Module 1
Unit 1

Unit 1 – The use of digital technologies in online teaching and learning

Module 1: DIGITAL EDUCATION DISRUPTION – THE ROLE OF ONLINE LEARNING AND DIGITAL TECHNOLOGIES

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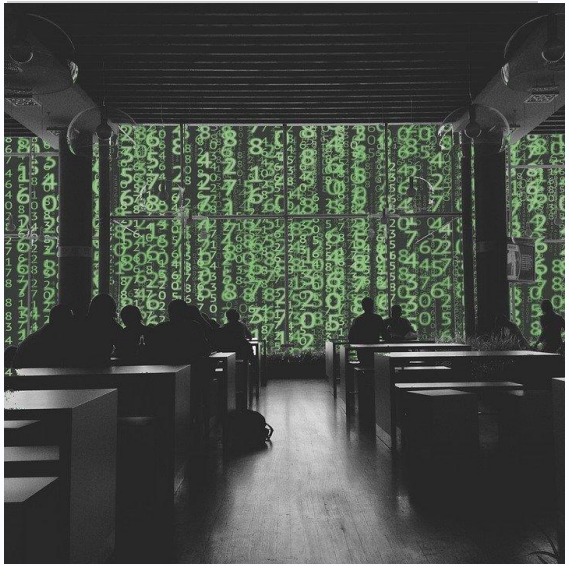
Unit 1: The use of digital technologies in online teaching and learning

Module 1: Digital Education Disruption – The Role of Online Learning and Digital Technologies

1. **The use of digital technologies in online teaching and learning**
2. The role of online teaching and learning in a globalized digital economy
3. Digital disruption in higher education



The objectives of this Unit are:

- Understanding how digital technologies are enabling new educational opportunities;
- Understanding specificities of the digital online education ecosystem;
- Identifying specific digital technologies and new models of teaching and learning used for online teaching and learning;
- Highlighting the benefits of using new digital technologies in online teaching and learning.

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1.2 New digital technologies in online education

1.2.1. *Extended Reality (XR)*

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1.2.3. *Gamification*

1.3 Benefits of using new digital technologies in online teaching and learning

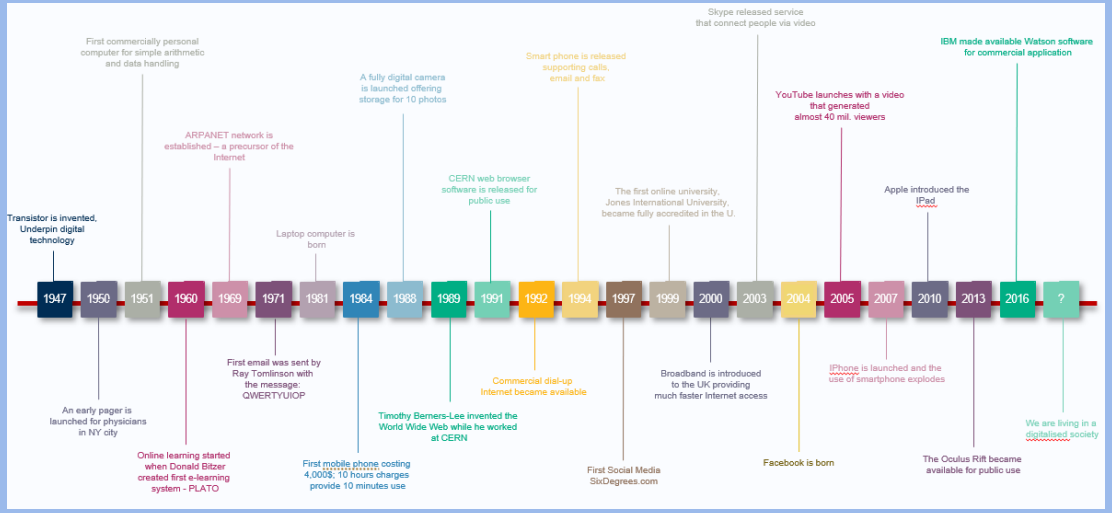
1.1. The emergence of new digital technologies

Digital revolution profoundly impacted the current educational landscape. The emergence of new digital technologies in education marked the beginning of transition from traditional teaching and learning to technology-based learning.

In this context, online learning became more manageable, sophisticated and accessible.

