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e-DESK

Digital & Entrepreneurial Skills
for European teachers

A Methodology for Digital and Entrepreneurial Teachers

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A Methodology for Digital and Entrepreneurial Teachers

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Introduction. The e-DESK project

This methodology was created as a core for e-DESK (Digital and Entrepreneurial Skills for European Teachers) project, an intervention co-funded by the European Union through the Erasmus+ programme.

e-DESK is about hybrid university education, fostering the digital and entrepreneurial skills of teachers and students. The COVID-19 pandemic has turned our lives upside down. We live surrounded by technology, but this situation has made visible some gaps that university education needs to fill to offer young Europeans a development in line with today's demands.

To address these needs, e-DESK puts the focus on continuous teacher training. We want to enhance teachers' digital skills and entrepreneurial competencies by designing a hybrid methodology in which face-to-face teaching and digital environments are combined. The final idea of e-DESK is to bring education closer to all students, to understand their way of using technology so that education adapts to new uses and to blur the frontiers through the possibilities offered by digital environments.

For that, our project has designed this hybrid methodology you are now about to use, to develop education, both in physical classrooms, outdoors and in digital environments, and to bring education closer through a hybrid methodological solution (physical and digital) to reach students anywhere in Europe and the world.

We aim to support the professional development of university teachers to make them able to respond to the needs of their students, to help develop the digital skills of educators and to know methods for their effective incorporation into lessons.

e-DESK is also about entrepreneurial competencies for educators to better understand European youth's needs to improve their employability and social integration, knowing the use that young people make of technology, in order to adjust the design of our teaching activities.

The e-DESK Methodology guided the implementation of the MOOC course “Digital and Entrepreneurial Teachers for a Fast-Changing World” for HEI teachers, designed by the project. It gave a frame on how to create MOOC modules, selecting modules in hold and represent the modules logically in the MOOC. The methodology guarantees that MOOC users will get a wide and thorough understanding of digital and entrepreneurial skills teachers need in today’s world.

The e-DESK methodology also contains key concepts based on the EntreComp framework, for educators to learn entrepreneurial skills to be part of an educational system that needs to be alert and responsive to change and capable of designing and implementing new solutions to complex challenges.

All e-DESK deliverables are an Open Educative Resource, free to use under a Creative Commons Licence, for individuals that want to develop their skills or, on an institutional level, to implement digital and entrepreneurial teaching in education. The e-DESK methodology aims to serve as a reference for educational institutions and educators all over Europe for designing, adapting, implementing and/or measuring hybrid educational programs and teaching methodologies.

The e-DESK programme is targeted for the HEI teachers to skill up entrepreneurship education competence in online teaching methods/practices and to develop their online teaching skills and to enhance the entrepreneurial competences for their learners.

Forewords

As of July 2020, 98.6% of learners worldwide were affected by the pandemic. It is estimate of 1.725 billion students from pre-primary to higher education in 200 countries were affected by lockdowns (United Nations, 2020). The other way to depict the scale of the magnitude of the Covid-19 is well stated by Kaplan et al. (2020) when a third of the global population worldwide was on a quarantine lockdown in spring 2020. The teachers and their teaching practices world widely changed from traditional face-to-face to different modes of digital learning in short time if not instantly.

The e-DESK programme is targeted for the higher education teachers to skill up entrepreneurship education competence in online teaching methods and practices and to develop their online teaching skills and to enhance the entrepreneurial competences for their learners. The objective of the e-DESK programme is to introduce the future of education trends in an online environment. Participating teachers are introduced to concrete entrepreneurship methods, and online tools that may be applied in their teaching practices to enhance their learners' entrepreneurial skills, competence, and mindset.

At the latest this unprecedented global pandemic brought the online learning and distance education as a daily teaching practice. With its newness though, it brought its challenges both to learner and to teachers. According to the literature the changeover from traditional face-to-face learning to online learning has been experienced differently by students and the teachers. Yet, everyone has had to adapt to it with the knowledge, skills, and resources they have had available. Challenges on online education were met differently depending each country, of course according to the existing infrastructure system and even on each institution level. Those institutions with an advanced IT strategy just shift into e-learning mode nearly instantly; for the others it took longer. Yet, similar challenges were widely identified with e-learning; first is naturally the IT accessibility, affordability, and flexibility, followed by pedagogical competence combined with the online teaching and learning methodologies and modes (Murgatroyd, 2020).

Adding to the challenges in digital teaching competences, online learning environment makes the provision of entrepreneurship education (EE) difficult (Liguori & Winkler, 2020; Kassean et al., 2015; Kuratko, 2005). It is said that entrepreneurship education as a discipline requires students to acquire practical competencies by learning by doing and gain experiences in real world settings (Liguori & Winkler, 2020).

IT- technology is advancing rapidly. Thus, innovative, and new learning upskilling is needed not only for IT- skills but also in teaching methods and modes of practices. Recently OECD (2021) calls for upgrades in digital curriculum, that is personalized, cross-sectional and competency based; yet to be aligned with its previous recommendations on uplifting the teachers' skills (OECD, 2018; 2020).

The e-DESK methodology is built with the objective of upgrading the teachers' IT skills and entrepreneurship education competence in their teaching practices. The methodology chapters are weighted based on the survey results that were equally and carefully analysed.

Introduction to the e-DESK methodology

The main purpose of this e-DESK methodology, as any basic research, is to generate knowledge by evidence research practices in applying entrepreneurship education to the online digital teaching environment, namely in the hybrid teaching format.

First the project seeks, predicts, and understands the change in teaching practices during the phenomena forced by Covid-19 pandemic all over the world as almost all teaching was shifted to online learning environment (Radha et al., 2020). Its goal is to provide tools, methods and means to enhance online teaching practices that are needed. Further its objectives are to enhance entrepreneurship education in an online environment.

The research process for developing the e-DESK methodology takes its shape from the results of initial survey that was conducted in four European countries and bases on findings it exposes. Its key choices are thus based on the needs of the target group: HEI teachers.

The initial survey itself is developed in cooperation with all partners of the e-DESK project. The survey was compiled based on the objective of e-DESK programme:

The ultimate objective of e-DESK project is to prepare European teachers and educators for using meaningful education and pedagogical tools in an increasingly globalized and rapidly changing environment, by developing key skills demanded by the needs of their students.

Such a project only makes sense when considered transnationally, firstly because the motivation behind the creation of this project came because of a pandemic crisis that left no one out of its impacts and secondly, because education is the pillar of any society, and we should aim at developing international strategies that can reduce the inequalities and the unfairness of the educational system.

The formulation of the e-DESK methodology reflects to the ongoing discussions of OECD (2020) the teachers and school leaders (OECD, 2018) within European Union feeling not well prepared for using digital technologies in their daily work. The challenges might be directly technological or focus on how to engage learners on an online environment. Thus, by seeking the specific obstacles via the evidence-based inquiry and reflecting them toward the digital competencies (DigComp) as well as consultation of several experts in both digital education field and entrepreneurship education field gives a baseline for the MOOC course formulation.

The basic research was carried out as it was necessary for the formulation of the survey itself to reach the set goal of the programme. The goal is to upskill teachers in applying entrepreneurship education practices in an online environment.

The teachers' own online education skills are crucial in understanding how students use technology for educational purposes, and they are also explored to adjust their needs accordingly (OECD 2021). Further the teacher role in delivering the entrepreneurship education in their classrooms regardless of the format is pivotal (Ruskovaara, 2014).

Entrepreneurial education skills, methods and mindsets are essential for the future generation of young people to improve their employability and contribute to creating new opportunities, better jobs, and solutions to the big challenges that are faced in our society in European Union and beyond (EC, 2018). Therefore, it is important that the teachers to have an understanding about the entrepreneurial competencies (Bacigalupo et al., 2016).

The methodology focuses on entrepreneurship education and teaching practices in an online learning environment, especially in a hybrid education mode. In addition, it examines the assessment methods applicable in online education.

The hybrid education involves the knowledge, planning of the course and creation of an environment that places students at the center of the teaching process, being able to combine both the digital and face-to-face environment, depending on the context, to answer to new societal demands (Gornitzka & Maassen, 2000) and to deliver the entrepreneurial competences to students. It focuses on the challenges of and adoption of new methods of assessment on hybrid modes.

The ultimate objective of the course is to prepare teachers to the design and production of a stand-alone digital course (MOOC) with needed skills and tools for educators to successfully manage their teaching activity on a digital environment with entrepreneurial competences. It facilitates an online learning design tool presented later in the methodology. The target group is the higher education teachers.

RECENT RESEARCH EVIDENCE

The information and communications technology (ICT) has been recently more and more applied in delivering education. Sun et al., (2008) already more than ten years ago predicted that e-learning will be an emerging paradigm of modern education (Sun et al., 2008). The predicted scenario came into full speed under the prevailing conditions erupted in the spring 2020 due to the Covid-19 pandemic and worldwide lockdown. The digital learning became at times the only solution and means to deliver education (Radha et al., 2020).

To enhance the teachers' competence in online teaching practices, the first essential step is to review the recent studies that assess students' experiences in online learning. The literature reveals that COVID-19 related factors naturally impact students' intention to engage on online learning either by challenges or its awareness directly (Nikou and Maslov, 2021). According to Nikou and Maslow (2021) students' perception on online learning effects can be mediated through perceiving how useful practices are and how easy it is to use the e-learning systems or platforms.

The challenges that rise from the above-mentioned survey are how to motivate, engage learners to participate in online learning lessons, and how to build learning groups, or apply the right kind of group dynamics (Nikou and Maslov, 2021). According to Hattie & Yates (2014), staying focused on something over 15–20 minutes at a time is not possible. Thus, even more in an online environment than in a classroom, the educator needs to find ways to facilitate learning by using many different methods, and keeping the students motivated and participating actively. This may be achieved by variation of working individually, discussing, and solving problems in pairs or in small groups between lectures, and by integrating videos, games, polls, etc. to teaching (Biggs, J. & Tang, C., 2011).

Research results by Nikou and Maslow (2021) showed that the educational institution's preparedness does not directly impact the intention of students to participate in e-learning during COVID-19. The results highlight that for example the length of the use of e-learning systems impact students' e-learning systems use (Nikou and Maslov, 2021).

