ENCORE

The ENCORE approach

By UNIPD
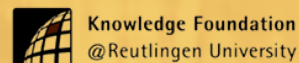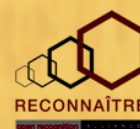
The ENCORE approach

Project result number D5.1 by UNIPD
9 November 2023

Executive Summary

The ENCORE approach combines AI-driven tools to retrieve relevant Open Educational Resources in order to improve teaching and learning. Through these means, it main goal is to guide educators in designing courses with learning outcomes directly linked to the skills required to address contemporary challenges such as digitalization, climate change, and post-COVID economic recovery. Therefore, the tools put emphasis in yielding and organising the resources through the lens of the DGE (the Digital, Entrepreneurial, and Green) Frameworks developed by the EU Commission to address the above-mentioned challenges.

The Pedagogical guidelines refer to a set of principles and recommendations to engage with the ENCORE system, organised in at least three technological layers: a search engine based on the DGE skills; a database that aggregates open educational resources under the DGE skills; and educational enablers that support design for learning by adopting a number of pedagogical concepts, such as the Bloom taxonomy. Therefore, the ENCORE system caters to educators, learners, and other stakeholders with several relevant educational instruments: digital, entrepreneurial, and green competences as frontiers of knowledge in a society that goes through transformation and faces global inequities and climate change as a key challenge; open education as a philosophy for an inclusive and participatory practise of teaching and learning; and the need to embed appropriately and effectively such ideas into the educational practise.

The ENCORE system, with its different layers, invites educators and learners to reflect on their own teaching practises and to support significant learning experiences. As a whole, the system can potentially trigger professional learning and development by the educators and trainers, as well as by those adopting each and/or any of the features. However, to that end, further interaction with educators to generate learning scenarios and to imagine the ENCORE system in contextualised situations is necessary. Professional learning is based on practise; practise is based on social approaches to doing and learning to do.

The present document introduces the key areas of reflection to develop pedagogical guidelines, as an instrument that makes of ENCORE not only a usable system, but an approach that encourages staff/educators' development. In this regard, we aim not only to explain and motivate ENCORE usage but also to promote institutional strategies embracing the principles of ENCORE, as a human-machine collaborative environment.

The document starts with relevant information to understand what Open Education is and what it takes to teachers and students to engage with such an approach. In this regard, a little bit of history on Open Education is retraced in order to introduce problems as search and retrieval, quality of OERs and effective usage in Higher Education and VET. We also consider how OER have been connected to the Educators Professional Development and to the Students' Empowerment, making it an approach worth to be considered in a post-pandemic, post-digital scenario. Hence, the document presents the ENCORE approach, considering its several components as integrated and smart system supporting educators to find and implement OER into the teaching and learning process. Suggestions of usage come with several exercises made by the ENCORE partnership to generate learning scenarios that deal with the DGE competence.

Furthermore, the exercises offer some ideas to focus on:

a) the types of possible interaction with the OER (for designing, for preparing resources, for teaching/delivering training, for learning);

b) planning appropriate learning goals while interacting with the ENCORE pedagogical enablers, adopting Bloom's taxonomy.

The reader must consider that this is an "in-progress" work and set the basis to expand the pedagogical guidelines as an instrument to make the most of ENCORE, conceived more than as a system and its interface. ENCORE can be considered an intelligent system that supports teachers and trainers in the development of DGE skills through open educational resources, but as said, this is only the starting point. ENCORE will only thrive as an approach through progressive loops of usage, comment, experimentation, and human creativity, contributing to solutions that bring to the fore the fruitful ways in which the system can trigger educational transformation. Only through these relevant experiences and cases delving on human-machine collaboration will we accomplish the more complex idea of ENCORE as a pedagogical approach.

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Meet Open Education: the opportunity, the challenge.

An initial question that comes to the mind of any educator when hearing about Open Educational Resources is: why should I use them?