Online learning is a new social process that, due to the emergence of new digital technologies, is beginning to act as a complete substitute for both distance learning and the traditional face-to-face class [1].

Did you know…


Transistor is invented, Underpin digital technology
1947
An early pager is launched for physicians in NY city
1950
First commercially personal computer for simple arithmetic and data handling
1951
Online learning started when Donald Bitzer created first e-learning system - PLATO
1960
ARPANET network is established – a precursor of the Internet
1969
First email was sent by Ray Tomlinson with the message: QWERTYUIOP
1971
Laptop computer is born
1981
First mobile phone costing 4,000$; 10 hours charges provide 10 minutes use
1984
A fully digital camera is launched offering storage for 10 photos
1988
Timothy Berners-Lee invented the World Wide Web while he worked at CERN
1989
CERN web browser software is released for public use
1991
Commercial dial-up Internet became available
1992
Smart phone is released supporting calls, email and fax
1994
First Social Media SixDegrees.com
1997
The first online university, Jones International University, became fully accredited in the U.
1999
Broadband is introduced to the UK providing much faster Internet access
2000
Skype released service that connect people via video
2003
Facebook is born
2004
YouTube launches with a video that generated almost 40 mil. viewers
2005
IPhone is launched and the use of smartphone explodes
2007
Apple introduced the IPad
2010
The Oculus Rift became available for public use
2013
IBM made available Watson software for commercial application
2016
?
We are living in a digitalised society

1.1. The emergence of new digital technologies

Smart (online) learning environments

Smart learning environments (SLE) are physical environments that are enriched with digital, context-aware, and adaptive devices to promote better and faster learning which can make learning environments more effective, efficient, and engaging on a large and sustainable scale [2].

In online learning physical classroom is totally replaced by new digital technologies.

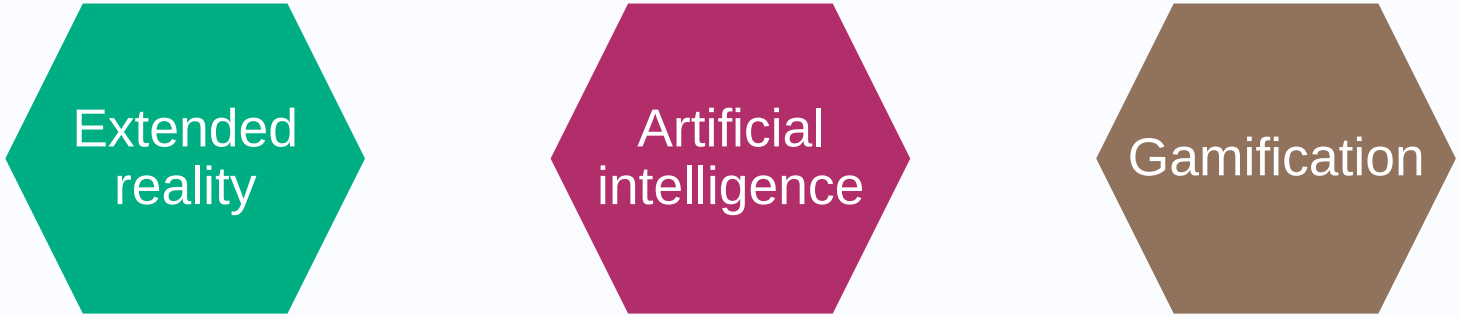
1.1. The emergence of new digital technologies

...in online learning

New digital technologies used in online learning are diverse, including immersive simulations, collaborative learning, asynchronous learning networks (ALN), simulation and gaming or collaborative knowledge systems.

Modern online learning process is based on Internet, special apps and a set of specific devices such as headsets, smart glasses, haptic gloves etc.

1.2. New digital technologies in education



1.2.1. New digital technologies in education: Extended Reality (XR)

Extended Reality (XR)

Extended Reality (XR) is an emerging umbrella term for all the immersive technologies, including augmented reality (AR), virtual reality (VR), and mixed reality (MR) and the areas interpolated among them.

- ***Augmented Reality (AR)*** is a computer-generated environment where virtual objects are overlapped on an existing reality;
- ***Virtual reality (VR)*** is a fully simulated digital environment, which can be explored and interacted with by a person;
- ***Mixed Reality (MR)*** imply a co-existence between digital and real-world objects that can interact with one another in real-time.