Teachers are increasingly using IT technology in their teaching practices; and they replace some of the traditional face-to-face classroom sessions partly with modes that are entirely online (Nikou and Maslov, 2021). The e-learning takes place in both an online environment and a face-to-face setting or offline.

Survey research results as a base for the methodology

By leaning on the evidence, the survey research results highlight the hybrid learning challenges being the utmost experienced challenges in online teaching. Further it raises the need for the upskilling of the assessment methods. The e-Desk provides online toolboxes; introduces various online learning methods and modes. It introduces the most common EE practice methods, and those tested to be delivered in an online learning environment. To summarize it introduces a Learning Design Tool for the Teacher to assist them in their own course planning and design. At the end it presents the practices that are presented in the following chapters.

The e-DESK project collected data from European teachers in 2020 of their experiences of the change in teaching practices at the beginning of the pandemic. The data is rich and manyfold, and in line with other research data collected. What came out clearly was the need for deepening the teachers' own skills in embedding entrepreneur education in teaching and learning as well as need for improving the teachers' own digital skills, both in a hybrid education mode and blended learning mode. This is where e-DESK methodology together with MOOC course design can make a difference for the future. Improving their own entrepreneurial competencies will make it possible for the teachers to convey the importance of an entrepreneurial mindset in their students, thus giving the students significantly better competencies in their future careers, as active members of society, better qualified to create value for others. When increasing their own digital teaching skills and being able to apply the appropriate methods of delivery fluently irrespective of the learning environment, teachers can focus on the content of their teaching and give their best performance.

The analysis report on the survey is part of the project deliverable documents like this methodology document. Furthermore, the research paper was published based on the results (Svetec et al, 2022).

LEARNING AND TEACHING MODES

The e-Desk project defines the online learning mode concept as follows:

Full digi = In full digital learning, the student completes the course entirely online. Full digi does not require the presence of the student on campus.

Blended learning = Blended learning can include many different teaching methods and their applications. The learning environment consists of an online environment and contact teaching.

Hybrid learning = In hybrid teaching, participants are **simultaneously** present in the same classroom either / or remotely over a network connection.

In the following, we will explain three, today very common teaching modes in more detail, that is, blended learning, flipped classroom, and to a more detail, hybrid learning, which is at the core of e-DESK.

Though blended and hybrid teaching modes are today distinguished from each other, it needs to be noted, that still quite recently they have used interchangeably in the same context. Therefore, some care needs to be executed in discussing the different teaching modes, both in peer discourse and in interaction with students, especially.

Hybrid

The term hybrid, by definition, means something that is formed by combining two or more things; of mixed character, composed of different elements. Hybrid learning means there are less or different routine classroom meetings with every learner present at once. In the hybrid learning session contacts are maintained through multiple channels. The hybrid classroom can be called a multi-local classroom, where simultaneously some of the students are present at a classroom site and some are in distant locations, so in a broad sense, a singular environment.

In the sense of hybrid work, the hybrid learning concept may have existed since early 1990s when distant learning and a flexi-work concept were introduced (Pekkola, 2002).

The hybrid learning became a daily routine at the wake of the COVID-19 in spring 2020. The idea of remote or distant learning that has been developed in the last two decades caught up in full speed in one instant worldwidely. In times of crisis there is a need for some degree of improvisation with educational methods that incorporate entrepreneurial thinking (Krishnamurthy, 2020). Hybrid teaching and learning is part of the phenomenon that is changing the nature of the classroom.

The technological revolution allows the change with multiple different IT tools and workspaces such as communication tools and learning platforms or portals. The technology is now intervowen (Ratten & Jones, 2020) into everyday teaching and learning. However, hybrid teaching and learning is more than just transferring former teaching models and lessons online. Although it seems to be convenient by saving time, and even saving the classroom spaces and facilities, it is more than just working with learning platforms, and operating computers online.

The hybrid teaching allows many new opportunities, yet to sync multi-locations, few issues such as the 'house rules' seem to be essential. It means the instructions for the learners must be made clear right at the beginning of the course or sometimes even repeated at the beginning of each lecture session. It is essential that all learners know what technology is being applied, how to access and where, to enhance the usefulness and effectiveness of online learning (Nikou and Maslow, 2021). The clear instructions will ease using the e-learning systems. It is equally important to enhance the students' perception on online learning effects by giving clear assignments, timetables, and assessment criteria as it would be done in the traditional classroom. Further, the clear schedule of time lapses on the screen and breaks are recommended since it has been noted that engagement. (Nikou & Maslow, 2021)

The hybrid teaching necessitates the understanding changes in classroom dynamics. In hybrid classroom, the original teacher's led authority or control shift more and more to the learner's responsibility. The teacher's traditional role shifts from more and more from the traditional center stage lecturer to enabler and facilitator. It leaves openness and responsibility to the learners and emphasises the importance of the learner's self-efficacy (Bagicalupo et al., 2016).

The entire organizational dynamics in classroom changes by adding many new constraints that were not a concern before. Although the technology is developing fast, and it is easing the distant learning, it still sometimes disrupts in the flow of teaching. The technology related obstructions tend to happen, and it can hamper the entire learning situation. The internet technology disruptions or systems collapses have happened both in teaching and learning ends. The statement 'you have a bad connection' is familiar to all by now. Yet as time is limited, the impediments will simply limit the operations. It is something to consider when planning the lessons.

All the teaching approaches, whether the traditional lecture or case study, group discussion, individual presentation, individual written report, group project, formal lectures, guest speakers, action learning, seminar on web-based learning go through though online window (Lonappan, 2011). Thus, an alternate technological option needs to be sorted to proceed e.g., video recording. To summarize, the 'plan B' becomes essential.

Other issues the hybrid world brings with contacts are maintained through multiple channels, the supervision of the classroom participation and performance. It is not only harder to follow lectures online than being on site; similarly, it is harder to follow if participants are remote, let alone how they engage as a team in the learning process.

The term 'Hybrid Learning' indicates to a learning method that simultaneously combines traditional contact instruction and distribution of learning online. It is characterized by the asynchronous involvement of different digital technologies. The highly advancing digital technologies and tools make it possible to learn in a hybrid mode: part of the learners are present, and part of the learners are online and learning in distance mode. The modern IT technology allows simultaneous interpersonal interaction. Even more significant is the fact that this interaction is happening in real time and instantaneously. Yet hybrid teaching requires different skills and competences of a teacher than if teaching took place in an all e-learning environment in a full-digi mode or in an all-traditional contact learning environment.

The main goal of the e-DESK is to present how to design and plan hybrid educational programs by best practices available. It also collects the best practice samples and lines up the common key success factors. Sun et al. (2008) suggests that in hybrid lesson planning it is essential to consider that the perceived e-learning satisfaction is depended on the six dimensions: learner, instructor, course, technology, design and environmental especially in times of crisis but also in general. Some degree of extemporization with educational methods that incorporate entrepreneurial thinking are essential (Krishnamurthy, 2020). Furthermore, hybrid lessons need to consider the critical factors pointed out by Nikou and Maslov (2021) that are crucial in affecting learner's perceived satisfaction. They are the key elements that reduce learners' computer anxiety and are indispensable of instructor's attitude toward e-learning. Some examples are e-learning course flexibility, e-learning course quality, perceived usefulness, perceived ease of use, and diversity in assessments (Nikou and Maslov, 2021).

Research and literature on hybrid learning is emerging rapidly, and besides academic publications, there are quite many blogs which teachers can quickly and easily explore for more insight on good practices.

Another way of inspecting the characteristics as well as benefits of hybrid teaching and learning is presented below, followed by an overview of differences between various teaching modes. These are, of course, examples, but can give hints how to approach the subject from different points of view when planning a hybrid session.

According to Barron et al. (World Bank Blogs, 2021) there are three distinctive features to categorize hybrid learning:

- Time (when): which can be synchronous (at the same time, also known as "real time") or asynchronous (sequential, at different times) or it can have a bit of both.
- Space (where): which can be in person (also known as face-to-face, sharing the same physical location) or can be remote (two or more people in different physical locations).
- Interaction (how): which can be unpacked in terms of the direction of the communication (one-way; bi-directional or multi-directional) or type of engagement, from no-participation (an individual is learning alone without interaction with others), limited participation (where the interaction with others is limited,

structured, or controlled) and high participation (active and dynamic exchange with others is regular and essential).

Comparing learning modes (hybrid/online/blended/flipped):

	HYBRID LEARNING	ONLINE LEARNING	BLENDED LEARNING	FLIPPED LEARNING
Meaning	In hybrid learning, the teachers conduct both offline and online classes for the students simultaneously.	As the name suggests, online learning aims at teaching the students completely online. The complete academics (theoretical instruction) of the student is executed via online mode with no in-person involvement.	Blended learning is the combination of offline learning with an online learning experience.	It is a type of blended learning approach that 'flips' the traditional method of a teacher teaching by one or many students being independently engaged in activities that boost their potential.
Mode and platform	Conducted both online and in-person; it depends on the students how they want to attend the classes.	The teachers conduct live classes via online applications like *Google Meet and Zoom meetings*. The students are also provided with online study material.	The physical presence of both the students and educators is usually required. Apart from the dominance of traditional teaching methods, students are also engaged in online educational activities, computerized learning, and other digital means of learning.	This may require both the online and offline presence of the students. It involves an *experiential learning strategy* that demands the active participation of students in their classes.
Note	Students are provided with online study materials, and they can attend the classes from anywhere they wish to.	Since last year [2020], almost every educational institution has taken up this mode of teaching.	It is different from hybrid learning as it requires the presence of all the students for offline classes which are assisted with digital learning techniques.	It doesn't mean that students are not taught in the class. It aims at make them capable of experiment, analyze and comprehend the assigned tasks under the guidance of the teachers.