Currently, governments pay a growing amount of attention to the issue of openness in all areas of lifelong learning. "Opening up" education i.e., a process of knowledge sharing based on the advancements of educational technologies, was envisaged already a decade ago as an opportunity to better use existing educational resources, including more inclusive educational models, a more direct connection with the labour market, and facilitating lifelong training. Central for the concept of open education are the OER, or Open Educational Resources. OERs were early defined by UNESCO (2002) as "*any educational material that can be used, adapted, and shared without restriction*" and include everything from textbooks to worksheets to lesson plans to instructional videos to entire online courses to educational games.

In the last decade, policy documents in the European Commission underlined that "All educational institutions need to improve their capacity to adapt, promote innovation and exploit the potential of technologies and digital content" (European Commission, 2013c, p. 4). The EU stressed the need to promote "innovative teaching and learning through new technologies and Open Educational Resources" as a strategy for lifelong learning, further embedded within the EU development goals and "flagship" initiatives for 2020 (EU2020). The actions deemed crucial in several documents were connected to the acquisition of digital skills, the availability of open educational resources, the connections between learning environments across physical barriers, and the engagement of all social stakeholders along the educational process to "change the role of digital technologies at educational institutions" (European Commission 2013b, p. 2). The concern for policymakers went also in the direction of becoming competitive as educational providers in the EU, in terms of MOOCs, for example (European Commission 2013b).

After ten years of open education support through policies and programmes, the EU still expresses the importance of open education (https://joint-research-centre.ec.europa.eu/what-open-education_en) as a crucial driver in the modernisation of educational provision, for reducing the barriers to access of quality education and bridging non-formal and formal education by recognizing the credential issued by accredited institutions.

The widespread dissemination of knowledge and data undoubtedly presents new possibilities. There has been a dramatic increase in the number of open educational resources (OERs) available in learning object repositories over the past two decades. Teachers can use this wealth of information to focus on higher-order tasks, including customising their interactions with students, while still meeting the demands of an ever-evolving curriculum and technological landscape. However, shifting from OER to OEP is a complex process that necessitates multiple reflections (Ossianilsson, 2020). The Joint Research Centre (JRC)'s framework (Innamorato dos Santos et al., 2016) aimed at encouraging OER adoption. The framework suggested a broad definition of open education that covered a variety of applications, encouraged openness, and took a more all-encompassing approach to teaching and learning. It covered 10 different aspects of open education, including but not limited to OER, MOOCs, and open access. The Open Education Europa (OEE) platform, which the Commission ran from 2013 to 2018, made available a subset of the articles published at OEE, among them eLearning Papers, in acknowledgement of the expanding body of research in this area. The goal of this strategy was to help teachers become open educators, not just to help them create, distribute, or use OER. The debate slowly moved towards the relevance of using more than creating resources for learning, therefore, recognising learning that happens around *learning in the open* (Camilleri et al., 2012). The scenario

evolved slowly towards offering frameworks of implementation of open education, supporting educational design and teaching with OER (Camilleri et al., 2014; Kawachi, 2014; Elias et al., 2020). Also, the discussion surrounding micro-credentials and open digital badges—methods of tracking, acknowledging, and certifying talents using digital evidence that can be taken anywhere—evolved rapidly (Camilleri et al., 2015). Most importantly, along a decade of progress, the concern went in the direction of characterising OER's impact on students' learning (Colvard et al., 2018; Hilton, 2020, later contested by Wiley, 2020).

Therefore, the trend of political support to initiatives for openness is consolidated and will continue to grow. The emphasis is probably coming out from decades of debate on the power of openness to transform teaching and learning aligning the educational process with the needs of the knowledge society (Banzato, 2012; Peter & Deimann, 2013; Innamorato dos Santos, 2016; Rodríguez and Pulido Montes, 2022).

