

iLab Manual

Future-proof your classroom – teaching skills 2030

Module 4

Creation and use of e-learning materials

Faculty of Economics and Business

University of Maribor, Slovenia

Future-proof your classroom – teaching skills 2030

Welcome to the course Teaching2030!

Technology rapidly changes the way we think, live, learn and lead. Education plays an essential role in this transformation process. Teachers and trainers have to be prepared for new challenges and learning environments in order to guide future generations the best way possible. Based on these considerations, the blended-learning course “Future-proof your classroom – teaching skills 2030”, Teaching2030 for short, addresses teachers, tutors and trainers in higher education institutions providing them with instructional competencies and skills over eight modules. The course comprises a **web-based training course (cBook)** and an **on-site learning space (iLab)** and can be accessed without limitations and is free of charge. It is funded by the Erasmus+ Austrian National Agency under Key Action 2 Strategic Partnerships.

Lucia and Marko will guide you through the cBook and iLab

The didactical concept of the entire blended-learning course follows the principles of **storytelling**. Storytelling is quite common in company training but has so far not been commonly used in educational courses. It is, however, an essential part of Teaching2030. Throughout the modules, Lucia and Marko, two teachers at a higher education institution, will guide you through your learning experiences, helping you deal with the new trends and difficulties you might experience in your future teaching. They tell stories about their recent successes with their students and their reservations about giving new approaches a try, they provide each other with teaching advice and support, and, last but not least, they help future educators manage the challenges they may face. They are both a constant presence in the cBook and in the iLab, which are closely interlinked.

The **cBook (computerBook)** is a web-based training environment that houses the eight modules of the course, each of which comprises five chapters organised around key topics. The cBook offers you a diverse range of learning material, like information (texts, hot spots, didactic sequences), interactive exercises (drag and drop, multiple choice, memory, surveys, word clouds), reflection tasks, videos and additional materials and links. Each cBook module contains five major tasks entitled “iLab”, indicating that these tasks are better suited for use within the iLab. In addition, the cBook provides reflection tasks, called “iThink”, for discussion in the iLab. Nevertheless, you can also work with the cBook as a stand-alone MOOC.

The **iLab (innovationLab)**, as part of the blended-learning course, is an on-site, open, self-directed learning space, estimated to require two days per module. It can be organized as a training environment under the supervision of a Teaching2030-developer, or without supervision, as a self-directed learning environment for teachers who would like to widen and strengthen their teaching approaches and skills. The iLab is designed to be used flexibly, as it provides additional exercises, tools, materials and links, but it is recommended that the cBook be completed first in order to build a solid basis for the iLab. Each iLab module offers a guide explaining the didactical approach of the entire course and a glossary containing the central items and terms used by the development team.

Give Teaching2030 a try and have fun!

Your development team:

CREATE 21st century GmbH
Eszterházy Károly Egyetem Eger
Fachhochschule Burgenland GmbH
Faculty of Tourism & Hospitality Management
Universidade de Aveiro
Università degli Studi di Perugia
Universitat de Valencia
University St Kliment Ohridski Bitola
Univerza v Mariboru



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

Disclaimer

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

What to expect

1. Technology is on your side	5
1.1. Address your reservations towards technology	5
1.2. Use of e-learning materials	6
1.3. Technology is nothing without the people	7
2. LMS helps your teaching	11
2.1. Storytelling: Let's give it a go	13
2.2. What are the LMS about	14
2.3. Essential functions of an LMS	14
3. Effective use of MOOCs	18
3.1. Storytelling: The power of MOOCs	18
3.2. Short history of MOOCs	19
3.3. Differences between cMOOCs and xMOOCs	21
4. Producing instructional videos	25
4.1. Storytelling: Becoming a movie star	25
4.2. Types of recordings and levels of support	26
4.3. Making a movie	27
5. Playing with realities	30
5.1. Storytelling: Blending the worlds	30
5.2. Virtual reality	31
5.3. Augmented reality	32
5.4. Mixed reality	35

1. Technology is on your side

Development of digital competences in project participants.

We are often reluctant to use technology, especially in education – the reason is most often the fear to appear clumsy in front of students who seem to be miles ahead of their teachers regarding the use of technology and the modern ICT tools. Within the module 4, we would therefore like to present you how technology can be on your side. Each chapter of the module 4 is dedicated to a different e-learning tool and respective materials:

- Chapter 1 introduces you to the module content and aim;
- Chapter 2 concentrates on Learning Management Systems (LMS). For instance, Moodle allows creating entire courses, including videos, in a quite simple but professional way; MS Teams allows simultaneous interaction between an entire classroom and the teacher etc.).
- Chapter 3 shows how to make the best of massive open online courses (MOOCs) that can be either self-produced or web-based trainings; we shall also talk about webinars in this chapter;
- Chapter 4 highlights the production of a simple video with the teacher as presenter; the chapter includes some recording tips (technical instructions) and standards (Hernandez, 2017).
- Chapter 5 presents independent materials, especially augmented and virtual reality, which already exist either in education or are already applied in business, to give an outlook in their possible use in 2030 and beyond.

1.1. Address your reservations towards technology

In education, we often have to deal with different types of reservations concerning the use of technology. We are constantly afraid that technology is far ahead of us and that it somehow controls us, instead of being an obeying tool on our side. We often even do not wish to try out new technological possibilities because we presume that learning how to use them would be too hard and too time-consuming, and we may doubt whether we would be able to use it appropriately. Furthermore, we are not sure how the students would accept this approach to education and we fear that our students will probably know more about the technology than we do. How many times has the following situation happened to you?

You are in the middle of your lecture, trying to show something really crucial and interesting to your students, as the computer suddenly stops working, and you are not able to solve the problem, no matter which key you press.

We in general experience fear not only from using the technology itself but also from the fact that not everything might work perfectly during the lecture. And should something go wrong in the middle of your public performance – can you as teacher be sure that there would be someone around, whom you could call for help, and who would be able to solve the technological problem as fast and as elegant as possible without much interruption?

Ready to do a task?

While reading this text, you probably have recalled all the fears and reservations you have about technology. Please put them down. We suggest you address the following questions not to miss out anyone of them:

- Why do I feel reservations towards technology?
- How could I overcome this fear?
- Where can I get reliable information and educate myself about it / acquire the necessary skills?
- Who can I talk to or ask for assistance when I need information, advice, help?
- Can I complete a task that requires technology and technological knowledge together with my students and thus try to master it by using the “learning by doing” method?
- What could be my first steps of using technology in lecturing? Is there a course or lesson, for which I suppose it would be appropriate to start with?

Please keep in mind that there is a myriad of ideas out there: you just have to be brave enough to start using and implementing them. Don't let the old-fashioned and conservative way of lecturing take over your innovative and creative approach. Embrace change, flexibility and adoption – your students will adore them. What are the first ideas you can think of? Think about them and have fun doing it.