XR is experienced through an app using smartphones, tablets, headsets, AR glasses or other similar devices.

1.2.1. New digital technologies in education: Extended Reality (XR)

Why XR in Education?

- XR provide active and experiential learning, enabling users to gain concrete experience that might not otherwise be available;
- By providing “hands on” experience, XR helps promote student engagement with learning materials and deepens student interaction with complex problems [3];
- XR enhance the interactivity , students can be placed in any real world or virtual situation and can preform tasks in a more active way;
- Students can be placed in any real world or virtual situation through a virtual field trip, perform experiments in a virtual lab or perform procedures and gaining skills without leaving the class.

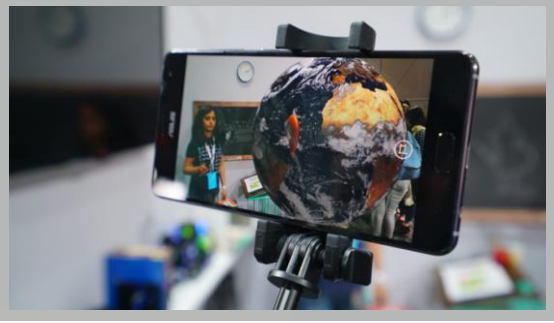
1.2.1. New digital technologies in education: Extended Reality (XR)

How is Extended Reality used in online Education?

- XR help to turn a virtual classroom into an engaging platform;
- XR provide a more engaging and active learning medium enhancing interactivity, improved retention and increased learning performance;
- XR allows engaging in virtual experiments offering students a similar experience to those from classes;
- XR is used to allow participants in online learning to meet other people('s avatar) in a virtual world;
- XR is used to increase the interactions with different people, enhancing diversity.

Example

Extended Reality in education



Good practice

Recommendations for using VR in the classroom

At the "VR in the Classroom" panel [4] at Games for Change 2017, panelists recommended five best practices for using VR in the classroom:

- Flip the experience and make it student-centered;
- Make VR experiences social;
- Combine physical and virtual objects;
- Keep iterating as you learn;
- Use VR to enhance, not replace.

1.2.2. New digital technologies in education: Artificial Intelligence (AI)

Artificial Intelligence (AI)

Artificial Intelligence (AI) is the capability of a machine to imitate intelligent human behavior [5]. It enables computers and machines to mimic the perception, learning, problem-solving, and decision-making capabilities of the human mind [6].

- ***Machine Learning*** is a subset of AI application that learns by itself. It actually reprograms itself, as it digests more data, to perform the specific task it's designed to perform with increasingly greater accuracy [6].
- **Deep learning** is a subset of machine learning application that teaches itself to perform a specific task with increasingly greater accuracy, without human intervention [7].

1.2.2. New digital technologies in education: Artificial Intelligence (AI)

Why AI in Education?

- AI allows providing of personalized learning experiences based on students' individual needs and strengths;
- AI can make predictions, recommendations and decisions about the approach of learning process based on data from individual students;
- Real-time learning analytics provide information about the class, student performance and needs allowing course corrections and individual suggestions;
- AI algorithms help students in finding relevant answers and to understand basic concepts;
- Help to classify and organise content, improving the microlearning experience;
- Ai reduces the cost of content development.

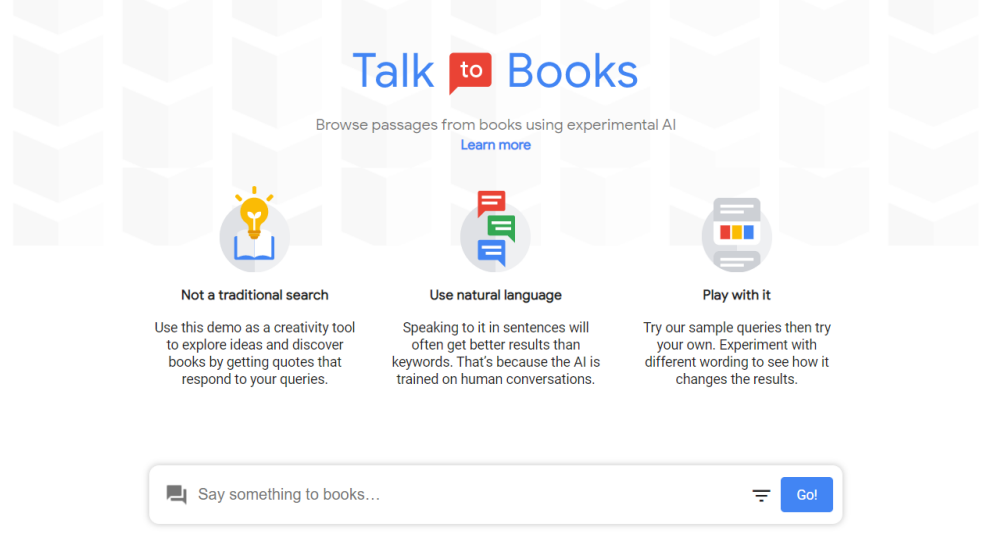
1.2.2. New digital technologies in education: Artificial Intelligence (AI)

