face to face" and converse as if they were physically together. Finally, holographic devices such as the Microsoft HoloLens smart glasses are now available to the public. These devices do not simply overlay digital information in the real world, but make it seem as if the digital objects they generate truly exist in it. Below is a live demonstration of the Microsoft HoloLens 2, and an explanation of how it stands out from the AR smartglasses solutions we have been introduced to so far.

FILM, VIDEO

UploadVR. (2019, February 24). HoloLens 2 AR Headset: On Stage Live Demonstration [Video]. YouTube. https://www.youtube.com/watch?v=uIHPPtPBgHk

FILM, VIDEO

The Verge. (2019, February 24). HoloLens 2: inside Microsoft's new headset [Video]. YouTube. https://www.youtube.com/watch?v=6lxGU66w0NM&t=413s

Technical type
Text – Document Streaming media – Video
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

Learning Object 2.4 Title
360° images and video
Learning Object Description/Introduction
This Learning Object presents the concepts of 360° images and video. Regarding 360° images, an overview of their utility is provided, along with an example of an organization providing help with creating such images, and an online tool that allows the creation of personal 360° image libraries. Next, the concept and utility of 360° videos is presented, along with a guide for one to create such videos him/herself.
Learning resource type
⇒ Narrative Text (theory) ⇒ Demonstration ⇒ Example
Learning Object Content
We begin by exploring the simpler concept of 360° images, before moving to 360° video. Essentially, 360° images are rotatable, allowing users to look in every direction as if they were standing in the middle of the area photographed. Naturally, this could be a very useful tool in education, since full visualization of remote objects and areas can be done as simply as taking a photo. Additionally, the 360° rotation gives the viewer the immersive feeling that he is indeed standing in the middle of wherever that photo was taken.

Figure 7. 360° image

Source: https://unsplash.com/s/photos/360

For anyone looking to get started with this technology, the ThingLink team (ThingLink, n.d.) provides a simple solution. By gathering the prerequisites and following the steps provided by their online guide (ThingLink, 2020), you can start capturing 360° photographs and use them for the creation of educational content in no time. ThingLink offers other services as well: it provides an easy way to create audio-visual learning materials that are accessible in 60 languages! It helps students become fluent in using multiple forms of media to express themselves inside and outside the classroom. Finally, it offers virtual walk-throughs and tours that give students access to real-world environments that would otherwise be out of their reach.

As mentioned in Module 6, h5p is an excellent webpage for creating interactive, digital games. One of the coolest tools it offers, is the capability of creating a list of 360° images. You can traverse the list, jumping from one image to the other, by pressing buttons on the image. In this way, the user can, for example, efficiently examine a wide area of interest, such as a museum or a park. In the past, such a capability would require long video recordings or lots of photographs, that would cover the whole area. With the list of 360° images, the initial image can be taken in the middle of the entire area, and any point of interest can have a button on it, leading to the 360° photo of that point of interest. The example list provided by h5p illustrates this case quite beautifully: https://h5p.org/virtual-tour-360#example=439470

Having examined the idea behind 360° photos, we can now move to 360° video. 360° video is an unprecedented and innovative kind of visual experience: through the use of an omnidirectional camera or a collection of cameras, 360° (equirectangular) videos allow users to look in every direction of the virtual 3D world, as the video progresses. Where Virtual Reality technologies usually place the user in a 3D virtual world and give him the freedom to explore it, 360° video takes the initiative and guides you itself through the world, while still allowing examination of the surroundings through camera rotation. Thus, just as 360° images allow full visualization of remote objects and areas, 360° video can aid teachers in presenting a 3D world of their choice in a guided manner, while still allowing personalized exploration of the virtual world through head rotations/movements. The video below illustrates this idea:

FILM, VIDEO

Video: VR 360 Video of Top 5 Roller Coaster Rides 4K Virtual Reality

Source: https://www.youtube.com/watch?v=hNAbQYU0wpg

Michael Maher provides a useful guide to start creating your own 360° videos (PremiumBeat, 2015). The guide first suggests some appropriate cameras and equipment, followed by instructions for video editing using the related software, and finishes with instructions for uploading it on YouTube.