1.2. Use of e-learning materials

Technology offers several possibilities that support your being creative in the classroom. Therefore, we are presenting some of them further on in this module. For some of them, you would need your institution's support – they are mentioned only briefly. Namely, we

have decided to show more in detail exclusively those that you can manage by yourself or in collaboration with your colleagues practically free of charge; these are:

- **Learning Management Systems: LMS**
- **Massive (Open) Online Courses: M(O)OC**
- **Computer-based training: CBT**
- **Web (or mobile) based training: WBT**
- **Augmented reality (AR)**
- **Virtual reality (VR)**

Exercise

Think about the e-learning tools listed above. Which one could be the most suitable for you? Have you already got acquainted with anyone of them? Explore them and decide, the use of which one would make you feel most comfortable.



Source: <https://www.swiftelearningservices.com/rapid-elearning-approach-to-convert-university-courses-into-web-based-elearning-programs/>

1.3. Technology is nothing without the people

Technology is here to support us and not vice versa. We control it and decide what, when and where we shall use it as an additional enrichment of our lectures. And yet, Alber (2019) suggest that *»new teachers often struggle with finding multiple ways for students to access course content, and video clips can help«*. Have you ever used video or audio clips to enrich your lecturing?



Source: <https://blog.wiziq.com/wiziq-recorder-2-3-redefining-video-lectures/>

This certainly could be one of the basic steps towards the use of technology in your teaching environment. Think about the following question: Do you think creating a video or audio content can add creativity and shift from the traditional teaching?

Exercise: Exploring the world of MOOCs

Explore the information from the edX website: <https://www.mooc.org> and gain some basic information about the offered edX online courses. Find out what MOOCs actually are, and for whom have they been created?

On the picture below, we can see the best known and the widespread labels that represent some world's best universities that offer online learning in MOOC form. If we take a look at the first one depicted on the picture, Coursera, and visit its webpage we get to know that they offer more than 3,900 courses and specialisations offered by more than 190 partners from academia and business (<https://www.coursera.org>).



Source : <https://www.diygenius.com/the-ultimate-guide-to-moocs/>

After exploring the website content, please answer the following questions: Did you already know about all the possibilities MOOCs can offer to learners and teachers? According to edX (2019), »MOOCs have dramatically changed the way the world learns«. Are you ready to adopt?

Excercise: Exploring the LMS

We have already heard about the learning management systems (LMS) as being one of the e-learning materials we are introducing in this module. But can we give a real-life example of an LMS? We think all the teachers, lecturers and professors have already had a closer look at the most widely spread LMS, the Moodle. However, if you do not know it yet, you will be able to explore some basic information about Moodle watching this video: <https://www.youtube.com/watch?v=3ORsUGVNxGs>.

After watching the video, let us reflect about the Moodle system. What is Moodle? Do you know this LMS? Are you perhaps already a user? Please put down, which are the things you can do when using the Moodle learning platform in the classroom (based on the information from the video).

Activity: People vs. school system

Watch the 6-minute video in the cBook in Chapter 1, in which the school system is being accused of having got stocked in history and not being able to cater to the needs of the modern youth. Cars and phones have developed considerably in the last 100 years but the school system lacks innovation and adaptation to modernity (technological progress): Considering the content of the following four chapters: which material would you use to make the school system as modern as a cell phone?

References

Alber, R. (2019). Using Video Content to Amplify Learning. Edutopia. Retrieved from: <https://www.edutopia.org/article/using-video-content-amplify-learning>

Diygenius.com. (2019). Retrieved from: <https://www.diygenius.com/the-ultimate-guide-to-moocs/>

edX.org. (2019). Retrieved from: <https://www.mooc.org>

Hernandez, M. (2017). *How To Record an Online Lecture (Tutorial + Complete Checklist)*. Retrieved 2019, from Youtube: <https://elearningindustry.com/5-teaching-techniques-virtual-classroom>

Majumdar, A. (2016). *5 Teaching Techniques In The Virtual Classroom*. Retrieve

2019, from e-learning industry: <https://elearningindustry.com/5-teaching-techniques-virtual-classroom>

Swift eLearning (2019). Retrieved from: <https://www.swiftelearningservices.com/rapid-elearning-approach-to-convert-university-courses-into-web-based-elearning-programs/>

WiziQ blog (2015). Retrieved from: <https://blog.wiziq.com/wiziq-recordor-2-3-redefining-video-lectures/>

YouTube video: What is Moodle? Retrieved from: <https://www.youtube.com/watch?v=3ORsUGVNxGs>

<https://www.coursera.org>

Wikipedia. (2019). *Learning Management System*. Retrieved 2019, from Wikipedia:
https://en.wikipedia.org/wiki/Learning_management_system

2. LMS helps your teaching

Learning Management Systems (LMS) are tools used by educational institutions and businesses for online courses and online training. They support several functionalities, e.g. reading the course materials (or/and downloading them), writing tests, assigning homework or participants, assessing the results etc. LMSs are either available free of charge on the Internet (the top 5 among them are Moodle as the most widely spread one among the universities in Europe, followed by Chamilo, Open edx, Totara Learn and Canvas) (Pappas, 2014 and 2019). Which one to choose depends, of course, on the one hand on how much money you can spend to buy them, and on the other, which functionalities they offer and which needs/requirements of your institution they support.

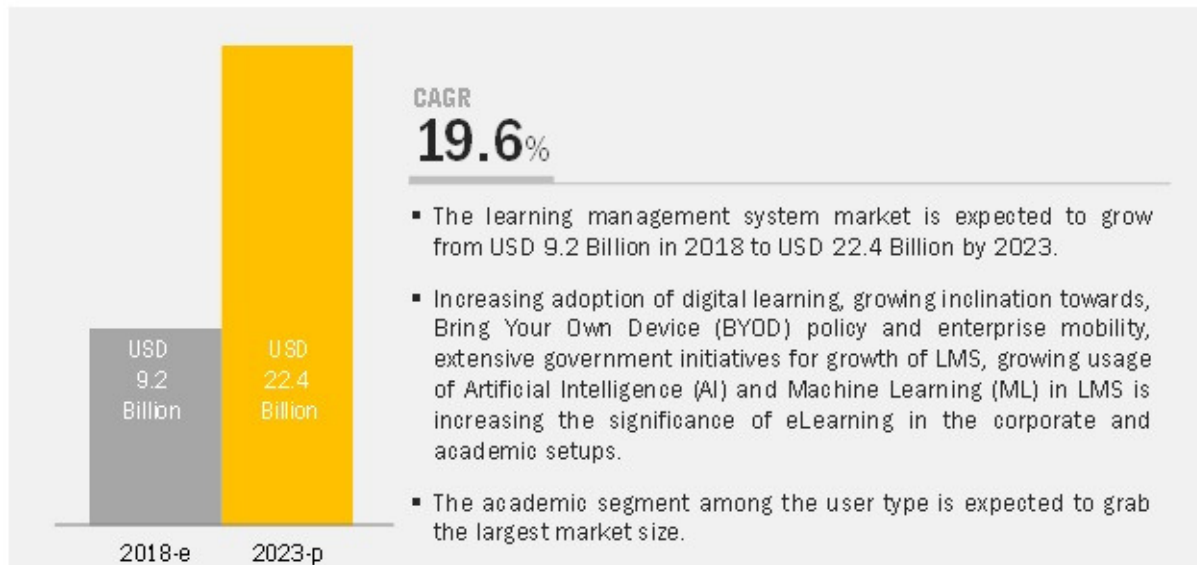


Khakimullin Aleksandr/Shutterstock.com

To get a first understanding of what the LMSs are about, you can have a look at a great blog, which explains all major questions that arise when someone tries to learn something completely new. Here is the link to the blog managed by Halden Ingwersen: <https://blog.capterra.com/lms-glossary/>.