How is Artificial Intelligence used in online Education?

- AI is used to improve the functionalities of LMS, for example categorizing individuals and providing effective and targeted content that fits with each preferred learning style (e.g. visual, auditory, text);
- Language processing algorithms are used to subtitle live speech, and can provide more dynamic descriptions of the visual content;
- AI helps in anti-cheating being used to determine whether an assignment was completed by the student or by someone else;
- Text translation and machine learning (including voice recognition and text summarization) used to create deep-learning systems can translate lectures into the student's native tongue;
- AI is used to develop virtual assistants that can aid both learners and educators;
- AI helps to track user's engagement pushing them to go forward by sending updates and reminders to complete tasks.

Example

Artificial Intelligence in education



Good practice

Ethical guidelines on artificial intelligence

The Digital Education Action Plan (2021-2027) - Resetting education and training for the digital age - outlines the European Commission's vision for high-quality, inclusive and accessible digital education in Europe.

Within the Plan, the Commission intends to develop an ethical guidelines on artificial intelligence (AI) and data usage in teaching and learning.

1.2.3. New digital technologies in education: Gamification

Gamification

"Gamification" is the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement [8]. Gamification involves the addition of specific game features, mainly involving the reward system and narrative structure, to an existing (nongame) learning environment in order to make it more motivating [9].

Gamification is not a Game!

1.2.3. New digital technologies in education: Gamification

Why Gamification in Education?

- Gamification offers a better learning experience, increase the engagement and provides immediate feedback,
- Gamification increases the retention.

How is Gamification used in online Education?

- Students get an avatar that allow to place themselves in the game;
- Learning process depends on user behavior and on goals that are set up from the beginning;
- Gamification could be a solution for online exams.

Example

Entrepoly[10]

Creativity house

This house (module) fosters creative thinking with simple tasks that require smart solutions.

Play now

Give feedback

Casino house

This house (module) gives insight into consumer behavior and fosters risk taking.

Play now

Give feedback

Break even point house

This house (module) requires business thinking and fosters complex problem solving.

Play now

Give feedback

Start-up house

This house (module) provides opportunity for students to introduce their own start-up idea.

Play now

Give feedback

Good practice

Gamification is a psychologically driven approach

Need of a systematic program of experimental studies mapping game elements to the learning and motivational specifics of individual (groups of) learners.

Avoid gamification scenarios that can harm learning [11].

1.3. Benefits of using new technologies in online education

- Increase learning efficacy;
- Makes distance learning more accessible;
- Improves engagement;
- Improves knowledge retention;
- Encourages collaboration;
- Allow access information at any time;
- Allow persoalised learning and personalised study environment;
- Tracked progress;
- Fewer emissions.

Key takeaways

- The emergence of new digital technologies in education marked the beginning of transition from traditional teaching and learning to technology-based learning.
- Online learning is a new social process that, due to the emergence of new digital technologies, is beginning to act as a complete substitute for both distance learning and the traditional face-to-face class.
- New digital technologies such as Virtual Reality, Augmented Reality, Artificial Intelligence, Gamification, Blockchain, 5G, Machine Learning and Deep Learning offer new potential for online education and fuel more radical transformations.
- New digital technologies brings a lot of benefits for education making it accessible to anyone with internet access.

Reflection

Have the roles changed at your university?

- Think about your own university.
- What were the learners' expectations 10 years ago? And the role of the teachers?
- And what about now? Have the expectations and roles changed some how?
- Write down the differences.

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