Blended

Blended learning is understood as a combination of two different learning systems, namely, the traditional face-to-face learning and digital online learning systems. The blended learning has expanded as the IT technology has enhanced the availability of new communication technologies (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Moskal, Dziuban, & Hartman, 2013). In addition, blended learning includes virtual environments (Powell, 2015) that are facilitated by using internet-based technology and computer aided tools, for example, the learning design tool, learning management platforms (Moodle) and communication forums (Zoom, Teams), and other communication means like e-mail and communication applications (Heinze & Procter, 2004). Here we refer to the traditional learning system as face-to-face learning. The main characteristics of traditional teaching methods are often teacher-centered (teacher is the only expert, authority) whereas students have observing and passive roles. Yet in EE the learner is the center of learning and action, and the teacher role shifts to a moderator, a coach or even a mentor (Ruskovaara, 2014).

The main concept of blended learning is referred primarily on both the physical and digital learning (Anthony et al. (2020) or alternating them in a sense that e-learning itself takes place both in an online environment and in a contact or face-to-face setting or offline or in full-digi mode. However, Hrastinski (2008) points out that it is important to remember that e-learning participation does not only occur online but also takes place offline (Hrastinski (2008). He states that the learning requires time and energy, to process the learned information and knowledge, to communicate about it, to think and finally to assess and reflect what has or has not been obtained. This process normally happens physically Hrastinski (2008). Learning in e-environment is time-consuming and differs from the learning process in traditional learning settings, as the distraction in an online environment and a physical classroom environment are different.

ENTREPRENEURIAL EDUCATION

Our survey results indicate that the teachers themselves feel pedagogically competent, and experienced. The target teachers rate their own IT skills and knowledge at a reasonably high level. Yet at the same time, during the pandemic more IT support is welcome.

Based on the survey results for this methodology the informants were not very familiar with EE learning, yet online learning was something all had engaged in prior to Covid-19; and fully engaged during and after pandemic. Some were more than happy with an online learning environment, producing videos and materials; yet some were not. A common dilemma seemed to be how to engage, motivate and keep students participatory in the lessons.

The objective of entrepreneurship education is to be learner centred. This is to say that the learner himself or herself is agent of one's own learning. To activate the learners' entrepreneurship education uses various learning environments, tools, and good goals/best practices of the educational institution. Teaching emphasizes social and working life skills, entrepreneurial mindset and initiative, teamwork skills, responsibility, innovation, and creativity, as well as self-awareness and self-efficacy.

Various tools, pathways and operating models have been created to support entrepreneurship education. Training has been developed for teachers to help them understand the purpose and goals of the education itself as well as understand how entrepreneur-ship education supports the implementation of the curriculum (Oksanen, 2020).

Entrepreneurship education may be considered as a method for the teaching practice and a content of teaching and learning (Ruskovaara, 2014; Seikkula-Leino 2006: 2007). Gibb (1996; 2000; 2002a, 2005) crystalized entrepreneurship education being about learning through, for, and about entrepreneurship, taking place in an entrepreneurial learning environment, and being about dealing with, creating, and enjoying uncertainty and complexity (Ruskovaara, 2014; Gibb 1996; 2000; 2002a, 2005).

Entrepreneurship education prepares and enables the learners in their career planning, provides an entrepreneurial way of examining and executing matters and can be used to characterize teaching and learning (Ruskovaara, 2014; see also Cooper et al., 2004; Fiet, 2000a, b; Pittaway & Cope, 2007; Rae & Carswell, 2001; Steyaert & Katz, 2004).

Following our investigation, we aim to utilize entrepreneurship education as an option to participate, engage and motivate learning.

Entrepreneurship teaching methods

Earlier studies on teachers' role as entrepreneurship educators (e.g., Fiet, 2001a; Bennett, 2006; Birdthistle et al., 2007; Löbler, 2006; Hytti & O'Gorman, 2004; Jones, 2010) state that the teachers' role is pivotal in delivering EE (Ruskovaara, 2014). It applies also in an online learning environment. Thus, teachers' EE competence is valuable when determining the appropriate teaching and learning methods in EE in an online learning environment and respective learning objectives must be taken in account.

Teaching entrepreneurship dialog is presented multifold and there is no one possible way to apply it. Ruskovaara (2014) states in her thesis, "learning through, learning for, and learning about entrepreneurship" by Gibb (2005) being the most used way. Similarly, Pittaway and Edwards (2012) recommend applying all "through, for and about" embeddedness into practice. This means according to Hytti and O'Gorman (2004) to learn to understand entrepreneurship, learn to become entrepreneurial and/or to be-come an entrepreneur.

Ruskovaara continues that the "about entrepreneurship" is to increase students' awareness, knowledge of the subject or content in question. She continues that the "for entrepreneurship" is to engage into tasks, project-based learning in an experimental way that develops skills and competencies. In addition, Ruskovaara (2014) explains that the "through entrepreneurship" is learning by doing in a real-life context or practice environment, e.g., practice enterprises. Ruskovaara (2014) highlights the word "embedded or in" which means that EE is embedded across the curriculum and across subject lines. It can be thought across all disciplines (Ruskovaara, 2014).

There are plenty of EE methods available. Ruskovaara (2014) concludes that it appears that the more 'hands-on' the teaching method is, the greater its chance of success." The EE students "get their hands dirty and have fun. They learn by experimenting, doing, discovering unexpected outcomes." is the famous statement by Draycott & Rae (2011). Furthermore, problem-based learning, action learning, and work-oriented learning approaches are suitable and useful in entrepreneurship education. Those methods engage students working in cross-disciplinary groups learn not only their own discipline, but also from each other's

disciplines, and offer them useful team-working skills needed in future work (Baeger, 2011; Ruskovaara, 2014).

To investigate the EE learning in the online context, the e-DESK methodology reviews the most popular EE evidence-based methods (Ruskovaara, 2014) and cooperatively selected outcomes according to the EntreComp Framework (Bacigalupo et al., 2016). The methodology also suggests the digital EE online teacher competence to focus on DigComp Framework (Annex 2.).

The programme methodology proposes to base its entrepreneurial competence on the EntreComp-framework (Bacigalupo et al., 2016) and its six pedagogical principles: creative thinking in e-learning, using the real-world examples for inspiration, promoting collaboration with a purpose digitally, include the value creating thinking in the lessons, and thought-provoking reflection on the learned, as well as learning from experience with peers, group. In conclusion it intends to make entrepreneurial learning visible. (Grigg, 2020). In 2016, the European Commission launched EntreComp: The Entrepreneurship Competence Framework. EntreComp flower presented in Annex 3. EntreCompEdu framework for teachers to teach entrepreneurial competences was created later based on EntreComp. EntreCompEdu description text in Annex 4. And EntreCompEdu framework 6 pedagogical principles by Grigg in Annex 5.

Entrepreneurship education may be considered as a method for the teaching practice and a content of teaching and learning (Ruskovaara, 2014; Seikkula-Leino 2006: 2007). In the following table we have included a table of EE methods suggested by Ruskovaara (2014).

Practices	Sources (e.g.)
Had students prepare entrepreneurship related calculation exercises, presentations, writings, and interview	Fayolle & Gailly (2008); Shepherd (2004); Solomon (2007); Gibb (2002b); Liñán et al. (2011)
Used stories about entrepreneurs as teaching material	Fletcher (2007); Gartner (2008); Shepherd (2004); Neck & Greene (2011); Pittaway & Hannon (2008); Korsgaard & Neergaard (2010); Blenker et al. (2011)
Had students play games related to entrepreneurship	Jones (2007b); Löbler (2006); Neck & Greene (2011); Gibb (2002b); Liñán et al. (2011); Hytti & O'Gorman (2004)
Arranged or took part in an entrepreneurship-related competition	Blenker et al. (2011); Gibb (2002b); Holmgren & From (2005); Lüthje & Franke (2003); Hytti & O'Gorman (2004)
Introduced local businesses in teaching	Henderson & Robertson (2000); Pittaway & Cope (2007b); Pittaway & Hannon (2008); Shepherd (2004)
Invited entrepreneurs or representatives of the business world to take part in instruction	Cooper et al. (2004); Pittaway & Cope (2007b); Solomon (2007); Pittaway & Hannon (2008); Kuratko (2005)
Arranged a field trip to a business enterprise	Kickul et al. (2010); Solomon (2007); Bell et al. (2004); Hytti & O'Gorman (2004)
Invited an entrepreneur to present their work in the school	Pittaway & Hannon (2008); Shepherd (2004); Solomon (2007); Fuchs et al. (2008)
Guided learners to utilize experts	Fayolle & Gailly (2008); Gibb (2011); Solomon (2007); Shepherd (2004); Fuchs et al. (2008)
Discussed entrepreneurship related to the subject with learners	Gibb (2002b); Neck & Greene (2011); Solomon (2007); Shepherd (2004); Fuchs et al. (2008)
Discussed entrepreneurship related to hobbies	Gibb (2002b); Solomon (2007)
Discussed current financial news with learners	Gibb (2002b); Shepherd (2004); Solomon (2007)
Discussed the economic effects of different actions with learners	Gibb (2002b); Shepherd (2004); Solomon (2007); Fuchs et al. (2008)
Guided learners to manage their own finances	Shepherd (2004)
Organized a voluntary work project with students	Blenker et al. (2011); Neck & Greene (2011)
Enabled learners to organize a jumble sale, hold a sales stand, etc.	Blenker et al. (2011); Jones & Matlay (2011)
Facilitated a project created by the learners (Presentation, event, newspaper, video, book, etc.)	Gibb (2002b); Löbler (2006); Pittaway & Cope (2007b)
Facilitated an enterprise or working world-driven project by learners	Cooper et al. (2004); Gibb (2002b); Pittaway & Cope (2007b); Pittaway & Hannon (2008); Shepherd (2004); Kickul et al. (2010); Jones & Matlay (2011); Fuchs et al. (2008)
Had learners complete a business idea assignment	Blenker et al. (2011); Gibb (2002b); Neck & Greene (2011); Fayolle & Gailly (2008); Hytti & O'Gorman (2004); Honig (2004)
Enabled learners to create marketing or other material for a business	Cooper et al. (2004); Pittaway & Cope (2007b); Solomon (2007); Pittaway & Hannon (2008)
Enabled learners to create a practice enterprise or a business of their own	Neck & Greene (2011); Pihkala (2008); Blenker et al. (2011); Leskinen (1999); Birdthistle et al. (2007); Fuchs et al. (2008); Drakopoulou Dodd & Hynes (2012)
Organised a theme day or study module related to entrepreneurship	Gartner (2008); Pihkala (2008); Shepherd (2004); Leskinen (1999); Blenker et al. (2011)

The table of suggested EE methods

Challenges in applying Entrepreneurial education

Digital and online learning incite challenges in entrepreneurship education (EE) as it is a discipline, which requires students to acquire the knowlegde by "learning by doing" that is to say get their hands into practical actions (Draycott & Ray , 2011) and experiences in an authentic setting as said above (Liguori & Winkler, 2020; Kassean et al., 2015; Kuratko, 2005).