If in 2012, Watson and Lee Watson tried to make clear what LMSs were, what they were not and what they should become, so today we know that LMSs are not a fashionable invention that is forgotten in two or three years: they have become indispensable in school and business life, and will develop enormously in this decade (2020-2030). For sure, additional functionalities will be added, yet the idea and the basic features will remain and develop rapidly. An estimation says that the LMS market would more than double within five years (estimation based in 2018, see picture below).

Attractive Opportunities in Learning Management System Market



Source: https://www.marketsandmarkets.com/Market-Reports/learning-management-systems-market-1266.html?gclid=EAlaIQobChMltKT-oful3QIVjcgYCh1PcwkEAAAYASAAEgIfGvD_BwE

If your institution is thinking about introducing a LMS, you can check several webpages that offer a good overview of what each one of them offers; a webpage where you can find previews and extrapolations regarding the development of the LMS market up to 2023 (based on 2018) can be found at: https://www.marketsandmarkets.com/Market-Reports/learning-management-systems-market-1266.html?gclid=EAlaIQobChMltKT-oful3QIVjcgYCh1PcwkEAAAYASAAEgIfGvD_BwE. It offers the Global LMS Market Forecast by Component (Solution and Services), Delivery Mode (Distance Learning, Instructor-Led Training and Blended Learning), Deployment Type, User Type (Academic and Corporate), and Region. In case your institution is about to acquire an LMS, you should consult Ingwerson's blog (6 Questions to Ask Before Choosing an LMS).

Several universities around the Globe have introduced different LMSs, mostly as a tool used for distant learning; others, as well as several businesses, use them for several other tasks as well. Their common denominator is called education and training.

Less developed countries are happy to introduce one of the LMSs that are available free of charge: it allows them to catch up, regarding their offer on distant learning, with the methodology used at renown educational institutions in the rich part of the world. In this way, Moodle has become the widest spread LMS in the world.

Yet even Moodle in all its popularity need local support at the institution that uses this system. Should Moodle act as a really helpful tool for the teachers, they would need an expert at the

faculty who can provide instant support to those who use it. As this is mostly not the case, Moodle often remains an obligatory system prescribed by the institutions, yet the teachers mostly use only its basic functionalities, e.g. assigning homework for students, setting up lists of participants, uploading study materials and similarly simple things. Recently, a new tool, presently free for Office users, with many additional functionalities, has been developed; we shall describe it in the chapter 2.1.

2.1. Story: Let's give it a go

Lucia: Our faculty has chosen Moodle as its official LMS – but I have started using MS Teams: first privately, and now in the classroom as well, and I find it great. Its functionalities go far beyond those of Moodle and the LMS that are available free of charge. Teams is a combination of an LMS and a social channel, reminding of Skype, yet with an array of additional possibilities. It allows talking, seeing the life picture of all participants in the video conference, exchange of messages, as well as documents- and screen-sharing. Its development is still in progress at the moment (beginning of 2020), and when the programme is completed, it will for sure largely impact the field of LMS. The official website for Teams: <https://www.elearningforce.com/blog-post-lms365/472-learning-made-social-lms365-meets-microsoft-teams>.



For students and for me as their teacher, it is really nice to be able to interact directly and immediately and to see each other, even if we sit hundreds of kilometres apart from each other. When using Teams, I as teacher can do everything exactly as if I was in the classroom together with my students: I have a whiteboard at my hand, and through sharing my screen with the students, they can see the documents I open on my PC, e.g. a Power Point presentation. I can decide which documents I want to share with my students – in this way, I can have two documents open parallel on my screen, and share only one of them with my students. I can also lower the accompanying music of a pps presentation, and then comment on the content of the presentation – exactly like in the classroom.

Can you imagine that part of your university's programmes are carried out online? Or that you as teacher do not leave your house every day and for all the courses you are giving, but still have a personal contact with your students via the Internet? Teams and some other LMSs make this possible. What do you think how your institution would act, once Teams is complete, and it is available free of charge within the MS Office package?

Exercise

Please log in into Teams and discover its basic functionalities: how to stream a lesson, make a post, and share a document.

2.2. What makes Teams so attractive for different layers of users?

In 2017, Microsoft added a new tool to the Office 365 family: Microsoft Teams, conceived as a chat-based workspace that provides instant access to a team's content from a single place. In only three years-time, this collaboration tool has been made available in 181 countries and in 18 different languages. Many educational institutions are already introducing it to support the changing way of learning (e.g. University of Maribor), as the younger generation is looking for more flexible ways of balancing their work- and leisure-time.

We as teachers are familiar with the Gen Y characteristics. They act as digital multitaskers: they listen to the course, yet at the same time, they cannot resist their desire / need (an increasing number of the youth being addicted to the technology) to search for similar themes (or chat or check emails or FB messages) on additional ICT devices (e.g. smart phones, tablets etc.). MS Teams seems to be responding to this generation's needs by offering a programme that allows several kinds of social contacts simultaneously within one single programme (listening to the teacher, posting a message to the entire group, sending a private message to only one group participant, surfing on a private Internet page etc.

2.3. Advantages of using an LMS in education¹

Laithangbam (2019) argues there are nine benefits of using an LMS in education. <https://www.proprofs.com/c/lms/advantages-using-learning-management-system-educational-institutions/>

Educational institutions need to regularly adopt their learning tools and their study material to the development in the ICT Sector. An LMS can bring along quite an array of benefits, like introduction of a **(1) centralized pool of information**. An LMS offers a centralized and

¹ This sub-chapter is based on Laithangbam, M. (2019) contribution: 9 Benefits of Using a Learning Management System in Education.

consolidated storehouse of educational data that can be kept in one single location and students can access them anytime and anywhere. Additionally, an LMS offers a **(2) personalized approach** to each student, which is almost impossible in large traditional classes. This software tool creates equal opportunities for learning for each student. Students can **(3) access these eLearning tools anytime, anywhere** as per their convenience and learn at their own pace. That is the top reason for students and working professionals to enroll themselves for online courses. Unlike traditional classroom-based teaching where teachers follow a fixed teaching methodology, online learning through LMS encourages instructors to be innovative and **(4) flexible in teaching** by implementing techniques like blended learning, flipped learning, storytelling, gamification, rapid learning, and social learning. What an LMS makes possible, is **(5) interactive learning**, where students build connections with peers for learning purposes, share opinions, collaborate on different assignments, keep themselves posted on instructors' and fellow students' latest updates, or have a live chat with teachers and students without meeting face to face. LMSs can also be **(6) customised** to meet the specific teaching needs of your institution, like creating tailor-made courses for different classes, providing personalised attention to each user with reminders, notifications, restricting attempts, authentication, or by incorporating images, logos, and messages into the courses. LMSs also allow an **(7) advanced tracking system** where instructors can track data related to each student's course activities, time spent completing different assignments, and learning paths. This enables automatic generation of learning reports and issuing completion certificates. Teachers can thus identify problem areas of each learner and, if necessary, **(8) involve their guardians** (in primary schooling). Some LMS tools allow parents to log in to keep tabs on their children's educational progress such as attendance and test grades. This helps to a better parent-teacher relationship, and **is (9) time-saving**. Students, too, save time, as all the study materials are placed in a centralized location, and can be accessed easily anytime, anywhere. Right from creating courses to assigning of tasks to grading, reporting, and feedback, everything is automated. This saves valuable time. Instant results and feedback delight both teachers and students in a big way. Further, you can train hundreds or thousands of students online at a time without the need for arranging different classrooms for training different groups of students.