Figure 8. 360° video equipment

Source: https://www.premiumbeat.com/blog/how-to-shoot-edit-and-upload-360-degree-videos/

Technical type
Text – Document – Hypertext Image – Image Application – Interactive Software
Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
60

Learning Unit 3 Title
How to create Digital Reality content
Learning Object 3.1 Title
Tools, services, and tutorials for creating Digital Reality content
Learning Object Description/Introduction
This Learning Object explores a variety of sources that can aid the reader in creating his own Digital Reality content. These sources include software tools, enterprises, courses, tutorials and more.
Learning resource type
⇒ Narrative Text (theory) ⇒ Demonstration ⇒ Example
Learning Object Content
The difficulty of creating DR content can range from relatively simple, to very hard. In Learning Object 2.3, “Mixed Reality”, we mentioned that Litiholo provides special kits that allow one to create small, simple holograms. During Learning Object 2.4, “360° images and video”, we have provided the prerequisite tools, tutorials, and online guides for creating either 360° images or 360° video. For even more complex forms of DR content, such as VR and AR applications, their creation can prove quite tougher and challenging. This Learning Object suggests various providers of tools, tutorials, and guides, in order for the reader to build his/her own DR solutions from as fundamental a level as possible.

Figure 9. ClassVR

Source: https://www.classvr.com/

ClassVR is perhaps the greatest provider of VR and AR equipment for classrooms and teachers, hence it occupies the top of this Learning Object. The company offers 5 different kinds of content:

- 360° images
- 360° videos
- 3D models

Using the ClassVR headsets' front-facing camera, students can get up close and personal with content, such as a beating heart or an ancient artefact. For an even more interactive experience, the ARCube (cubic object/technology) takes things to the next level! By bringing the ARCube into view of the camera, the 3D model will attach to the cube, allowing you to manipulate and view the model as if you were holding it! The ARCube is presented below:

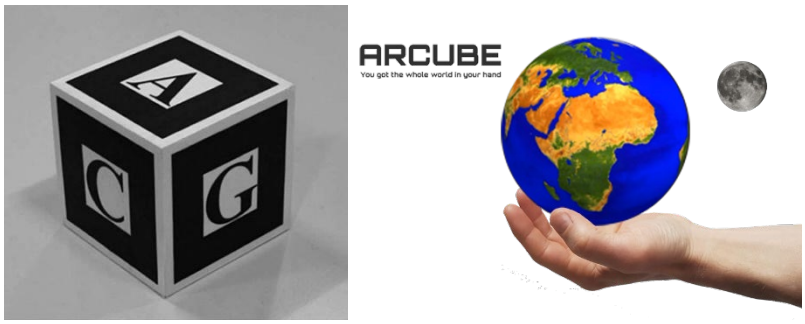


Figure 10. The ARCube

Source: *https://onlinelibrary.wiley.com/doi/abs/10.1111/arcm.12120*

Source: *https://vrmaster.co/arcube/*

Apart from the vast range of ready-to-use 3D models and AR worksheets, ClassVR allows the user to import his own created 3D model. A 3D model can be created through any of the following websites and tools: Paint3D, Vectary, SketchUp, CoSpaces. A 3D model can be downloaded through any of the following websites: Sketchfab, Thingiverse, Turbosquid. The 3D model can be uploaded to the ClassVR portal and then it is ready to use by the headsets and cube.

- AR worksheets

These worksheets contain 3D models and additional information that provides a greater overall experience, engagement, and knowledge retention.

- Explorable scenes

Explorable scenes are virtual worlds and environments. Each scene has numerous things to explore, explain and research, and provides contextual learning in a highly immersive way. There are many different scenes to select, from the surface of the moon, to a volcanic island and from

an Egyptian Temple to a Roman Villa. Alternatively, teachers can create their own environments with 3D creator tools such as Blende, and upload them to the ClassVR portal.