Gibb (1996; 2000; 2002a, 2005) crystalized the entrepreneurship education being about learning through, for, and about entrepreneurship, taking place in an entrepreneurial learning environment, and being about dealing with, creating, and enjoying uncertainty and complexity.

Up till now Sousa et al. (2018) have studied entrepreneurship education methods that are applicable in an online learning environment and list them as follows (see BLUES methodology).

- business plan (project-based learning; problem-based learning; digital stories; online learning environments; technology integrated teaching methods; digital storytelling; educational games; active learning)
- choice and structuring of the idea for the enterprise (collaborative communities; cooperative learning; network participation)
- pilot project of the entrepreneurial idea (augmented reality; web-based video; gamification; simulation)
- market and product analysis (web-based video; narrated stop-motion animation; generic modelling language; digital video; augmented reality; gamification; simulation; webinars)
- achieving sustainability of entrepreneurial ideas (collaborative communities; cooperative learning; collaborative learning; network participation
- evaluation of entrepreneurial skills and characteristics (flipped classroom using digital media; cooperative learning; collaborative learning; moving from fixing to online space; experiential online development; open educational practice; online learning environments; technology educational practice; digital storytelling; educational games; active learning).

Regardless of the obstacles, the online learning environment creates other new opportunities for entrepreneurship education (Ratten & Jones, 2020) such as virtual company visits (Oksanen, 2021) that have an opportunity to create worldwide experiences to learners.

Some other studies concentrating on the EE methods, practices, entrepreneurial learning, and related learning environments (Ruskovaara & Pihkala, 2013; 2016) are also taken into consideration in building the e-DESK methodology.

Traditional entrepreneurship training in HEI

In context, it is important to point out that the most traditional manner to teach entrepreneurship in HEI and universities is in formal lectures, case studies and business plans (Solomon 2007). Those approaches utilize traditional teaching methods or rely heavily on lectures which can be considered traditional. (Mwasalwiba, 2010) In addition, Lonappan et al. (2011) categorize teaching approaches followingly: case study, group discussion, individual presentation, individual written report, group project, formal lectures, guest speakers, action learning, seminar, web-based learning, video recording.

The traditional way to look at entrepreneurship education leans toward new business development. Some key features are presented by Jamieson (1984). According to Jamieson the EE is geared toward new business and new venture creation. He highlights the following:

1. education about entrepreneurship (enlightenment of students on entrepreneurial procedures and features of entrepreneurship)
2. education for entrepreneurship (exposure of student to creation of ventures they can lay claim to) and
3. education in enterprise (practical exposure of participants to their own ventures).

In addition, in a similar note by Garbuio et al. (2018) tends to summarize EE approaches in business planning and framing them to the approaches to teaching and learning. In the following table displayed adapted version of EE approaches mentioned above.

Approach and main references	Approach to teaching and learning
Business plan development: (Barringer, 2009; Honig, 2004; Kaplan &Warren, 2009; Kuratko, 2003) The systematic analysis and business plan are used to collect information that helps entrepreneurs make decisions in highly complex and uncertain environments.	• Teach and monitor production of business plans internally or via jury • Usually done in groups where individuals split tasks and produce a report
Contingency planning: (Abetti & Phan, 2004; Gruber, 2007; Honig, 2004) Adaptive business planning that accounts for environmental factors. In highly dynamic environments, only specific activities are planned to speed up the starting up process, while in slow environments, in-depth planning is preferred.	• Taught as unrelated modules • Like the approach used to train medical interns who follow an expert and make diagnoses
Effectual entrepreneurship: (Dew, Read, Sarasvathy, & Wiltbank, 2009; Sarasvathy, 2001) Entrepreneurs do not start with concrete goals but constantly develop them on the fly through personal strengths and available resources.	• Use cases and guided discussions to help students adopt and practice an entrepreneurial mind-set • Focus on differences in framing between expert entrepreneurs who redefine the frame to look for new solutions (effectual) and novices who accept the frame and look for opportunities within it • Analogical reasoning allows students to go beyond data.
Process perspective: (Aulet, 2013; Baron, 2006; Hjorth & Johannisson, 2007) Entrepreneurial process begins with opportunity recognition; can be learned; and entrepreneurs can be trained to better recognize opportunities.	• Focus on a process that unfolds over time, with each stage requiring different knowledge and skills • Opportunity identification taught through classic strategy tools (e.g., market segmentation, end user profile) and cognitive framework • Focus on training entrepreneurs when to direct their attention and on the process of searching for patterns
Opportunity-centered learning: (Rae, 2003) Exploration and development of an opportunity through individual and group investigation, understanding, selecting, and acting on an opportunity.	• Students to explore the opportunity (through brainstorming, use of Post-It notes, and directed creativity); relate the opportunity to personal goals, plan to realize the opportunity, and act to make the opportunity happen • Use of exploratory questions and a short case to illustrate an entrepreneurial learning process
Lean startup approach: (Blank, 2013; Ries, 2011) Hypothesis-driven approach that focuses on experimenting rather than planning. Directly engaging with customers through a minimum viable product, built iteratively and incrementally, according to customer feedback	• Often uses graphical representation of business models, i.e., lean canvas (Maurya, 2012) or business model canvas (Osterwalder & Pigneur, 2010), to develop testable hypotheses • Engage in a dialogue with customers about product development (agile development) instead of forecasting financial return

Table EE approaches in business planning

In conclusion entrepreneurship teaching methods that gear toward new business and venture creation are feasible to be applied in an online learning environment as well.

Online learning toolbox

Online teaching is the process of delivering pedagogical sessions in virtual environments, through live online classes, video conferencing platforms, webinars, and other online resources. Nowadays, teachers and students have access to a wide range of solutions to improve the online teaching and learning experience. In fact, technology is advancing fast to improve distance education and at the same time, the need to equip teachers with the necessary skills to keep up with this digital evolution increases.

Adapting and rethinking the design of an online course to this new reality presents challenges such as:

- Effectively interacting and engaging with students virtually, promoting active learning
- Choosing the best strategies and resources to prepare synchronous and asynchronous activities
- Ensuring the alignment of all three components: learning outcomes, teaching methods and assessment (constructive alignment - John Biggs, 2011)

The European Framework for the Digital Competence of Educators (DigCompEdu, 2017) Framework suggests six main areas which enclose the competences that can help teachers in approaching digital teaching.

Area 1 - Professional Engagement refers to the set of competences that teachers require to interact with their peers, students, and parents, through the use of digital technologies, in favour of their organization's proper functioning and development.

Area 2 - Digital Resources encloses the digital skills needed for content creation and modification and subsequent responsible use of resources.

Area 3 - Teaching and Learning focuses on the development of digital skills that support teaching processes, promoting collaborative and self-regulated learning.

Area 4 - Assessment includes the use of digital technologies to enhance assessment strategies, evidence analysis and feedback.

Area 5 - Empowering Learners addresses the importance of actively engaging students, considering their diverse learning needs, ensuring accessibility and inclusion to different target audiences.

Area 6 - Facilitating Learners' Digital Competence lists the set of competences required to help student's digital development, such as:

- Information and media literacy
- Digital communication and collaboration
- Digital content creation
- Responsible use
- Digital problem solving

This framework represents a guide to support teaching in different learning environments, namely, to contribute to the design of a successful remote or hybrid experience.

To cover the competences presented by DigCompEdu, it is essential to use resource centers, toolboxes that contain the necessary information to facilitate the design and implementation of digital-based teaching strategies.

The content of a toolbox should include simple and practical tutorials (easy to navigate, preferably containing videos), about digital tools and pedagogical methods, suitable to meet the challenges mentioned earlier, regarding the design of an online course.

In case more dedicated attention is needed regarding a particular subject, method or a more complex tool, there is always the possibility to search for specialized training sessions. That is why a toolbox should include a section with updated information on events, webinars, and online courses.

In terms of tools to be included in the toolbox and following DigCompEdu once again, there are standard digital requirements to be covered. Please note that it is important not to clutter this resource center with an overwhelming amount of information, but rather a controlled and objective number of effective tools.

Learning Management Systems (LMS)

LMS are platforms created to support online courses creation, allowing the content to be available online, including lessons, assignments, and assessments. A teacher can build a course using a LMS providing various types of content, such as syllabi, lectures, multimedia files and readings. These systems promote communication and collaboration through direct messaging or discussion forums. Most LMS also feature quizzes and tests, that allow student assessment.

A widely used LMS is Moodle (https://moodle.org/). It was created to enhance the interaction between teacher and students, and it is available as an Open-Source platform. In addition to the basic elements of any LMS, Moodle presents many features, such as activities integration, internal messaging system, students' progress monitoring and evaluation.

Video Conferencing Platforms

Video conferencing allows people to connect in real time, from distant locations, allowing video and audio interaction, in addition to enabling the direct sharing of content (presentations, files, images). And as technology evolves (as well as the needs of users), these platforms present more resourceful and engaging features.

Zoom (https://zoom.us/) is a good example. This video conferencing platform is a solution for online meetings (either by video or audio-only or both) and it allows group video conferences, live chats, screen sharing, session recording and breakout rooms, among other features.

Gamification and Polling Tools

Gamification can be used as technique to engage with students, promoting collaboration and interaction. The audience is given challenges and goals through game mechanics and dynamics, available on specific online platforms, built for this purpose. As students interact with a gamification program, they receive immediate feedback on performance and are guided towards new achievements. For example, Kahoot! (https://kahoot.com/) is a widely used gamification platform.