Activity: The MOODLE demo

Try out Moodle features by surfing their official website at: <https://moodle.org/demo/>. This demo (example of the Mount Orange School) allows trying out multiple roles. The site is populated with courses, activities and users, and is purged every hour. Multiple users regularly join in therefore you may assist to some unexpected activities.

Exercise

Please visit the webpage: <https://elearningindustry.com/the-20-best-learning-management-systems>, and read carefully about the five ones that can be used free of charge. Check the characteristics and functionalities of the Five Top Open-Source Learning Management Systems (Pappas, 2014, update 2019) and consult your colleagues which one would be the most suitable for your institution. Find some colleagues who would be willing to start using one of them (in case your institution has not yet introduced another LMS).

References

Canvas (2015) *Tutorial Video Series: Instructor Canvas overview*. Retrieved 2019 from: Canvas overview. Retrieved from: <https://community.canvaslms.com/videos/1095-canvas-overview-instructors>

Captera (2018). *LMS software*. Retrieved 2019 from: <https://www.captera.com/learning-management-system-software/#infographic>

Fenton, William (2018): *The Best (LMS) Learning Management Systems for 2018*. Retrieved from: <https://www.pcmag.com/picks/the-best-lms-learning-management-systems>

Ingwersen, Halden. (2017). *LMS Glossary*. Retrieved from: <https://blog.captera.com/lms-glossary/>

Ingwersen, Halden (2018): *6 Questions to Ask Before Choosing an LMS*. Published March 7th, 2018 by Halden Ingwersen at his blog [LMS](#)

Keramisa, Marida (2019): *The Final Touch: 7 Tips & Tricks For Outstanding eLearning Storyboards*. <https://elearningindustry.com/outstanding-elearning-storyboards-final-touch-tips-tricks>

Laithangbam, Michael (2019): *9 Benefits of Using a Learning Management System in Education*. <https://www.proprofs.com/c/lms/advantages-using-learning-management-system-educational-institutions/> (Blog, last update 31st March 2020):

LMS Market (published: Jan 2019, Report Code: TC 2142)

https://www.marketsandmarkets.com/Market-Reports/learning-management-systems-market-1266.html?gclid=EAlaIqobChMIItKT-oful3QIVjcyCh1PcwkEAAYASAAEglfGvD_BwE

Markets and Markets: *Learning Management System Market - Global Forecast to 2023*. https://www.marketsandmarkets.com/Market-Reports/learning-management-systems-market-1266.html?gclid=EAlaIqobChMIItKT-oful3QIVjcyCh1PcwkEAAYASAAEglfGvD_BwE

Moodle (2017). *Managing a Moodle course*. Retrieved 2019 from: https://docs.moodle.org/34/en/Managing_a_Moodle_course

Moodle (2019). *Moodle: Demo*. Retrieved 2019 from: <https://moodle.org/demo/>

<https://elearningindustry.com/the-20-best-learning-management-systems>

Pappas, Christopher (2014, with a 2019 Update): *The 20 Best Learning Management Systems*. Retrieved 2019 from: <https://www.pcmag.com/picks/the-best-lms-learning-management-systems>

Shortsleeve, Alex (2018): Learning Management Systems: what they are, and why you might want one. Retrieved from: <https://www.freecodecamp.org/news/learning-management-systems-what-they-are-and-why-you-might-want-one-9bc28186e395/>

Teams: <https://www.elearningforce.com/blog-post-lms365/472-learning-made-social-lms365-meets-microsoft-teams>

Watson, William & Watson, Sunnie Lee (2007): *An argument for clarity: what are learning management systems, what are they not, and what should they become?* Retrieved from: <https://hal.archives-ouvertes.fr/hal-00692067/document>

3. Effective use of MOOCs

Let us first explain the acronym MOOC: it stands for a **M**assive **O**pen **O**nline **C**ourse. As the name tells us, they are aimed at bringing knowledge to a mass of people who do not have to pay for the tuition. They are online, which means that some MOOC attendees can sit during its duration in Australia, and others in Europe or South America, and learn simultaneously – the Internet makes it possible. MOOCs are offered by more and more higher education institutions, and the density of the offer and their accessibility have turned them to pedagogical tools which neither students nor teachers around the world would wish to miss. It is also clear that they will remain popular and widely used companions of the educational system for a long, long time. MOOCs have spread very quickly, and today they cover any field of expertise we may think of, from medicine over physics to business, arts or sports.

After clearing what MOOCs are, we should discover who is offering them and why they are free? Are they, compared to the regular university courses, shorter and less demanding? Does a certificate on a MOOC attendance have the same value / recognition as a regular bachelor certificate issued by this same university? These and some other questions will be answered in the following subchapters.

3.1. Story: The power of MOOCs

Marko: You know, Lucia, yesterday I tried to remember which was the event with the maximum number of participants I have taken part in. I was first thinking about rock concerts and football



matches – yet finally recognised that none of the totally sold-out stadiums could win. The absolutely biggest event I participated in was a MOOC: I was one of the students who have enrolled into the Machine Learning class, organised by Stanford in 2012, which had more than 100,000 participants from around the Globe. As normal in-class courses at Stanford are limited to 400 students as a maximum, you can imagine what a classroom alternative to this MOOC would have meant: a 250-years of teaching for one professor! What yet impressed me most, was the extremely short reaction

time when someone of us, participants, asked a question: as our instructors could not be with us 24/7, we developed a peer collaboration: no matter when a participant has asked a question,

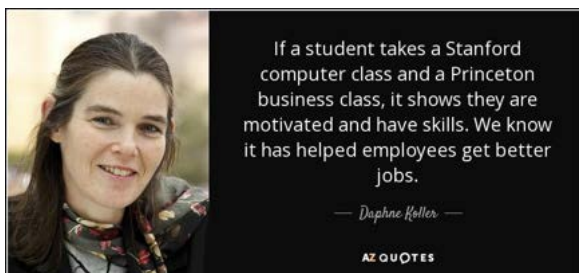
there has always been someone somewhere in the world, sitting exactly at that tie at his PC, who knew the answer (Koller, 2012). This was for sure my most amazing experience in education, and I am still grateful that it was made possible.

Let us prepare some information for our readers about what MOOCs are, who can develop them, and who are the target audiences. We shall for sure not reach 100,000 people with the Teaching 2030 materials – yet even only a handful of teachers, learning how useful MOOCs are, and starting including them into their tuition would make me feel happy. It could say “mission completed”, somehow like forwarding a bit for the benefits I gained during my first and “most massive” MOOC.