- VR lesson plans

These are structured lesson plans, guides and printable resource sheets, providing teachers with all the information they need to help use the aforementioned explorable scenes with many different subjects and topics across the curriculum.

All the above content can be accessed through the provided ClassVR headsets, in combination with the ClassVR portal where content is uploaded. The ClassVR portal allows the teacher to deliver a defined playlist of resources to multiple headsets simultaneously and organise the experience appropriately.

Before moving on to more information about DR tools, services, and tutorials, we believe it is important to introduce a couple of online courses, that have already established their reputation as credible and useful. By doing this, the reader is given more sources of knowledge for creating DR content, this Learning Object aside. One of the most DR inclusive online courses out there is "How to design for Augmented and Virtual Reality", by the Interaction Design Foundation (Interaction Design Foundation, (n.d.). This course provides the student with an abundance of information on various aspects of DR application, apart from design: It explores the arts of storytelling, Imagineering, and improvisation. It presents ways to enhance overall immersion. It explores the concepts of and relationship between 3D UI, UX and the user's responses to 3D stimuli. Finally, it lays out the tools through which all the above knowledge can be put into application, and tests that capability. Overall, it is highly recommended for any teacher willing to invest in his DR developing skills. Another course with very similar content is "Augmented Reality UI UX design", by the Designerrs Academy, available for both designers and marketeering personnel (Designerrs Academy, (n.d.).

Figure 11. "How to Design for Augmented and Virtual Reality" Course Certificate

Source: https://www.interaction-design.org/courses/how-to-design-for-augmented-and-virtual-reality

For teachers with a more affluent technical background in design and design frameworks, Sam Applebee and Alex Deruette provide a tutorial on how to design VR interfaces (Invisionapp, 2017). Their choice of equipment consists of the "Sketch" interface design software, the "GoPro VR Player" 360-degree content viewer, and the "Oculus Quest 2" VR headset.

For teachers with some basic skills as programmers/developers, there exist various Desktop tools and WebVR tools for them to develop their own DR experience. Desktop tools focus on development for desktop platforms and operating systems, such as Windows. WebVR tools are used to develop experiences that invoke the newly established DR capabilities of the modern browsers. Put simply, they enable VR and other types of immersive experiences while browsing the internet. Below are some examples of Desktop and WebVR tools (Lulabot, 2017):

- **Unity 3D** is one of the most, if not the most, famous game engine for VR development. It comes with a VR mode to preview your work in an HMD (Head Mounted Display), which can really boost productivity by designing for VR within a virtual environment. Furthermore, there's a huge community around this tool, and thus plenty of resources and documentation to learn from.
- **Unread Engine 4 (UE4)** is yet another notorious game engine, with its main attributes being its advanced graphic capabilities and superb performance when used by experienced developers. After all, the engine is responsible for masterpieces like Batman: Arkham Asylum and Hellblade: Senua's Sacrifice.
- Unlike game engines, **3DS Max & Maya** are architectural design products for modeling, animation, lighting, and VFX. VR support is offered through a pricey plugin. They have some of the most precise tools in their UI.
- **Blender** is a modeler for VR developers, used mainly for modeling, UV mapping, lighting, rigging, and animation. It's free, open source software written in Python and available for Windows, Mac, and Linux. There's a huge community of people devoted to this software and its use.
- Google's **SketchUp** is also a modeling application, but a basic one, with a very low learning curve that can get anyone up and running in a short amount of time. The tutorials on the website are excellent, with introductory lessons to basic software development and 3D modeling concepts. It's a great tool for quickly learning the basics and then moving onto bigger and better things.
- **Three.js** is a JavaScript library that serves for creating 3D graphics for web browsers. There are some excellent applications being developed with it, which utilize 3D design to create anything from fun demos to multiplayer worlds and games.
- **A-Frame**, by Mozilla, is a web framework built on top of Three.js to build virtual reality experiences with HTML using an Entity-Component ecosystem. It is a very easy framework to pick up and familiarize yourself with, since it has an HTML-like syntax, and you can use all your typical web development tools. A-Frame works on Vive, Rift, desktop, and mobile platforms.