On the other hand, resorting to a polling tool (student response systems) can be a quick and easy way for gaining insight for both teachers and students. These online applications are easy to use and can be accessed through any mobile device. Here two examples of effective polling tools:

- Mentimeter (https://www.mentimeter.com/)
- Poll Everywhere (https://www.polleverywhere.com/)

Both gamification and polling elements can be added to a LMS course.

Video material creation

Creating video materials is an online solution to engage and to deliver educational content to students. Using video edition, it is possible to add captions and text to instructional materials, to link to interactive content (quizzes, posts, other activities to assess knowledge acquisition), or to divide a long video into shorter segments, as to keep the audience interested and motivated.

Incorporating animations in educational videos can also be an effective way to introduce concepts, to reinforce important ideas, or to summarize relevant information.

Video content can be available through an online video repository/library, an LMS or live, using a video conferencing or streaming platform.

Below two online solutions for basic video editing and hosting:

- Youtube Studio (https://studio.youtube.com/)
- Vimeo (https://vimeo.com/).

Flipped classroom

The Flipped Classroom model alternates the study mode from online lesson and face-to-face lectures online (Bergmann & Sams, 2012). Flipped Classroom means a change in the teaching culture in which the teacher becomes a learning instructor and a producer of active teaching materials. Typically, these are instructional videos that are uploaded online for learners to learn (Mehtälä, 2016). It also focuses on student centered learning. The method emphasizes the students own action and responsibility for his or her learning; and allows students the freedom to study flexibly as best suits one's own learning manner.

Time in the classroom, that was previously intended for lectures, is in a Flipped Classroom model spent on some group work or experiential activities. (Mehtälä, 2016)

The evidence shows that the flipped classroom which relies on videos as learning material, improved student, and teacher satisfaction at school (Mehtälä, 2016). In addition, previous studies have shown, that the Flipped Learning method can improve student satisfaction and in some cases test results. (Mehtälä, 2016) The Findings from (Divjak et al, 2022) indicated that those who had used flipped classroom approaches in face-to-face or blended learning environments more successfully continued to use them in online environments than those who had not used it before.

ASSESSMENT

The base survey results show that there are significant challenges in adopting the traditional assessments to the online environment.

Assessment and reflection of the learned is an important part of learning. The most important element upon completion of the project work of any sort is the learners' reflection on their own successes and failures as a learning lesson. Learners will reflect on their own learning, make choices and set targets accordingly. Formative assessment is woven seamlessly into tasks and activities and used purposefully by learners and teachers alike.

In turn, studies concerning measuring and evaluating entrepreneurship education practices (Pittaway & Edwards, 2012; Fayolle et al., 2006; Fayolle, 2008; 2013; Edwards & Muir, 2012; Falkäng & Alberti, 2000; Matlay & Carey, 2007; Dickson et al., 2008), the study goals, objectives, contents, targets, methods, and evaluation of entrepreneurship education are all important (Ruskovaara, 2014) when setting up the course, syllabus or even an individual lecture.

In line with this, Jones & Matlay's (2011) heterogeneous view of entrepreneurship education presents a model where the student, educational processes, educator, community, and institution are intervened in relationship and role in a dialogic entrepreneurship education system (Ruskovaara, 2014). This involves the cooperation with and inspiration from a real-world context and learning beyond the school walls.

Assessment in hybrid teaching and learning environment has specific challenges. (Divjak et al, 2022c) found it important that technology should not distract students during assessment tasks and considered cheating in a controlled e-assessment environment to be no more frequent than in face-to-face assessment.

The research base for the methodology

The research base for the e-DESK methodology is a quantitative survey. The quantitative survey inquiry is formulated based on the literature review on the topics of entrepreneurship education and online learning. The survey questionnaire was formulated, sought, acquired, formed, and justified based on two European frameworks: EntreComp and DigComp. Further it was reviewed and consulted among the experts in the participating universities in four countries in collaboration.

The survey questionnaire consisted of questions on Likert scale and yes and no questions. All the questions were assessed descriptively, and a summary of the results was drawn. The survey allowed the informants to answer each section also with qualitative remarks. Those qualitative answers were collected and measured question by question. Later the grouping by the topics were made.

The core of the methodology is built on to the research results collected by the survey from the participating HEI teachers and trainers (n167) of the four universities involved in this project.

The quantitative survey results and the qualitative answers within are evaluated. The results are reviewed and reflected to the previous research evidence. Inquisitive research is based on rational and cogent reasoning and seeks to avoid unfounded assumptions.

Thus, the research results were assessed by mean value received on five scale Likert, and positive and negative information received from yes and no -format. Further some of the topics were collected from the multiple-choice answers in a more the relevant principle.

In addition, the open answers received via survey were grouped with their relevance to be noted in developing the methodology. Both quantitative and qualitative results were reflected to the available research evidence of both entrepreneurship education and digital online learning to draw a systematic, common understanding of teachers' quests in their e-learning delivery and entrepreneurship education competence.

Learning outcomes

For the design of the learning outcomes for this course, both the EntreComp framework on entrepreneurial competencies and the DigComp framework on digital competencies have been considered by the e-DESK team.

After completion of the MOOC learner/teacher (MOOC participants) will be able to:

- **LO1** - Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment. (Weight: 10)
- **LO2** - Identify what entrepreneurial competences students need in the contemporary world to seize and create opportunities and meet challenges to generate value. (Weight: 15)
- **LO3** – Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment. (Weight: 15)
- **LO4** - Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. (Weight: 10)
- **LO5** - Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences. (Weight: 10)
- **LO6** – Create interactive learning designs and sessions developing students' entrepreneurial competences, minding students' pre-competence, available resources and pedagogical techniques that enhance students' engagement and motivation. (Weight: 20)
- **LO7** - Integrate the learning material available in the MOOC with other appropriate teaching and learning resources to foster entrepreneurial competences and ethical and sustainable thinking. (Weight: 10)
- **LO8** – Evaluate the learning process and students' acquisition of learning outcomes related to entrepreneurial competences. (Weight: 10)

Digital stand-alone MOOC for the target HEI teachers

The e-DESK professional development programme is designed to combine a Massive Open Online Course (MOOC) with a Toolkit providing guidelines for the introduction of these delivery modes into the university classroom. The methodology will assist in the design of this MOOC in an online learning environment by introducing the Balanced Learning Design Planning (BDP) and tool (Divjak et al, 2022b). This BDP tool has been designed by University of Zagreb's Faculty of Organization and Informatics and used by the e-DESK team in the design and conception of the MOOC structure, modules, and activities.

As the online learning environment and distance learning course provides a new EE opportunity (Ratten & Jones, 2020), the e-DESK program will enhance teachers EE learning on Massive Open Online Courses.

The course is to be provided on a platform with high-quality learning resources, accessible anywhere anytime. The e-DESK methodology concentrates on the end users, i.e., the HEI teachers so that they benefit most of the course.

The online professional learning MOOC course is cost efficient (Li & Dervin, 2018) and as it is open access, it is available for teachers to dwell on information or to review the material any time they find suitable. Secondly the online MOOC course is available and connected to the teachers' everyday teaching (Avalos, 2011; Clarke & Hollingsworth, 2002; Borko, 2007). The MOOC by its user-friendliness is available to support the daily practice (Opfer, 2016; Kraft, Blazar & Hogan, 2018; OECD 2018).

The MOOC content development evolves logically and helps teachers adapt to the unprecedented demands. It proceeds to purposefully adapt to remote teaching with efficiency, integrity, creativity, compassion, and enthusiasm (Healey-Benson et al., 2021) by presenting an online learning design tool.

The e-DESK programme utilises the following six pedagogical principles (Grigg, 2020) developed in EntreCompEdu by adapting creative thinking, looking into the real-world for inspiration, promoting collaboration with a purpose, creating value for others and stimulating reflection, flexible thinking and learning from experience in other words assessment. In conclusion make entrepreneurial learning visible so that the learners know what to do and how to do it (Hattie, 2008) regardless of the subject or topic.

The e-DESK MOOC assists the teacher design an online learning course by:

1. Introducing knowledge and information of the online learning methods in combination of the EE principles according to EntreComp-Framework (Bacigalupo et al., 2016) and EntreCompEdu framework (Grigg, 2020).
2. Proceeding to planning of the course.
3. Introducing tools and methods that are available for online learning in addition to the EE tools and methods that are applicable to online learning environment.
4. Proceeding to assessment and reflection of the online learning concept, as the reflection and review are important part of learning process.
5. Providing the best practices collected in the pilot learning phase.

The goal is according to prevailing curricula (Spain, Portugal, and Croatia) e.g., to create critical and creative thinkers, so that learners can identify problems and go from ideas to action and endeavor to leave the world better than they found it. Further it emphasizes the work-based learning (borrowed by the Finnish curricula) in real-world context in online learning environment (Oksanen, 2021 in review process).

It is demanding to pivot the teaching online digitally. Online learning requires frequent contact with the learners and reflecting on the lessons learnt. Contacting learners needs to be routine. Communication may take place via email, or messaging on LMSs or other communications means (SMS, What's App, Messenger etc.) The individualized feedback or reflection on learning in online accounts is necessary to engage learners in distance similarly it is important to the learners in the schools left open for others to enter in (Millán et al., 2014). The online learning creates conditions for an increased appetite for entrepreneurial competence development and personal resilience, unleashing a form of entrepreneurial persistence (Millán et al., 2014).

The Balanced Learning Design Planning (BDP)

The Balanced Learning Design Planning (BDP) tool is an innovative learning design (LD) tool developed by the Faculty of Organization and Informatics of the University of Zagreb. The BDP concept and tool build on existing LD concepts and tools, at the same time implementing the findings of contemporary research and the relevant theoretical framework. The BDP concept and tool are founded on learning outcomes (LOs) and student workload, as bases of student-centered learning approaches, aiming to ensure their alignment at the study program and

course level. The concept and tool focus on establishing constructive alignment between course LOs, teaching, and learning activities (TLAs) and assessment, as well as ensuring assessment validity by assigning LOs with relative weights. The tool also makes use of advanced analytics in enhancing LD planning, supporting innovative pedagogies. (Divjak et al, 2022b)

Particularly, the BDP concept and tool provide theoretical guidance and practical support to practitioners in LD planning. On the study program level, the BDP concept relates study program LOs to course LOs, to ensure vertical alignment. For each course LO, corresponding TLAs and assessment are defined, ensuring horizontal constructive alignment. Student workload is determined accordingly. On the course level, the BDP concept links course LOs with specific topics. Topics are linked with units, which are divided into activities, assigned with descriptors. The descriptors include the TLA types (acquisition, discussion, investigation, practice, production, assessment), as well as student workload, delivery modes, an indication of collaborative activities, as well as detailed information on assessment and feedback provided to students. One of the essential elements in the overall BDP concept refers to determining the relative weights of LOs at both the study program and course level.