Nowadays, against the raising abundance of resources, significant shifts are occurring in the instructional strategies and financial models of educational institutions in the pandemic aftermath, and in an era apparently governed by intelligent technologies. Climate change with their effects is also a relevant concern, pushing educational systems to provide responses. The recent COVID-19 pandemic brought the education sector to a crossroads of upheaval, heightening the importance of this issue and the necessity to rethink education (Williamson et al., 2020). To solve the problem of adapting to changing social demands, one way considered early in the literature devoted to educational technologies was to shift focus from the dissemination of information to a more adaptive and preventative strategy that makes use of automation and AI. More recently, the generative artificial intelligence (AI) drastically moved the educators' attention to the use of a direct system that is able of providing any sort of response through an anthropomorphic interface, namely, the popular chatbot "ChatGPT" developed by OpenAI (Tlili et al., 2023). Nonetheless, different instructional techniques, grounded in scientific, technical knowledge but also a critical debate, have been considered necessary in light of the plethora of proposals presently "at our fingertips". Considering the human impact of technological progress, as well as the knowledge economy, in which data and information are more valuable than physical products, highlights the importance of these educational shifts (Williamson et al, 2020). It is unquestionably important to develop educational interventions and policies. But the educators need to gain "a bigger picture" regarding technological change, through their re-evaluation of methods and central concerns is crucial. Educators' participation in the design and debate of interventions that promote technologically advanced, environmentally friendly, and socially resilient communities is crucial to re-centering their abilities. Open Education, which was deemed central until the pandemic (Rodríguez & Pulido, 2022) appears to be blurred against the AI hype. However, the relevant issues discussed after two decades of open education are still central (Baker & Manning, 2023).

As an illustration, the European Union has developed a number of policies and measures to guarantee a digital transformation and encourage both inclusive and sustainable growth. Embracing technological progress without compromising sustainability and social inclusion was clearly emphasised in the early policy recommendation "*A strategy for smart, sustainable, and inclusive growth*" (EU2020). But the Digital Education Action Plan (2021-2027) was specifically formulated to realign education and training with the changing demands of the educational system in light of COVID-19. Also, the European Union (EU) upgraded its Digital Competence Framework (Carretero et al., 2017, Vuorikari et al., 2022) to include algorithmic and critical digital literacies. Also, the Citizens and the European Skills Agenda, a five-year strategy to assist individuals and businesses in improving their skill sets was launched. The effects of the digital transformation on the workplace, education, civic

engagement, and daily life inspired this endeavour, highlighting a strong connection between the European Digital Strategy and the European Skills Agenda. Across such documents, not only accessing information and spaces for communication, but becoming aware of the impact such resources might have on personal and professional life.

In this light, we could claim here that the concept of openness has been probably endowed with a power that should be reconsidered in the light of real practices and institutional projects, as well as the gaps of skills amongst academics and other teaching staff (Hodgkinson-Williams & Gray, 2009). Indeed, "*Openness is a controversial topic. Even people who agree on its desirability can disagree over what openness really means and how best to achieve it*" (Mackie, 2008, p.119). This is particularly the case when regarding educational quality, an issue that has been often connected with openness in a rather superficial way (Ossiannilsson & Creelman, 2012).

It has also been argued that every institution devoted to lifelong learning should find the "right way" to implement openness, connecting it to their own learning culture and mainly, to educators' professional development to embrace openness (Raffaghelli, 2014). Invasive, top-down reforms always find resistance and lack of cooperation. In fact, according to Wiley & Hilton, every institution can analyse and find its own path to introduce open education principles and practises.

There are a number of ways institutions can be more open, including programs of open sharing of educational materials. Individual faculty can also choose to be more open without waiting for institutional programs. Increasing degrees of openness in society coupled with innovations in business strategy like dynamic specialisation are enabling radical experiments in higher education and exerting increasing competitive pressure on conventional higher education institutions (Wiley & Hilton, 2009, pp. 13-14).

Instruments and networks that in time strengthen professional learning and engagement with the abstract concept of "openness" have been considered crucial. Despite the relevant work by the EU and connected international networks (like OEGlobal ,https://www.oeglobal.org/ ; or OERCommons, https://oercommons.org/; or https://www.oerknowledgecloud.org/); and the several documents illustrating barriers and cases (Castaño et al., 2016; Tarkowski et al, 2019; Innamorato dos Santos et al, 2018) and promoting the self-evaluation of practises and institutional strategies (Inamorato dos Santos et al., 2017; Inamorato dos Santos, 2019) by the Joint research Center in Europe , it seems there is more to be done to boost open education. The introduction of intelligent tools might support educators' engagement with open educational resources, triggering further creativity. Nonetheless, such tools should be introduced in contexts that allow the educators to reflect on their own practices and professional identity (Raffaghelli, 2022).