3.2. A short history of MOOCs

MOOCs originate from the famous Khan Academy: In 2003, Salman Khan began tutoring his nine-year-old cousin Nadia, posting instructional video lessons in mathematics on YouTube. What he hasn't expect was that thousands of other users would also start watching his videos. The private online lessons turned into a fulltime job for Khan. Videos had success because of their simplicity: in no longer than 10 minutes, they were accessible from any device, all around the globe, and free of charge. Yet at that time, nobody has called them MOOCs. It was only in 2008 that Dave Cormier from the University of Prince Edward Island in Canada coined this term for his own course called “Connectivism and Connective Knowledge”, which he was giving for a tuition fee to his 25 in-house students, and 2,200 non-paying external participants. *“This first MOOC also made ample use of several social media applications, such as blogs, forums, Facebook, Second Life (Kaplan and Haenlein, 2009), and Wikis (Kaplan and Haenlein, 2014). The idea then spread like wildfire so that 2012 was proclaimed “The Year of the MOOC” by the New York Times”* (Kaplan and Haenlein, 2016).

We suppose that one of the reasons, why NY Times proclaimed 2012 as the year of MOOCs was the launch of the MOOC platform “Coursera” at Stanford by professors Daphne Koller and Andrew Y. Ng.



Photos: <https://www.azquotes.com/quote/1220622> (Koller) and <https://medium.com/@bondadenavin23/machine-learning-yearning-an-book-by-andrew-ng-get-it-free-8b17cd91f48b> (Ng)

Their plan was to offer best courses of best instructors from best universities to everyone around the Globe for free. Launching of the Coursera platform was a huge success for Stanford: it was founded in February 2012, and only half a year later, in August, this platform has reached 640,000 students from 190 different countries, offering 6 million quizzes in 15 classes – and 14 million videos have been viewed (Koller, 2012).

Impressive? In 2020 (January), thus only 8 years later, these figures are even more impressive: Coursera has 450 employees; it offers more than 3.900 courses and specialisations, and has more than 53 million users (<https://about.coursera.org>).

No wonder that top universities took this as a model, creating instructional videos to market their knowledge all around the globe and to attract international students. Here is a list of the top five MOOC providers by registered users (as of 2018 – more recent data are not available in Jan. 2020):

Course platform / founding university:

- Coursera (37 mio, Stanford)
- edX (18 mio, Harvard, Berkeley)
- XuetangX (14 mio, Tsinghua)
- Udacity (10 mio, Udacity)
- FutureLearn (8.7 mio, Manchester)

Activity: The history of MOOCS

Let's go for another, more practical iLab exercise! The history of MOOCs is well explained in this short [video](#). Let's have a look! When you watch the video, you will be able to answer these questions:

1. What is blended learning?
2. What is flip teaching?
3. Give the timeline for the development of most important xMOOCs globally.
4. What is the distinction between xMOOCs and cMOOCs?

3.3. How do MOOCs work?

MOOCs are online courses available to anyone with a computer (or similar device) and an Internet connection. They are similar to an online class, yet can be accessed without paying tuition. MOOCs are ideal to learn either just for fun or to get a certificate for a small fee, or to refresh one's knowledge. MOOCs from renown universities (e.g. Stanford) can help someone find a job or get promoted.

The three primary characteristics of MOOCs are: they are free, they are open to everyone, and they have a flexible course structure. Unlike the traditional classroom with a fix time-table, in MOOCs, participants can work at their own pace and at times that are convenient for them. This makes them an ideal for example for young mothers who have to take care for their children during the day, and can postpone the studying and completing their homework to the time when they are in bed. They are ideal also for employed people who are not able to attend regular classes, and finally, MOOCs are ideal for people with a weak immune system (or who have at home a seriously ill family member with a weak immune system): as they study from home they cannot get infected and represent no danger for this seriously ill person. Let us have a look in which points MOOCs are different from online college courses:

SIMILARITIES	DIFFERENCES
MOOCs are offered online.	MOOCs are free.
MOOCs are often taught by the same professors that teach online college classes.	MOOCs have unlimited class size.
MOOC course materials are often exactly the same as the course materials provided to college students taking online classes.	Anyone can enrol in a specific MOOC, even if they're not "qualified" to take it.
MOOCs are sometimes offered in partnership with colleges and universities.	Students can start and stop the course at any time, without any formal consequences.
A set of MOOCs can sometimes be offered for academic credit. However, in these instances, the student will have to be officially enrolled in a college or university and pay tuition to receive academic credit for the MOOC.	Upon completion of the course, a student will not have a tangible or formally recognized degree, certificate or transcript of completion.
MOOCs offer self-paced study, allowing students to complete coursework and take tests on their schedule.	

(Source of the table: Fieland, (2019))

The main difference between a regular course and a MOOC is the value of the certificate that is issued upon its completion: a MOOC cannot replace a regular bachelor. MOOCs are normally shorter in duration and less demanding (several topics that appear in a regular course are left out in a MOOC). Yet no matter of the written, MOOCs help boost careers: by two relatively equal candidates, a certificate of having attended a MOOC at a renowned university would tip the sale in their favour.

We differentiate between two kinds of MOOCs: cMOOCs and xMOOCs. Let us check the differences between them: **xMOOC** stands for **eXtended** Massive Open Online Course; they are based on traditional university courses. Their **advantage** is that they significantly broaden the number of students who can be exposed to university-level courses. Their **disadvantage** is the criticism that xMOOCs are inferior to the university courses they mimic because they considerably limit or completely eliminate the student-student interactions.

The **'c' in cMOOC** stands for **connectivist**. The lecture is delivered to the student by an instructor – this is the key distinction between an xMOOC and a cMOOC.

[Stephen Downes](#), co-founder of one of the first MOOCs, coined this term to create a distinction from the 'xMOOCs'. Yet rather than being delivered by an individual instructor (typical for traditional university courses), cMOOCs involve groups of people who learn together. They often offer content and promote interaction through blogs, learning communities or social media platforms. In this environment, all participants are considered teachers AND learners at the time, which stands in contrast to the structure of xMOOCs, where each individual is either a student OR a teacher (ExtensionEngine).

Differences between cMOOCs and xMOOCs

xMOOCs		cMOOCs
Scalability of provision	Massive	Community and connections
Open access - Restricted license	Open	Open access & licence
Individual learning in single platform	Online	Networked learning across multiple platforms and services
Acquire a curriculum of knowledge & skills	Course	Develop shared practices, knowledge and understanding

Wikipedia, 2019

Exercise

- Look in Google for an example of a xMOOC, and an example of a cMOOC and check the differences between them.
- Now think about the possibility of using cMOOCs and xMOOCs in your teaching – which course would be appropriate to start with? Remember that you first need to find a cMOOC that fits the course content and is available online while your course is running. Our tip: browse the websites of Coursera, EdX, and Udacity.
- After you have found a suitable cMOOC, you offer it to your students. You as teacher will take part in discussions, using a social networking platform. Your students will generate the content, which will then be made available to the rest of the group. As cMOOCs are very dynamic, we do not define their learning outcomes very strictly: we only set a certain framework.

xMOOCs can be considered as a highly valuable supplement to your lectures:

1. Choose a MOOC that fits your course (topic availability and the lecture time table).
2. Choose a suitable content, considering the ECTS points and the grading.
3. In the last step, choose communication mode with the students outside the classroom, e.g. how often you will be available for feedback and questions, and which social networking platform (LMS system) you will use (M4/Ch2). This depends, of course, on the number of students enrolled. Sometimes, an xMOOCs can be combined with virtual classrooms (chapter 3 of module 7). When teaching face-to-face, you can invert the classroom (chapter 3 of module 2) in order to train the abilities based on the knowledge acquired through the MOOC.