The BDP tool also enables analyses of a planned LD, focusing on curriculum analytics. The analytics dashboard presents an overall picture of a study program with its courses, helping practitioners to reflect on their LD planning. The tool enables to establish whether study program LOs are covered by course LOs, as well as gives analyses of delivery modes, TLA types, collaboration, and assessment, which is important in determining if an LD is in line with the intended pedagogical concept. It also provides analytics of student workload, supporting meaningful workload planning, and helps the planning of credits (e.g., ECTS) allocated to courses, ensuring their coherence with the workload. Importantly, the BDP tool also provides an overview of the evaluation of intended LOs through assessment activities. (Divjak et al, 2022b)

The e-DESK MOOC syllabus

The syllabus of the MOOC developed by the e-DESK took the learning outcomes compiled in section 10 for the design of the modules and activities that compound the MOOC. The stand-alone online training is composed of the following modules:

0. **Introduction.** This module aims to serve as a guide for participants to get to know what they will encounter throughout the MOOC and to reflect on their expectations and

assess their own pre-knowledge about the contents of the MOOC. Also, it will serve as a roadmap for participants and provide them with information about the certification criteria.

1. **Competences, skills and values in general.** This module provides an introduction to competences, skills and values, focusing on entrepreneurial competences, and pedagogical approaches which can support the acquisition of such competences.

2. **Developing entrepreneurial competences.** This module aims to serve as an introduction to entrepreneurial competences and, especially to the EntreComp Framework and its adaptation to entrepreneurial education, EntreCompEdu.

3. **Real-world requirements for entrepreneurial competences.** This module aims to provide successful examples of application of entrepreneurial education in real-world contexts. Also, it aims to foster participants' research of best practices and application of these competencies in the university sphere.

4. **Relevant pedagogical approaches.** This module gives an opportunity to gain deeper insights into innovative pedagogical approaches. There is a number of such approaches of which participants might be using some or many of them in your everyday practices. However, some of these approaches are still not that widespread, and this module aims to bring them closer to participants and inspire their teaching practice.

5. **Evaluating the digital teaching and learning skills of students and staff.** This module serves as an overview of how technology can support learning and how we can define and assess the digital skills needed to promote this enrichment.

6. **Learning design concept and tool.** This module will provide you with guidelines and a tool which will support you in designing learning in line with the intended learning outcomes and pedagogical approaches.

7. **Learning resources.** This module aims to provide teachers with resources to include ethical and sustainable thinking in their classes, but also to prevent plagiarism, learning resources to include in their classes, etc.

8. **Evaluation and quality assurance.** This module focuses on the importance of quality assurance in the different dimensions of Higher Education, for example, in assessment. It also provides examples of quality assurance standards useful for European university educators.

9. **Delivery models of teaching and learning.** This module aims to differentiate and introduce the main delivery modes contemplated by the e-DESK methodology. Moreover, it provides best practices on the implementation of these delivery modes within the university classroom and fosters participants' reflection on the application of these delivery modes in their institutions.

10. **Further personal development.** This module aims to serve as a guide for those participants willing to deepen their knowledge on the different delivery modes and innovative methodologies included in the course modules. It serves as a first step to take a step forward to further research on the topic.

Face-to-face training

In order to complement the knowledge acquired with the MOOC, the e-DESK methodology proposes a face-to-face training aimed at analyzing and adapting what is taught in the MOOC to the individual characteristics of each educator or institution. To do this, this section provides a detail description of this face-to-face training and goes through its syllabus, the resources needed and recommendations for the implementation.

The e-DESK face-to-face training syllabus

The face-to-face training syllabus has been designed, as the Massive Open Online Course taking as a reference the learning outcomes in Section 10 and providing a more practical approach to the knowledge acquired in the MOOC. The main modules developed in the face-to-face training are the following:

1. **Gallery walk.** The main objective of this module is for participants to get to know how entrepreneurial education and digitalization are being included into other institutions, schools within the same university, departments, etc. In addition, participants will be able to share their reflections about how this is being done within their own environment, fostering self-reflection.

2. **From MOOC to own reality**. Assessing training needs. This module is aimed at taking the reflection made in the previous module to the next level. In this module, participants need to assess the needs of their teaching and institution in order to be able to adapt the knowledge they got from MOOC to them.
3. **Hybrid or not hybrid? That's the question.** This module aims to clarify and solve any questions about what hybrid delivery mode is and what differentiates it from other delivery modes such as blended learning, with which it is often confused.
4. **When and why shall we use the hybrid approach?** This module aims to provide the main reasons to opt for a hybrid approach in their classes, paying special attention to the moments when this delivery mode is suitable.
5. **Hybrid: How to plan, to do, to evaluate.** Since the hybrid mode entails some challenges to educators regarding how to fit and fulfil the needs and expectations from both the students in class and those who are on remote, this module aims to help educators discover the best ways to organize and plan their lessons, how to carry out activities and how to assess the knowledge from their students.
6. **Hybrid: From the Global to the Institutional reality.** After understanding the main characteristics of hybrid teaching and learning, this module aims to help educators adapt what they have learnt to their reality based on the analysis carried out in previous modules.
7. **An institutional Case.** When organizing the face-to-face training it is interesting to include am example of usage of these delivery modes, something participants can relate to and understand the feasibility of the inclusion of these models into the university classroom.
8. **Assembling a customized portfolio.** This module aims to provide the space and help for each educator to develop their own way to implement the knowledge they got from both the MOOC and this face-to-face training into their own reality. This portfolio will then guide them through the implementation of the methodologies, delivery modes and tools in their course curriculum and classes.

Recommendations for the implementation

Based on the experience gained through the piloting of this methodology, we have developed the following recommendations that could help you organize this training:

- Select the delivery mode to be used. Decide how you want this training to be implemented. Consider the possible risks ahead and ensure all participants will have a good experience.
- Work in interdisciplinary teams to widen participants' burdens and enhance ideas exchange.
- Try to include the contents as participative as possible, so teachers participating get engaged into the activities.
- Ensure all participants have completed the digital training. If not possible, make a short summary at the beginning. This way, you are all on the same page and can build-up from that point.

ANNEXES

Annex 1. DigComp Framework

(https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework)

The Digital Competence Framework 2.0

DigComp 2.0 identifies the key components of digital competence in 5 areas which can be summarised as below:

1. **Information and data literacy:** To articulate information needs, to locate and retrieve digital data, information and content. To judge the relevance of the source and its content. To store, manage, and organise digital data, information and content.
2. **Communication and collaboration:** To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.
3. **Digital content creation:** To create and edit digital content to improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied. To know how to give understandable instructions for a computer system.
4. **Safety:** To protect devices, content, personal data and privacy in digital environments. To protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technologies and their use.
5. **Problem solving:** To identify needs and problems, and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up-to-date with the digital evolution.

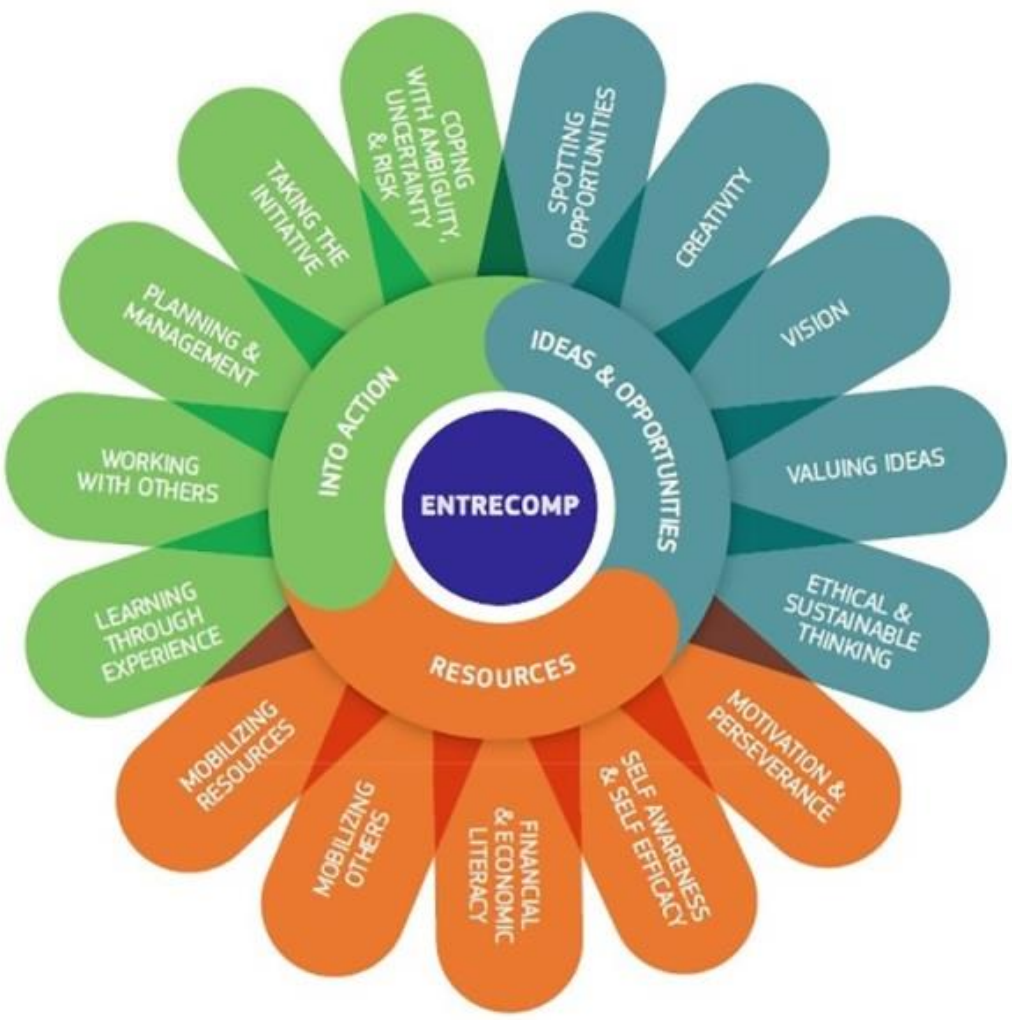
Annex 2. EntreComp / Description and EntreComp Flower

(https://ec.europa.eu/social/main.jsp?catId=1317&langId=en)

The European Commission has developed EntreComp: the **European Entrepreneurship Competence Framework** as a reference framework to explain what is meant by an entrepreneurial mindset.