The above-mentioned trends emphasises the insufficient reach of OERs with regard to their initial ambitious goals, focusing on professional development and institutional strategies. However, a more radical critique scrutinises the very conceptual basis of open education, exploring also the digital architectures that support it (Villar-Onrubia & Marin, 2022) To which extent Open Education is an enabler of equity and social justice and hence reach the goals of a quality education available, accessible and inclusive globally through a more complex epistemological approach to openness, is still a matter of concern, particularly after the pandemics (Veletsianos, 2020). For example, is still open a resource that circulates on networks that concentrate knowledge from the global north, ignoring intercultural and epistemic justice issues in the content delivered (Bali et al., 2020). Baine, Knox and Ross punctualised the juncture early in 2015:

'Openness' has become a highly charged and politicised term, a movement operating in many areas outside of education (for example, open knowledge, open government, open access, open data, open

source, and open culture) In the process, it has acquired a sheen of naturalised common sense and legitimacy, and formed what seems to be a post-political space of apparent consensus. Invitations to question openness are quite rare, particularly within a field like education that is above all motivated by a desire to exchange knowledge, to make it accessible, and to positively affect the lives of individuals. However, it is precisely this view of openness – as a virtue of natural worth – that is problematic, not only because it masks alternative perspectives, but also because it does so with an apparent moral authority that renders the critic at best a technophobe and a cynic, and at worst an elitist and a champion of the status quo. (Baine et al., 2015, 247).

A clear case in this regard has been the raise of public interest on MOOCs (Massive Open Online Courses) a decade ago, which were later hardly criticised for several business models that were only superficially "open" (Stracke et al., 2019). Currently, there is an attempt to understand what openness means beyond the performative idea of something that is easily available in a repository. If the Open Educational Practise movement has brought to the fore the need of promoting collaborative circulation of knowledge as part of teaching practises and hence of an open pedagogy (Cronin & McLaren, 2017); or through openness from design to assessment (Nascimbeni, 2020); more recent debates have focused on novel pedagogical approaches that recognise and value students as active participants in their own education (Hilton & Mason, 2016). Also, the development of open educational infrastructures (Villar-Onrubia & Marín, 2022) have come to the fore: Can we consider open what is embedded in digital private platforms like YouTube, The Khan Academy, or Google resources for educators? The debate on the problems raised by the platformisation of education connected to data-driven pedagogy and AI in education as part of a business model (Williamson et al., 2023) uncover a clear conflict on what can be deemed "open" and what is a visible surface for a private interest. The entanglements between open/public access and restricted access/private must be considered at this point.

Also, smart solutions are starting to be applied to deal with the issue of OER quality (Segarra Faggioni, 2022). This has been considered a key problem for OER usage and consumption, and commonly faced through professional communities' peer-checking quality, or crowd-sourced approaches more than expert-driven or centralised evaluation (Almazyad, 2019; Camilleri, 2014). However, this was a growing trend before the "generative AI avalanche" that is currently occurring. More than analysing and classifying contents into digital libraries, generate AI can create content with the right prompts (Tlilli et al. 2023) so it poses a significant challenge to the professionalism and expertise of educators. In this light, one of the key problems faced is the awareness relating to intellectual property, the appropriate attribution that is frequently neglected within most generative AI systems. While they generate "open content" that can be used and circulated, AI training is often carried out adopting human creations (Smits & Borghuis, 2022) which, to be coherent with the principles of the open education, open access and open-source movements have to be appropriately attributed and recognised. Therefore, the ease of access and usage of such systems and novel strategies require educators' and students' consciousness of their own expertise and the importance of critically adopting the mentioned technology in the classroom.