More honourable mentions from the WebVR tools category are ReactVR, Vizor.io, JanusVR and JanusWeb. It is worthwhile noting that Udemy offers a variety of courses for anyone willing to learn using the aforementioned tools and frameworks. Kuman Ahir (Medium, 2019) also offers a guide to creating VR content, mentioning a variety of available software tools.

Concluding this Learning Object, we couldn't omit some interesting pieces of advice from the academic literature, for DR content creation. In particular, Rinat R. Nasyrov and Peter Excell, in their paper "Creation of Interactive Virtual Reality Scenarios as a Training and Education Tool", present a novel approach to the creation of realistic VR training scenarios for safety-critical industrial applications (R. Nasyrov and P. Excell, 2020). One innovative feature is the use of virtual buttons displayed on the image of the user's hand, thus avoiding the need for accessories such as haptic gloves. The user can virtually perform actions that would result in dangerous errors, with the realistic consequences of those errors simulated, all while the user is in complete safety. An example would be virtually pulling a lever that causes heavy blocks to fall from a great height. The reader may benefit from exploring the foundational blocks of this approach.

Technical type

Text

– Document
– Hypertext

Image

– Image

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

180

Learning Unit 4 Title

Good Practices of Digital Reality used for Educational Purposes

Learning Object 4.1 Title

Good Practices of Digital Reality used for Educational Purposes

Learning Object Description/Introduction

This Learning Object presents various good practices that should be applied when creating or using Digital Reality content. The practices vary depending on the entity applying them. Apart from providing such advice, we also present some external services that can help the reader to update/re-evaluate the practices he/she currently adopts, since the constant evolution of DR generates a need for that.

Learning resource type

⇒ Narrative Text (theory)

Learning Object Content

When it comes to the creation and utilization of Digital Reality content, there are various good practices that can be applied. These practices vary depending on the capabilities and aspirations of the entity in question: a company or enterprise, such as a university, can do considerably more

to adjust to the constant evolution of DR, compared to an individual teacher. Below are some suggested practises for these two entities:

- Enterprises may need to **upgrade their infrastructure** by installing sensors and beacons, among other systems, to facilitate augmented setups. They may also need to improve connectivity—in the form of wired, wireless, and cellular—to cater to DR requirements in remote locations. Finally, they should consider investing in new tools and services such as high-definition 3D image capture, mapping equipment, and high-end gaming engines, to recreate simulations and virtual environments for DR interaction (Deloitte, 2018).
- As we move towards the level of the individual, it is harder to acquire the technologies mentioned above. Part of the reason for this is the fact that DR is still a relatively new field, and so implementations of such technology (e.g. VR headsets) can range from cheap to extremely expensive. Hence, **affordability and accessibility capabilities must first be determined**, to bridge the opportunity gap rather than expand it (University of Toronto, 2021).
- Along with the aforementioned infrastructure changes**, updates to the management** may also prove essential for organizations to train their workforces and make them technology-ready. Trained personnel utilizing DR equipment can drive effectiveness and productivity to higher levels (Deloitte, 2018).
- Although DR technologies can be exciting, it is advisable to **focus more on the learning experience** during the creation of DR content. The excitement will eventually fade, and you want to make sure the content to be learned is delivered effectively, and not lost in the experience. It is a good idea to do a bit of research about a product, application, and company before utilizing their tools (University of Toronto, 2021).
- Put simply, **DR shouldn't replace what you're already doing, but instead enhance it in ways that you can't achieve through normal instruction**. In other words, try to keep working, satisfactory solutions in place, and enhance them through the additional capabilities DR offers.