EntreComp offers a comprehensive description of the knowledge, skills and attitudes that people need to be entrepreneurial and create financial, cultural or social value for others.

EntreComp is a **common reference framework** that identifies **15 competences in three key areas** that describe what it means to be entrepreneurial.



Annex 3. The e-DESK MOOC Syllabus

This syllabus was designed with the Balance Learning Design Planning (BDP) tool developed by the Faculty of Organization and Informatics of the University of Zagreb. (Divjak et al, 2022b).

MOOC

Planned ECTS: 2, **Number of learners:** 50, **Mode of delivery**: Online
Status: IN PLANNING, **Course public access**: Private
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Course learning outcome	Level	Weight
Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment.	Understanding	10
Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills.	Applying	10
Integrate the learning material available in the MOOC with other appropriate teaching and learning resources to foster entrepreneurial competences and ethical and sustainable thinking.	Applying	10
Identify what entrepreneurial competences students need in the contemporary world to seize and create opportunities and meet challenges to generate value.	Analysing	15
Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment.	Analysing	15
Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences.	Evaluating	10
Evaluate the learning process and students' acquisition of learning outcomes related to entrepreneurial competences.	Evaluating	10
Create interactive learning designs and sessions developing students' entrepreneurial competences, minding students' pre-competence, available resources and pedagogical techniques that enhance students' engagement and motivation.	Creating	20
		Total Weight: 100

Topic / Unit name	Workload	Learning type	Mode of delivery		Groups	Collaboration	Feedback	Assessment		
								Points	Types	Providers
Introduction										
Introduction										
Introductory video This video should summarize the main aspects and relevant contents/characteristics of the MOOC. Maybe it could be done after we have the rest of the final draft materials. *To keep the narrative, we could do very short introductory videos (using the same voice/person/character) to all modules/submodules.	20 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No	
Self assessment Entrepreneurial competences and teaching methods. The main objective of this assessment shall be to make participants aware of what they already know and from where they depart.	30 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	0	Summative	Self
Glossary A compilation of the main terms that will be used during the MOOC and can cause doubts.	10 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No	
Total unit workload	1h									

Topic / Unit name	Workload	Learning type	Mode of delivery			Groups	Collaboration	Feedback	Assessment		
									Points	Types	Providers
Competences, skills and values in general Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment. (**70%**), Identify what entrepreneurial competences students need in the contemporary world to seize and create opportunities and meet challenges to generate value. (**10%**)											
Entrepreneurial competences											
Pre-reading + introductory video Reading and audiovisual materials regarding the basics of entrepreneurial education.	60 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Quiz Formative assessment based on the pre-reading. Multiple choice questions. Can be used as an entry pre-competence test (to check the level of teachers´ pre-competence).	60 min	Assessment	Online	Asynchronous	Teacher not present	No	No	Automated	3	Summative	Automated
Videos of best practice Short videos (3 - 6 mins) with good examples. Can be existing or newly recorded videos.	60 min	Investigation	Online	Asynchronous	Teacher not present	Yes	Yes	No	No		
Disscussion based on reading, videos and own experiences Discussion based on questions. For this forum assignment we recommend having only 2-3 questions not focused exactly on the videos, but maybe things ans characteristics shared by all/most examples.	90 min	Discussion	Online	Synchronous	Teacher not present	No	Yes	Peer	2	Summative	Peer
Total unit workload	4.5h										
Pedagogical approaches, teaching and assessment											
Videos Videos on pedagogical approaches, learning outcomes, learning theories, constructive alignment etc.	115 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Quiz Short formative assessment related to the pre-reading.	60 min	Assessment	Online	Asynchronous	Teacher not present	No	No	Automated	3	Summative	Automated
Videos/materials on best practice Participants will be provided with materials on good practices in flipped classroom and work-based learning approaches (E+ project RAPIDE).	60 min	Investigation	Online	Asynchronous	Teacher not present	Yes	Yes	No	No		
Discussion based on the pre-reading, videos	90 min	Discussion	Online	Synchronous	Teacher not	Yes	Yes	Peer	2	Summative	Peer

and own experience Participants will be divided in groups and provided with questions for discussion.					present						
Total unit workload	5.41h										
Final test											
Final test - Copy	30 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	10	Formative	Automated
Total unit workload	0.5h										

Topic / Unit name	Workload	Learning type	Mode of delivery	Groups	Collaboration	Feedback	Assessment		
							Points	Types	Providers
Developing entrepreneurial competences Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment. (**10%**), Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences. (**40%**), Evaluate the learning process and students' acquisition of learning outcomes related to entrepreneurial competences. (**10%**)									
Evaluating the pre-knowledge on entrepreneurial competences									
Introductory videos Videos about the entrepreneurial competences framework - ENTRECOMP Europe.	30 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Discussion Discussion on the entrepreneurial competences framework. E.g. Participants in groups discussing various aspects or dimensions of the entrepreneurial competence framework.	60 min	Discussion	Online	Synchronous	Teacher not present	No	Yes	No	No		
Introduction to EntreComp Edu Get to know how to apply the EntreComp framework to education.	30 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Final test	30 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	10	Formative	Automated
Total unit workload	2.5h										

Real-world requirements for entrepreneurial competences Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment. (**10%**), Identify what entrepreneurial competences students need in the contemporary world to seize and create opportunities and meet challenges to generate value. (**90%**)									
Real-world requirements									
Introductory presentation videos and readings Videos on the future of jobs. References: Frey & Osborne 2013 and 2017, World Economic Forum, ENTRECOMP and sustainability etc.	90 min	Investigation	Online	Asynchronous	Teacher not present	No	No	No	No

Case-study analysis Examples of entrepreneurial stories. Several stories, analyzing them from different points of view (scientific fields, countries, regions), producing essays on students´ entrepreneurial skills needed for this particular entrepreneurial environment. Making generalizations.	60 min	Production	Online	Asynchronous	Teacher not present	No	No	No	No		
Peer-review Assessing the essays according to rubrics. [For moving the course to the WP platform, it shall be turned into self-assessment based on the criteria from the rubrics]	90 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	10	Summative	Peer
Total unit workload	4h										

Relevant pedagogical approaches

Describe pedagogical approaches, teaching and assessment methods that enhance students' engagement to develop students' entrepreneurial competences in online learning environment. (**10%**), Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. (**10%**), Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment. (**80%**)

Relevant peadgogical approaches

Branching scenarios Possibility of creating a character; selecting relevant pedagogical approaches related to the acquisition of spotting opportunities, sustainable and ethical thinking, creating values.	60 min	Practice	Online	Asynchronous	Teacher not present	No	No	Automated	9	Summative	Automated
Discussion Discussion about the scenarios.	60 min	Discussion	Online	Synchronous	Teacher not present	No	Yes	Peer	2	Summative	Peer
Introductory materials Introductory videos (10 mins per video) and other materials on pedagogical approaches (strategies): - in general - flipped classroom - problem/project based learning - inquiry-based learning - work-based learning.	60 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Total unit workload	3h										

Evaluating the digital teaching and learning skills of students and staff

Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. **(50%)**, Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences. **(40%)**, Evaluate the learning process and students' acquisition of learning outcomes related to entrepreneurial competences. **(10%)**

Digital skills for teaching and learning

Self-assessment of digital skills (first part) A rubric for self-assessment. Comparing to the average according to different criteria. Gap analysis and feedback. Evaluating pre-knowledge of digital skills according to the DigComp framework, using the Digital Skills Assessment tool from the European Commission platform (https://digital-skills-jobs.europa.eu/en/digital-skills-assessment).	30 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	0	Summative	Automated
Content provision and practice Provision of different scenarios and choosing the tools that can enhance teaching and learning for that scenario. The scenarios are chosen according to the results from the first self-assessment, for each skill.	75 min	Practice	Online	Asynchronous	Teacher not present	No	No	No	No		
Self-assessment of digital skills (second part) A rubric for self-assessment. Comparing to the average according to different criteria. Progress analysis and feedback. Evaluating resulting knowledge of digital skills according to the DigComp framework, using the Digital Skills Assessment tool from the European Commission platform (https://digital-skills-jobs.europa.eu/en/digital-skills-assessment).	60 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	0	Summative	Automated
Introductory Videos General videos on technology enhanced learning. These videos should focus on digital skills necessary for different scenarios. (The different modes of delivery will be further explored on the Delivery Models of Teaching and Learning module).	30 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Reflection on digital skills at own institutions Essay on ways to improve faculty digital skills at your institution. Use your strengths/weaknesses as examples.	60 min	Production	Online	Asynchronous	Teacher not present	No	No	No	No		
Peer-review Peer-review of the essays with suggestions for improvement.	75 min	Assessment	Online	Asynchronous	Teacher not present	No	Yes	Peer	5	Summative	Peer
Total unit workload	5.5h										

Learning design concept and tool

Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. (**10%**), Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment. (**10%**), Create interactive learning designs and sessions developing students' entrepreneurial competences, minding students' pre-competence, available resources and pedagogical techniques that enhance students' engagement and motivation. (**80%**)