References

Coursera (2019). Retrieved from: <https://www.coursera.org>

Dehaye, Paul-Olivier (2014): *History of MOOCs*. Retrieved from: https://www.youtube.com/watch?v=JCE_yhGWI6c

edX (2019a). Retrieved from: https://www.edx.org/course/demox#.VRI9SHrF_2o

ExtensionEngine: *xMOOC vs cMOOC? Defining Common MOOC Terms*.
<https://blog.extensionengine.com/xmooc-vs-cmooc>

Fieland, Margaret (2019): *The ultimate MOOC Handbook*. Massive open online courses: who they're for, how they work, and where to find them

Future Learn (2019a). *What is a MOOC?* Retrieved 2019 from:
<https://about.futurelearn.com/blog/what-is-a-mooc-futurelearn>

Future Learn (2019b). *Future Learn*. Retrieved 2019 from: <https://www.futurelearn.com>

Kaplan, A. M.; Michael Haenlein (2016): Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, Volume 59, Issue 4, July–August 2016, Pages 441-450.

Kaplan, A.M.; M. Haenlein (2009): **The fairyland of Second Life: About virtual social worlds and how to use them.** *Business Horizons*, 52 (6), pp. 563-572

Kaplan, A.M., M. Haenlein (2014): **Collaborative projects (social media application): About Wikipedia, the free encyclopedia.** *Business Horizons*, 57 (5), pp. 617-62

Koller, Daphne (2012): *What we're learning from online education.* Retrieved from:
<https://www.youtube.com/watch?v=U6FvJ6jMGHU>

Wikipedia (2019). *Creative Commons*,. Retrieved from: <http://desarrolloweb.dlsi.ua.es/moocs/what-is-a-mooc>

Wikipedia (2019). *MOOC*,. Retrieved 2019 from:
https://en.wikipedia.org/wiki/Massive_open_online_course

Serhat, Kurt (2018): *Massive open online courses (MOOCs), Definitions.* Retrieved from: <https://educationaltechnology.net/massive-open-online-courses-moocs-definitions/>

Sergio Luján Mora (2013). *What is a MOOC?* Retrieved 2019 from:
<http://desarrolloweb.dlsi.ua.es/moocs/what-is-a-mooc>

Shah, Dhawal (2018): *By The Numbers: MOOCS in 2017.* Retrieved from: Retrieved from:
<https://classcentral.com/report/mooc-stats-2017/>

Udacity. Retrieved from: <http://https/eu.udacity.com>

Xuetang, X. Retrieved from: <https://www.xuetangx.com/global>

4. Producing instructional videos

4.1. Storytelling: Becoming a movie star

Lucia: Last week, students asked me to share a video of my lectures. I would really like to create a professional one. And at the same time, the dean wishes to use it as a promotional video. Can you please help me out?

Marko: Maybe I could, I am running a multimedia class this semester, so maybe I can be of some help.

Lucia: How to approach all this? I am afraid that these are two perfectly different things. I understand that promotional videos are important, but I would really like to help the students. And finally: you do know that I am far from being a movie star...

Marko: Huh, this is quite a task. Technical quality is of course important, but in this case, the more important are the purpose and the content – your videos should facilitate the learning, and I am afraid that you do not have the resources to create a commercial all by yourself.

Lucia: But I need to produce something. How should I start?

Marko: First, you should decide on what you would really like to do, and then, how to do it. Let us start from the beginning....

Exercise: Answering these questions might help you start

First, you should analyse what is actually expected from you. So you may start planning your video by selecting or commenting on the following criteria and competences (personal or organisational):

1. The target groups
 - a. Regular students attending your classes
 - b. Distance students
 - c. Promotional video for your school
 - d. _____
2. The target groups' expectations
 - a. Supporting the learning process
 - b. Selling the teaching courses
 - c. Presenting the institution
 - d. _____
3. The equipment:
 - a. Laptop-camera, standard microphone, screen recording

- b. Full HD camera, microphone with noise reduction, green screen
 - c. Professional lights, camera, microphone recording studio
 - d. _____
4. The length of the presentation
 - a. 15 minutes short lecture/webinar
 - b. Full 1.5 hour-lecture
 - c. Up to 5 minutes promo
 - d. _____
5. Editing software, equipment and skills
 - a. Free software, I edited an amateur video before
 - b. Accessible software, computer with a graphic card, I can manage audio and video
 - c. Professional editing software and equipment, expert knowledge
 - d. _____
6. Organisational support
 - a. It is all on me
 - b. There is a person, who can do the recording and editing
 - c. A full video and editing crew, waiting for ME
 - d. _____
7. Have you done it before?
 - a. What should I do now?
 - b. I' am a pro, I control every step of the process
 - c. I can follow directives and speak my text
 - d. _____

4.2. Deciding on the contents and technology

Now you can decide on the type of the recording you would like to produce based on the topic, the audience and the organisational expectations. If the vast majority of the answers was A, you should opt for Type 1; If you answered B, then Type 2 would be appropriate; in case you opted for C, the suitable approach would be Type 3.

- Type 1: a simple screen recorded presentation;
- Type 2: a presentation with voice-over and presenter;
- Type 3: a presentation with live recording.

If you selected Type 1, you should use the following steps. If not, you can scan the contents and then process to the next chapter.

Activity: Choose your style

We have presented three types of video recording-choose one and record a video of your lecture/presentation by using the type that fits best your purpose.

Type 1: On-screen presentations

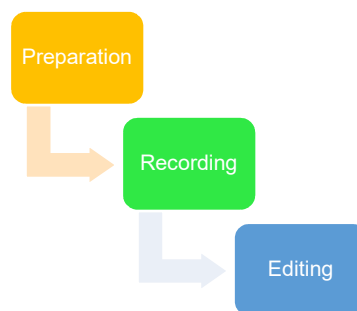
Type 2: A presentation with voice-over and presenter (facecam), using open broadcaster software

Type 3: A presentation with live-recording and editing, using ShotCut

1. Show your video to other colleagues to obtain feedback.
2. Don't be too hard on yourself.
3. Note down what you would like to improve next time.
4. Remember: Others will not be as critical of you as you will be of yourself.
5. Experiment with your recordings.

4.3. Making a video

After identifying the targets, assessing the capacities and deciding on the type, it is time to start. Let us use the three steps process:



Record one of your lectures for the students

1. Preparation

The story: Use one of your favourite presentations. Plan some breaks (we suggest every 15 minutes) and enough time for the listeners to complete tasks. Do not forget: students know how to use the pause button.