For teachers involved with the design of the DR experience, the following advice can be shared:

- **Try to make the experience student-centered**. That is, if possible, allow the students to interact and, as a result, create new possibilities through the use of the digital content. That way, they will be more invested in whatever they are learning. An example would be a VR game where the choices of the students affect the presented storyline (Classcraft, 2017).
- **Try to make the experience social**. This is especially important in cases of low budget, where only one device is available for a whole classroom. For example, one student can wear a headset device, while others interact with it through their laptops/phones.
- A mix of the physical and the virtual is often optimal: a fully virtual world does not allow the sense of touch to be invoked, which removes part of the immersion. **Mixing physical objects into the virtual world**, by, say, overlaying them with virtual skins, is a great way to make a DR environment even more realistic and exciting.
- Since the world of DR is relatively young, what works and what doesn't is not fully comprehended yet. As a result, it is important to **iterate over each decision and application**, evaluating both with each passing iteration and making the necessary adjustments.

- **Attempt to enhance pre-existing behaviours through DR, while taking into consideration any negative implications**. In other words, you can simulate a normal activity virtually, such as visiting a museum, but make sure that the simulated space does not cause any corresponding real-life symptoms such as claustrophobia or visual discomfort (Invisionapp, 2016).
- DR experiences aim to be immersive, which implies that they **avoid being linear and narrative**. In other words, the experience, and the control of it, needs to be had by the user (Invisionapp, 2016).

As DR evolves, so do the practices that should be followed for its application. In order for one to stay updated with the latest practices, the following services are available:

- The Virtual Worlds Best Practices in Education conference (VWBPE) is a completely virtual conference that is conducted using simulated environments. It offers current teaching, learning, and research practices in 3D virtual environments. The conference focuses on the identification of best practices in education designed for virtual world technology (VWBPE, n.d.).
- Yet another way of staying updated is through related podcasts, such as "Voices of VR". The service publishes podcasts and interviews with pioneering developers and experts to bring a diverse range of VR perspectives and insights from over 500 makers and academics.
- Stanford's Virtual Human Interaction Lab is also a great resource to learn about emerging VR research and practices. The mission of the Lab is to understand the dynamics and implications of interactions among people in immersive virtual reality simulations using empirical behavioral science methodologies. Some of their current projects include understanding childhood development and immersive virtual reality and leaning in immersive VR classrooms.

Technical type

Text

– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

20

Learning Unit 5 Title

Enablers of Digital Reality, Challenges and Sources of Knowledge.

Learning Object 5.1 Title

Enablers of Digital Reality and Challenges.

Learning Object Description/Introduction

In the course of this Learning Object, the reader will be informed on the factors that make Digital Reality possible, applicable and more affordable as the years progress. The reader will also get to learn about the challenges involved with applying Digital Reality.

Learning resource type

⇒ Narrative Text (theory)

Learning Object Content

Digital Reality as a market is experiencing some of the greatest expansion out there, with many factors contributing to that growth rate (Deloitte, 2018). One such primary factor is the increase in mobile phone usage, along with the increased capabilities/features of these devices. Another factor is the fact that, ironically, DR products are now advertised through immersive DR means, which in turn attracts customers more, and in higher numbers. On the same note, as more customers enter the market, and as technology capabilities arise, the products themselves become cheaper, and hence more affordable. Furthermore, the improved and faster network connectivity that each passing year offers, makes DR technologies that rely on good connectivity, such as holograms, more applicable. Yet another factor is the general increase in technical capabilities: batteries that last longer and increased video resolution are just a couple of factors that make the implementation of efficient DR technologies more realizable. Finally, the demand from one of the largest markets out there, gaming entertainment, pushes focus and funding for DR on new levels.

Despite the aforementioned enablers of DR, there exists a list of challenges that need to be addressed if the technology is to be fully utilized. For starters, the most demanding forms of DR require a substantial amount of computing power and resources. As technology progresses, we can only hope that better processors and renewable energy methods will assist in tackling this challenge. Additionally, although the human field of view can extend to up to 180 degrees, current DR hardware cannot support such wide fields of view. Solving this issue would make projections of the working environment more useful. Another problem is that, as we dive into the newly discovered technological territory, the ways in which that territory can be malevolently exploited increase. Thus, it is imperative that the security practic es governing DR also grow along with it.