Learning design concept and tool

Introductory video Video on learning design concept and the tool (10 min in total). BDP Learning Design tool: https://learning-design.eu/en/	90 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Case-study analysis Several case-studies provided and discussed in groups. Delivery mode is hybrid.	120 min	Investigation	Online	Synchronous	Teacher not present	Yes	Yes	Peer	No		
Preparing learning design Preparing learning designs/sessions in an LD tool based on the discussion related to the case-studies based on the hybrid delivery mode. (Self-assessment instead of teacher assessment in	280 min	Production	Online	Synchronous	Teacher not present	Yes	Yes	Teacher	30	Formative	Teacher
Quiz A short automated quiz related to the learning design concept.	10 min	Assessment	Online	Asynchronous	Teacher not present	No	No	Automated	2	Summative	Automated
Total unit workload	8.33h										

Learning resources

Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. (**10%**), Integrate the learning material available in the MOOC with other appropriate teaching and learning resources to foster entrepreneurial competences and ethical and sustainable thinking. (**80%**), Create interactive learning designs and sessions developing students' entrepreneurial competences, minding students' pre-competence, available resources and pedagogical techniques that enhance students' engagement and motivation. (**10%**)

Learning resources

Discussion Discussion on the takeaways from this course related to learning resources and what´s missing. Finding information to support ethical and sustainable thinking.	90 min	Discussion	Online	Asynchronous	Teacher not present	No	Yes	Peer	No		
Video Videos on how to find relevant and reliable resources about ethical and sustainable thinking.	60 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Preparing resources on ethical and/or sustainable thinking Based on the discussion and the video, participants prepare (collect and systematize) materials on the selected topic and for a selected group of students (taking into account the educational level and pre-knowledge of students).	75 min	Production	Online	Asynchronous	Teacher not present	No	No	Teacher	5	Summative	Self

Demonstration of selected resources Participants demonstrate the prepared resources. For the MOOC - the prepare recordings or other formats (e.g. infographics). For the project - participants prepare presentations.	90 min	Practice	Online	Asynchronous	Teacher not present	No	Yes	Peer	5	Formative	Peer
Total unit workload	5.25h										

Evaluation and quality assurance

Integrate the learning material available in the MOOC with other appropriate teaching and learning resources to foster entrepreneurial competences and ethical and sustainable thinking. (**10%**), Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment. (**10%**), Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences. (**10%**), Evaluate the learning process and students' acquisition of learning outcomes related to entrepreneurial competences. (**80%**), Create interactive learning designs and sessions developing students' entrepreneurial competences, minding students' pre-competence, available resources and pedagogical techniques that enhance students' engagement and motivation. (**10%**)

Evaluation and quality assurance

Pre-reading Reading materials on evaluation and QA in HE.	60 min	Acquisition	Online	Asynchronous	Teacher not present	No	No	No	No		
Quiz Short quiz based on the pre-reading.	60 min	Assessment	Online	Asynchronous	Teacher not present	No	No	Automated	3	Summative	Automated
Self-evaluation Self-evaluation of a learning design, learning resources and the learning process, based on a rubric.	90 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	20	Formative	Self
Total unit workload	3.5h										

Delivery models of teaching and learning

Use appropriate technology to support sound pedagogical approaches that contribute to the development of students' entrepreneurial and problem-solving skills. (**20%**), Integrate the learning material available in the MOOC with other appropriate teaching and learning resources to foster entrepreneurial competences and ethical and sustainable thinking. (**10%**), Identify relevant pedagogical approaches to support students to analyse the impacts of ideas, opportunities, actions, created values and ethical implications in the selected real-world environment. (**0%**), Evaluate individual and group strengths and weaknesses of students and staff regarding hybrid and digital teaching and learning about entrepreneurial competences. (**10%**)

Delivery models on teaching and learning

Videos on different delivery modes Videos on different modes of delivery.	60 min	Investigation	Online	Asynchronous	Teacher not present	No	No	No	No		
Discussion on good practices Group discussion on good practices, based on delivery modes.	90 min	Discussion	Online	Synchronous	Teacher not present	Yes	Yes	Peer	2	Summative	Peer
Total unit workload	2.5h										

Hybrid teaching and blended learning

Videos on best practices (hybrid teaching and blended learning) Videos related to best practices hybrid and blended delivery.	60 min	Investigation	Online	Asynchronous	Teacher not present	No	No	No	No		
Discussion on hybrid teaching and blended learning	90 min	Discussion	Online	Synchronous	Teacher not present	Yes	Yes	Peer	2	Summative	Peer
Group discussion on hybrid teaching and blended learning, based on the video.											
Total unit workload	2.5h										

Further personal development											
...											
Final self-assessment Entrepreneurial competences and teaching methods	30 min	Assessment	Online	Asynchronous	Teacher not present	No	No	No	0	Summative	Self
Recommendation for further independent work In this submodule, we can include some related open courses or videos, as well as interesting papers. Perhaps it could be divided as a directory, having different "sections" for each of the topics: hybrid learning, digital learning, face to face teaching, etc. (here we could also include a section referencing papers focused on the covid-19 consequences on the digitalization of universities...)	60 min	Investigation	Online	Synchronous	Teacher not present	No	No	No	No		
Total unit workload	1.5h										

Total course workload: 50h

Annex 4. EntreCompEdu / framework for teachers - description

(https://entrecompedu.eu/entrepreneurship-for-everyone/) / part EntreComp and EntreCompEdu history + EntreCompEdu competence areas & competences

Entrepreneurship for everyone: introducing EntreCompEdu, a new professional development framework for teachers to support entrepreneurial education.

In 2016, the European Commission launched EntreComp: The Entrepreneurship Competence Framework, which sets out the competences that everyone needs if they want to become entrepreneurial. For example, the ability to spot opportunities, develop creative ideas, stay focused and work with others. What was missing, however, was a specific framework that teachers could use to map their own progress in teaching entrepreneurial competences.

Hence EntreCompEdu was conceived as a complement to EntreComp in supporting educators so that they could teach these entrepreneurial competences effectively. Based on a review of what is known about good pedagogy, both in general and in the field of entrepreneurship, EntreCompEdu was built around five broad competence areas:

1. Professional knowledge and understanding of entrepreneurial education
2. Planning and organizing entrepreneurial education
3. Teaching and training for entrepreneurial education
4. Assessment for entrepreneurial education
5. Professional learning and development

The names of these competence areas are likely to be quite familiar with most teachers because they typically reflect the contents of teacher education programmes in the UK and across Europe. This is seen as an advantage so that teachers do not see entrepreneurship as something alien to their everyday practice. These broad areas are broken into smaller, more detailed competencies that teachers need to demonstrate.

The 17 competences within the EntreCompEdu Professional Competence Framework

5 Competence areas and 17 competences

1. Entrepreneurial knowledge and understanding
    I. Knowing and understanding entrepreneurial education
    II. Valuing entrepreneurial education for all
    III. Understanding how students develop entrepreneurial competences.
2. Planning and organizing creative learning environments
    I. Setting entrepreneurial learning objectives that are ethical and sustainable
    II. Making connections to support entrepreneurial education
    III. Creating an empowering entrepreneurial learning environment
3. Teaching and training
    I. Teaching to inspire and engage students
    II. Creating value for others
    III. Teaching through real-world context
    IV. Encouraging self-awareness and self-confidence to support learning
    V. Promoting productive working with others
4. Assessment
    I. Checking and reporting on students' progress in entrepreneurial learning
    II. Sharing feedback on entrepreneurial learning
    III. Celebrating progress and achievement
5. Professional Learning and Development
    I. Evaluating impact of entrepreneurial education
    II. Research-informed and evidence-based practice
    III. Building and sustaining entrepreneurial networks

Annex 5. EntreCompEdu / six pedagogical principles (Grigg)

(https://entrecompedu.eu/entrepreneurship-for-everyone/) / Part pedagogical principles

Underpinning EntreCompEdu is a set of six pedagogical principles to guide educators in their practice.

Author: *Dr. Russell Grigg*

- Think creatively
- *Look to the real-world for inspiration*
- *Make entrepreneurial learning visible*
- *Promote collaboration with a purpose*
- *Create something of value for others*
- *Stimulate reflection, flexible thinking and learning from experience*

1. Think creatively

This principle involves facilitating creative thinking throughout the learning process. In practice, this means encouraging learners to ask, 'What if...?' questions, wonder about possibilities, 'to look twice' and be adaptable to different ideas and solutions. Teaching observational techniques, such as slow looking, can help learners spot opportunities that they might easily miss.

2. Look to the real-world for inspiration

Seeking out real-world opportunities to add value is essential for learners to develop and apply their entrepreneurial competences. Despite the horrendous consequences of coronavirus, the pandemic has sparked a rise in creativity with many weird and wonderful suggestions to help us keep a safe distance from others. These include virtual holidays to remote islands, virtual concerts, hats with foam 'pool noodles' worn by café customers in Germany, and eye-catching graphics to help people move in the right direction. When learners explore authentic problems in their school, immediate locality, or wider world, they are likely to work harder and engage in deeper thinking than when they learn through textbooks.

3. Promote collaboration with a purpose

Learners need opportunities to collaborate with a clear purpose both in and be-yond the classroom. Historically, most of the innovations that eventually find their way in our lives stem not from a single genius figure, but through networks who thrash out possibilities, redesign elements and add modifications. The success of the likes of Apple, YouTube, eBay, and Toyota is based on the creative power of collaboration.

4. Create something of value for others

Being entrepreneurial is about adding value in people's lives. This does not have to be about making money. It could involve lessons in adding social value, such as arranging a schedule to check on the welfare of older ones or setting up an inter-generational project, where skills between students and grandparents are shared online. Or the value might take cultural forms, such as creating a heritage walk in the community or a virtual arts gallery.

5. Stimulate reflection, flexible thinking and learning from experience

Being entrepreneurial also involves ongoing reflecting over what's worked well and needs developing or improving. For example, upon reflection, perhaps the unique value of a product or service needs to be communicated more clearly or through a different medium. Taking a new direction can be fearful for some learners. And so, teachers might offer incremental challenges. Learners who dread making a class presentation might begin with presenting to a small group. Teachers can also model reflection by thinking aloud and being open about their own learning experiences.

6. Make entrepreneurial learning visible

In recent years much has been said by the likes of John Hattie and others about ensuring that learners know what to do and how to do it. In entrepreneurial education, this means making learning goals clear while being open to unexpected responses. It also involves fostering dialogue with and among learners so that they are not playing some form of guess-what's-in-the-head-of-the-teacher game.

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