The equipment: You do not need a camera; only earphones and a (noise-cancelling) microphone are required.

Execute a test-run:

Sit down comfortably and tell your story.

Pay special attention to the sound – especially the reverberation. Remember, it is all about the story. Let somebody else assess the recordings quality.

Recording a live remote lecture might help identifying potential issues. We also suggest you to have a look at the demo how to prepare an interview: <https://youtu.be/Jv1jdXZFqiQ>

Relax: tell or listen to some jokes.

Start when you are ready.

2. Recording and Editing

a. Audio Recording

Since your face is not recorded, you can record the audio and video separately and join them in the edit phase.

Record the audio a couple of times. Try not to read, but interact with the camera as if you were in the classroom with your students. Pauses and intonation are important.

Use the **third** recording – the one where your voice is **enthusiastic** enough.

b. Audio Editing

In the audio editing, clear the language flow, erase disruptions, but do not exaggerate.

The recording should sound natural, so some mistakes are in order. You may use several tools for the task, for instance Audacity

c. Presentation recording

Record the screen of your presentation to match the audio. It is fairly easy: First open the presentation, you would like to record. Then use the Windows key+g on your keyboard. Put your earphones on, start recording, start your audio file and record your presentation. Now you have two files: audio and video.



d. Marrying video and audio

If you have done everything right, your audio and video are a perfect match. You may put them together using just any video editing tool.

Now you can sit down and enjoy: the recording can be shared with your students. They will appreciate it.

References and further reading/watching

Grumo School (2019). *Lecture Recording Checklist (Webcam + Slides)*. Retrieved 2019 from: <http://grumo.com/teach-webcam>

Mareike Hachemer (2017). *Empowering educators for the global goals*. Retrieved 2019 from: <https://www.youtube.com/watch?v=u5OcbNTqbM4&feature=youtu.be>

Mogul, I. (2019). How to Shoot Cinematic Interviews | 10 Easy Steps. Retrived 2019 from Youtube <https://youtu.be/Jv1jdXZFqiQ>

Movavi Vlog (2018). *How to record a let's play for YouTube channel*. Retrieved 2019 from: <https://www.youtube.com/watch?v=7HBE0u9epfE>

Shotcut (2019). *Shotcut- tutorial videos*. Retrieved 2019 from: <https://www.shotcut.org/tutorials/>

Micorsoft (2020). *Record your screen in PowerPoint* Retrieved 2020 from: <https://support.office.com/en-us/article/record-your-screen-in-powerpoint-0b4c3f65-534c-4cf1-9c59-402b6e9d79d0>

Audacity (2020). Retrieved 2020 from <https://www.audacityteam.org/>

5. Playing with realities

5.1. Story: Blending the real world with additional realities

Lucia: Have you ever been to the ancient Rome, Marko? Stand in the ruins of Domus Aurea, Nero's palace in Rome, and having a nice view from there across the ancient Rome?

Marko: What are you referring to?



Lucia: The world is changing; the technology has become an indispensable part of it, and the world is presented by data. We can visualise almost everything these days, even Rome as it looked like in Nero's times.

Marko: I see, you have become a real expert in videos.

Lucia: Not just that, Marko, I am thinking of the Hybrid reality, where data and reality are mixed. Would you like to explore the anatomy of the human body, submerge in the ocean, or understand the city logistics on the spot? It can be done, you know.

Marko: I think we are just starting our journey.

Exercise

Please assess how the options provided below would modify the learning process in your classes. There is quite an array of possibilities you can choose, e.g.:

- Options to experience new places (visualisation),
- Insights into complex structures and processes,
- Dynamic data visualisation (formula, graphs...),
- Interactive engagement with the content,
- Emotional learning for a better fact retention.

5.2. Virtual Reality

Virtual reality provides an environment that can be assessed. To submerge in the virtual environment, we only need a small technological investment: virtual reality goggles can be built by using an existing phone with a gyroscope.

Three tasks are waiting for you:

1. Find an appropriate virtual reality headset, then find out whether your mobile phone is VR capable, and finally, identify the cost of the VR headsets that are compatible with your mobile phone.

Is there a controller to be used with the headset?

2. Explore on YouTube the 360 VR videos that have been recorded in the last month, then search for VR apps on your mobile phone.

Maybe you can visit the “Maritime Museum Piran”'s virtual tours at:

<https://pomorskimuzej.si/en/virtual-tours>

3. Would you like to teach students how to record 360 VR videos?



<https://www.youtube.com/watch?v=je7zfhi3Del>

Please watch the video “How to Film 360° VR Video” and discuss/comment on the 10 hints on creating the 360 videos. Consider the following topics: the camera, the hidden recording device, the storyline, the editing, the audience.

To equip a classroom with virtual reality equipment, a viable strategy should be developed, though. It should invoke the topic, which you would like to use the VR on, and you still need a set of a more robust equipment than used for personal interests. Before considering the investment, other Hybrid Reality options should be considered.

5.3. Augmented reality (AR)

AR advances the existing natural environment and overlays it with virtual information. As both, virtual realities and real worlds coexist harmoniously, the users of AR experience a new and improved natural world where virtual information is used as a tool to provide assistance in everyday activities. The augmented overlay can be for example static information, but it can also include animation and audio inputs.

To activate the AR elements, usually an element in the real world (QR code, dots...) has to be identified by the users' smartphone or tablet. To create new materials, specialised software combining pictures and animations is required.

Research: Finding Augmented Reality examples

Examine the augmented reality apps on your mobile phone that exist for the following educational fields:

A: medicine <https://www.youtube.com/watch?v=AQHkIij7-S0>

B: geography <https://www.youtube.com/watch?v=CRbkZEyKTEE>

C: Engineering <https://www.youtube.com/watch?v=V0WrCf8PbEk>

D: Logistics <https://www.youtube.com/watch?v=0PPbMQXqbhs>

E: Defence <https://www.youtube.com/watch?v=TfCVkmAmTqA>

F: Your personal field of interest:

Equipment needed

Explore the listed devices below. For each of them, please comment on:

- Where the application fields could be applied to your sessions?
- Define the gap between your requirements/desires and the state of research.

Many of us already have experiences with AR: the popular game Pokémon Go is an example of it. Further examples:

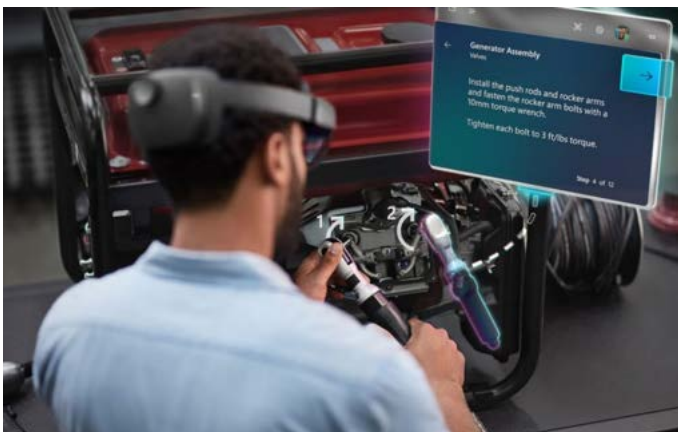
- **Navion**, the first holographic navigation systems for cars, where no special eyewear or headgear is required due to a built-in HD camera and internal sensors.