Technical type

Text

– Document

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes

10

Learning Object 5.2 Title

Sources of Knowledge regarding Digital Reality.

Learning Object Description/Introduction

This Learning Object focuses on presenting updating sources of knowledge regarding DR, so that anyone interested in staying up to date with DR over the years may do so. These sources include conferences, podcasts, books and publications.

Learning resource type

⇒ Narrative Text (theory)

Learning Object Content

No matter how much or little information this module provides on Digital Reality, being such an expanding market, there will always be new information to take in and new knowledge to grasp. Because of that, it is important for anyone interested in keeping up to date, to have some established sources of DR knowledge in mind, and to visit for news and updates on the field. Learning Object 4.1, "Good Practices of Digital Reality used for Educational Purposes", already presented a couple of these sources, that were specifically focused on good practic es for the application of Virtual Reality. In the following paragraphs, we examine more of these sources, that cover a wider range of subjects.

Arguably, the most formal and scientifically inclined sources of knowledge around DR are conferences and events. IEEE organises an abundance of conferences on DR (IEEE, n.d.), such as the International Conference on Mechatronics and Robotics Engineering (ICMRE) and the International Conference on Automation, Robotics and Applications (ICARA). Other notorious conferences include the SPIE AR/VR/MR 2022, Consumer Electronics Show (CES) 2022 and SIGGRAPH Asia 2021 (CircuitStream, 2021).

Podcasts and Webinars is a nother great source of DR knowledge, that is comfortable and entertaining to involve yourself with . Once again, IEEE is a leading figure in this aspect, with its IEEE Digital Reality Webinar Series and EEE Digital Reality Podcast Series (IEEE, n.d.). These podcasts are available on Apple Podcasts, Google Podcasts and Spotify. Deloitte is also offering such podcasts, such as the "Deciphering virtual reality use cases and business applications" podcast, as part of their "User Friendly" podcast series. Furthermore, William Blaire also offers a podcast named "Beyond Digital Reality", during which the metaverse and the trends of DR are discussed (William Blaire, 2021).

Finally, traditional methods of knowledge acquisition: books, magazines and publications, can prove very useful on your path towards deeper understanding of DR. IEEE offers some amazing books on that matter (IEEE, n.d.), such as "The Future of Digital Twins", which can be of immense utility for enterprises looking to take their system's modelling to the next level, and "Megatrends for 2021-2030", which discusses expected popular trends in the coming years. As for magazines and publications, the "AR/VR Magazine" is an industry- leading B2B resource offering the latest news on the field, while the "AR/VR Journey" magazine shares the latest AR/VR news, info, tools and tutorials (Feedspot, 2022).

Technical type

Text

– Document
– Hypertext

Workload (Estimated study time) (min) The estimated study time needed for an average learner in minutes
20

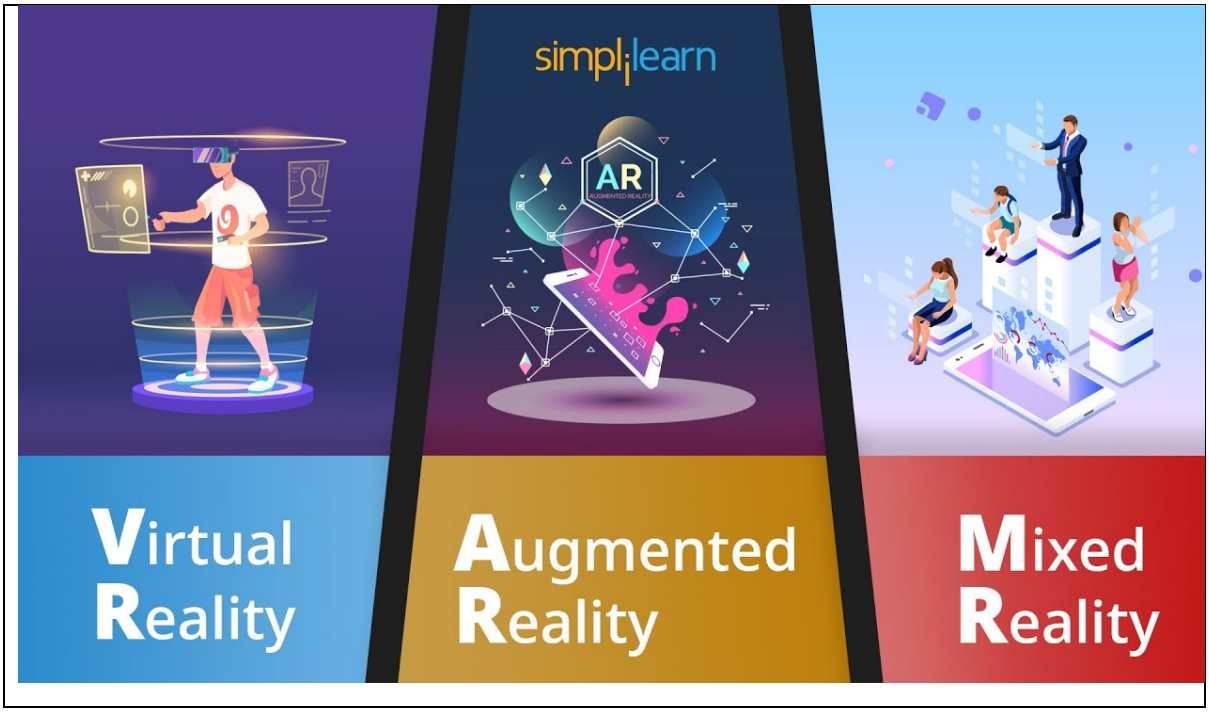
Conclusion of the module
This module focused on Digital Reality (DR) and how it can be utilized in education. Starting off, the reader was introduced to Digital Reality, its various definitions and all the elements that compose it as an ecosystem. This, we hope, aided him/her in classifying various applications in the correct category, based on which element of the ecosystem represents each application the most. Next, each element of the DR ecosystem was described, and examples of relevant applications were given: We examined Augmented Reality and the way in which overlaying information and 3D objects assist in learning and productive work. We examined Virtual Reality and the benefits it offers, including an increase in productivity, memory retention, mental health and readiness for an anticipated event. The presentation moved on to Mixed Reality, with its most popular application: holograms. Finally, we discussed 360° images and video, which is arguably the easiest application of DR for an amateur or individual to create. The next part of this module was quite an important one, as it explored a variety of sources that can aid the reader in creating his own Digital Reality content. These sources include software tools, enterprises, courses, tutorials and more. The module concluded by first suggesting some good practices for when creating/applying DR, and then proceeds to specify the enablers of DR, challenges in its application, and related sources of knowledge. A set of exercises that test the knowledge gained by the reader, from previous learning objects, constituted the “icing on the cake” of this module. By the end of this module, we hope that the answers to the following questions are clear: ● How can I make what I am teaching more exciting, intriguing, and interactive? ● How do I go about creating immersive experiences for my students, so that they learn efficiently and effortlessly? When and how do I invoke each of their senses? ● How can certain aspects of the current educational system be altered, given the opportunities offered by Digital Reality?
Conclusion type
– Text

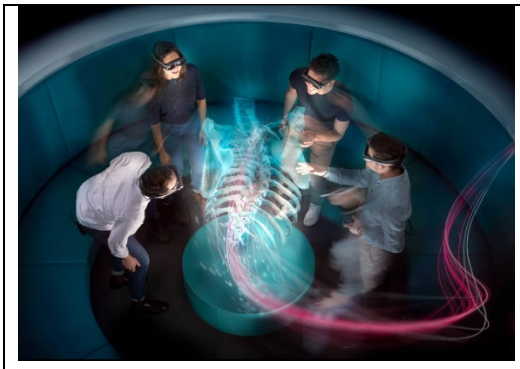
Summative Assessment of the module
https://thalissite.h5p.com/content/1291550861584541227