Application _____

Gap analysis _____

- **Hololens 2** from Microsoft is a holographic computer that allows the view and interaction with the digital content by projecting onto the world around us. From its invention (2016), hundreds of AR apps have been developed (like “hollow anatomy” for education).



Application _____

Gap analysis _____

- **Daqri worksense™** powered by Amazon Web Services, intended to maximise the performance and the productivity. It can be used to react with a remote expert to deliver a next-gen service experience. It can scan and model in 3D.



Application _____

Gap analysis _____

- **Vuzixblade**, fashionable glasses that provide relevant contextual information; it features a battery, a frame-mounted touchpad, a noise-cancelling microphone, a micro SD storage slot, and an HD camera.



Application _____

Gap analysis _____

- **Magic Leap One** combines natural light waves with layered synthetic light fields, triggering neural signals that travel from the retina to the brain and offer unbelievably realistic experiences.



Application _____

Gap analysis _____

5.4. Mixed reality (MR)

Mixed Reality combines elements from Virtual- and Augmented Realities. Currently, mixed reality development is only starting. But According to Flavián et al. (1019), we can expect to have profound effects on the customer experience.

Mixed Reality produces a picture of the environment, augmented with additional elements.

When you look through the mixed reality headset, you don't see your environment, but its representation. The representation of the environment can be *augmented* with additional elements. For instance, a x-ray goggles can represent the vires in the wall.

This way you can turn static explorational elements into a dynamic interactive experience that is not possible in the real world. For instance, in biology class, a seed can virtually grow in your hands.

Equipment needed

To use Mixed Reality materials, mobile phone or semi-transparent goggles, combined with an interaction device, are required. Other specially designed devices, such as holograms or projections can be applied.

To create new materials, specialised software combining pictures and animations is required. Often the materials are custom-built for a specific exposition.

Activity: Create your own Augmented Reality for teaching

- Install [HP reveal](#) on your mobile phone
- Register
- Search for an existing AR (e.g. you can scan the T2030 logo)
- Create a new Augmented reality by doing the following:
 - Select an object to scan
 - Select an existing animation
 - Publish the augmented reality and share it with friends.



A word of caution

Teaching effects of Virtual reality in classes are disputed. By using the current standards of memorising concepts, the reports state that it may provide lesser teaching results (Makransky et al. 2019). Before buying-in the state-of-the-art equipment, a word of caution: it takes a long route for the technology to develop up to the state where it can be safely and simply embedded in our lives. Sometimes early results are overestimated and need in further development stages a lot of adaptation and investment. Please read "The long nose of augmented reality" by [Linda Rodriguez McRobbie](#) (2020).

References

- Augmented *Reality (AR) & textbooks*. Retrieved 2019 from: <https://www.youtube.com/watch?v=KHjxfjebX7g>
- Barmak Heshmat (2019) *Is Augmented reality doomed? A look into future of AR* Retrieved 2019 from: <https://www.youtube.com/watch?v=f05o2KtEpK8>
- CBS This Morning (2015) *Google virtual reality in classes*. Retrieved 2019 from: https://www.youtube.com/watch?v=FQ_whw6oSv4&feature=youtu.be
- Endgagged (2019) *Google Maps AR First Look*. Retrieved 2019 from: <https://www.youtube.com/watch?v=XWbY5jdJnHg>
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100, 547-560.
- Oxford University Press ANZ (2018) *Oxford Exploring augmented reality for education*. Retrieved 2019 from: <https://www.youtube.com/watch?v=yL3DrY-nQj0>
- Makransky, G., Terkildsen, T. S., & Mayer, R. E. (2019). Adding immersive virtual reality to a science lab simulation causes more presence but less learning. *Learning and Instruction*, 60, 225-236.
- Mulvahill, Elizabeth. (2019). *31 Amazing Sources for Free Teacher Resources*. Retrieved from: <https://www.weareteachers.com/free-teacher-resources/>
- Padlet (2017). *How to create a padlet*. Retrieved 2019 from: <https://www.youtube.com/watch?v=U3P5QySmLeU&feature=youtu.be>

Pappas, Christopher. (2013). *321 Free Tools for Teachers - Free Educational Technology*. Retrieved from: <https://elearningindustry.com/321-free-tools-for-teachers-free-educational-technology>

Linda Rodriguez McRobbie(2020). <https://www.strategy-business.com/blog/The-long-nose-of-augmented-reality?gko=fcbad>

Tarantula Digital Studio (2016) *Mixed reality for medicine* Retrieved 2019 from: https://www.youtube.com/watch?v=zmdRe_6lqtI

TechnoNerd (2018). *5 BEST AUGMENTED REALITY TECH 2018*. Retrieved 2019 from: <https://www.youtube.com/watch?v=vQtwWzfzKXI>

The maritime museum Piran (2020) <https://pomorskimuzej.si/en/virtual-tours>

Wilms Kurt (2016). *Introduction to 360-degree video and virtual reality*. Retrieved 2019 from: <https://youtu.be/10YBJx18BPI>

Glossary

Learning Management System: LMS is a software system that manages the learning on the one hand, and the teaching on the other. LMS have become indispensable with the development of distant learning because they allow mastering situations that could not be easily managed in classical classrooms as for instance managing changes in students, lectures and learning places. LMS can be used for several tasks, including documentation, tracking as well as online training.

MOOCs: “Massive” means that large numbers of subscribers can participate: from 50 to more than 50.000 participants. The courses are usually free of charge. **“Open”** has several meanings: (1) MOOCs are open to everyone and should not require prerequisites. (2) Access to educational resources (videos, lecture notes) should be free. (3) Educational resources are hosted in different places like websites, blogs, wikis, or multimedia repositories. (4) MOOCs use open content, which is also published openly so it can be reused by others. **“Online”** is the way of how students attend these courses and of how participants complete assignments and communicate: teaching and assessments take place online. **“Course”** refers to the clear learning objectives that ought to be achieved by students in a given period of time (start and completion dates). In addition, the course should include quizzes and exams to assess the acquired knowledge, as well as some kind of interaction between students and teachers (student-student and student-teacher). If a MOOC is collaborative, we speak of cMOOCs (c for connectivist). If the focus is on the self-paced study, we speak of xMOOCs (x for extended). Some MOOCs are a mixture of both.

Virtual reality (VR): In VR environments the users’ field of view is completely obstructed by the visualization display. This could be a helmet or goggles. VRs are not connected to the real

world. Google Cardboard, for instance, is the easiest way to adopt VR in class. It is affordable, easy to handle and makes fun.

Augmented reality (AR): Augmented Reality systems use a combination of the real world with overlaid computer-generated content. It is mostly used to enrich the information given in the real world by additional content. In this sense, it is static but can also include animations.

Mixed reality (MR): Mixed reality combines elements from Virtual and Augmented Reality as the boundaries are not clearly defined. Its main characteristic is the interaction between the real world and the virtual environment that allows hybrid learning experiences. Remember the Holodeck in the Sci-Fi series of Star Trek? This is exactly what it is meant to be.