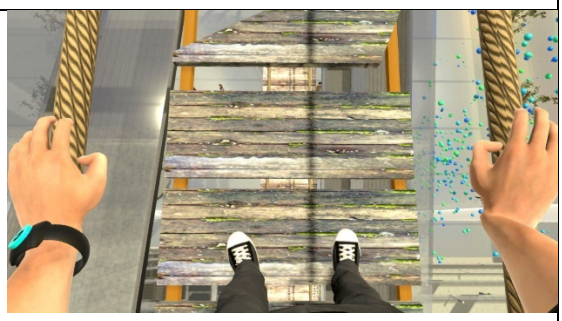
https://thalissite.h5p.com/content/1291550903136191517 https://thalissite.h5p.com/content/1291550905029636067
Assessment type
– Multiple Choice Questions (single or multiple correct answers) – Drag and Drop
Technical Type
– Text – Document
Workload
440
Number of questions in the assessment object
4

Categorization quiz – drag-n-drop game in h5p.org

The goal is to map each image to the appropriate concept: Mixed Reality (MR), Virtual Reality (VR) or Augmented Reality (AR). Out of the 6 images, 2 represent AR, 2 represent MR, and the other 2 represent VR.







Mapping quiz using a mapping game from h5p.org

Make the crossing accordingly. The first column (tools) is randomized, and the user should connect each tool in the first column with the correct utility on the right column.

	Tool	Utility
1.	**SketchUp**	A basic modelling application, with a very low learning curve, and introductory lessons to basic software development and 3D modeling concepts.
2.	**Three.js**	A library for creating 3D graphics for web browsers.
3.	**Unity 3D**	One of the most famous game engines for VR development, offering a lot of help through its community and documentation,

		and having a VR mode to preview your work in an HMD (Head Mounted Display).
4.	**3DS Max**	An architectural-design product for modeling, animation, lighting, and VFX.
5.	**ClassVR**	Enables a person wearing headsets to examine AR content, such as a beating heart or an ancient artefact, by allowing custom or downloaded 3D models to be imported into the headsets.
6.	**Litiholo kit**	A tool for an individual to create small holograms, that has been used by many K–12 schools, colleges, and organizations for educational purposes.
7.	**H5p.org**	An online tool that allows the creation of a traversable list of 360° images, where clicking on one area of a 360° image takes you to the 360° image representing that area.

Multiple choice questions

Question template for Multiple Choice Questions	
No.	1
Question (stem)	When creating Digital Reality content, it is advisable to
Possible answers	• focus on making the visuals as impressive as possible, in order to capture the attention of the user. • ensure that the experience is constantly varied, so that it remains exciting from start to finish.
Correct answer	focus more on the Learning Experience, to make sure the intended content is delivered effectively instead of being lost in the experience.

Question template for Multiple Choice Questions	
No.	2
Question (stem)	Regarding the utilization of Digital Reality,
Possible answers	• it should replace as much of the current practices as possible, since this new methodology is more exciting and more resourceful. • It should only be used where current practices are lacking or obsolete.
Correct answer	it should complement current practices wherever possible, in ways the traditional methods cannot achieve.

Question template for Multiple Choice Questions

No.	3
Question (stem)	Digital Reality experiences should aim to be
Possible answers	• linear and narrative, so that the Learning Experience is easily followed and understood by the user. • event-driven and randomized, so that new, unpredictable scenarios are experienced with each and every new exposure.
Correct answer	immersive, in the sense that the user has control over the experience and can affect it.

Question template for Multiple Choice Questions	
No.	4
Question (stem)	When creating Digital Reality content, it is advisable to
Possible answers	• pursue a Virtual Reality experience as much as possible, since the immersion and excitement achieved in a virtual world is incomparable to other types of experience. • Pursue an experience where information and holographic objects are overlayed in the physical world, making the distinction between current knowledge and newly-obtainable knowledge clear for the user.
Correct answer	Pursue a Mixed Reality experience through, for example, overlaying real objects with virtual skins, combining the best attributes of both Virtual and Augmented Realities.

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