In this regard, while recognition and micro-credentials are being considered central and prevailing over formal methods to develop the technical competences to live in an AI-governed society, a cautious reflection should be made on all forms of automation. Formal approaches may take a long time to be configured or might only show one perspective or be driven on interest to embrace a particular tool, but particularly in the public space, they entail participatory and democratic forms of governance upon digital infrastructures (Williamson, 2023). Therefore, they might not be effective to support immediate rapid skills-gaining (to engage with intelligent technology and learning environments due to the fast

pace and turmoil into which these systems are evolving, but they should set the basis to rethink educational challenges to shape future societies. While training industries and end users might benefit from smart solutions that bridge the gap between the plethora of digital resources and skills recognition, a careful and dialogic approach between the public and private sectors in education should be carried out.

To know more about the Open Education, please go to the Annex I

To deepen on strategies to engage educators and learners in the usage of OER, go to Annex II

Over the mentioned bases, this document introduces the "ENCORE pedagogical guidelines". Leveraging on the impressive literature already produced on Open Education along 20 years of recent history, our aim is:

a) Firstly, to consider open education in a context of digital transformation led by AI, as a broader perspective to bring quality lifelong learning experiences.
b) To introduce the ENCORE approach as an instrument based on intelligent technologies (that cover several areas of open education, from searching quality resources to recognising learning after adopting OER) that facilitates the access to quality open educational resources, later supporting the educator in her/his exploration of OER adoption into pedagogical practises.
c) To support professional learning about open education through usage examples, research proving its efficacy, and templates to support learning design.

In conclusion, we hope that the ENCORE approach, based on key principles of Open Education, will facilitate educators' engagement and build professional networks and working groups that could push for holistic and reflective institutional strategies level.

The ENCORE Approach

The Key Components

The project ENCORE self-defines as "an innovative project that brings together **cutting-edge data-driven techniques**, and a **qualitative pedagogical approach** to foster the use of **OER**s and existing taxonomy of skills- **ESCO** to produce resources for teachers" (https://project-encore.eu/).

In detail, hence, the ENCORE is based on relevant components:

1- **The data-driven tools to search for quality OERs classified according to a taxonomy of skills.** The ESCO(the European framework of Skills, Competences, Qualifications, and Occupations) skills (https://esco.ec.europa.eu/en/classification/skill_main) is so relevant in this context because it provides a clear point of reference to address educational planning. The ESCO skills pillar categorises skill and competence concepts by indicating the skill type but does not differentiate between skills and competences. Each concept has a preferred term and non-preferred terms in each of the 28 ESCO languages. ESCO also provides metadata for each skill profile, such as a description, scope note, reusability level and relationships with other skills and occupations. The ESCO skill hierarchy is continuously improving, and feedback can be shared through their contact page. The Report produced by the University of PISA (UNIPI, 2022) introduces the research that supported the elaboration of this classification, preparing the search engine that lies behind the ENCORE system. By using NLP the OER can be analysed and Skills detected and linked to the ones existing in ESCO. Quality is also controlled through automated methods, which are under exploration but will encompass a phase of human-machine comparison about quality labels applied to the OERs (UNIPI & Beam Me Up, 2022).

2- **An integrated Database organised according to the GDE skills, according to the criteria of a meta-ROER (Repository of OERs),** that is, an interoperable portal offering the possibility of retrieving OERs from several OER repositories.

3- **A facilitated interface for educators, or "Educational Enabler",** which supports the participants through visuals like: Venn diagrams intersecting DGE skills, to understand the number and type of resources got by any of the skills as categories; the possibility to see concept maps of keywords relating the retrieved resources, exploring the key terms to refine the resources retrieval; a tool to create personal collections of resources retrieved, which can be exported on Moodle; an interface to produce "Learning Paths" connecting learning goals (based on Bloom's taxonomy) with activities and the retrieved resources.

4- **Professional Development Support,** that combine documentation and videoresources, combined with learning scenarios and templates and recommendations to implement staff development activities. This component is essential to integrate ENCORE usage within the daily life of institutions, supporting Teaching and Learning units in Universities or Human Resources Management units in the VET sector to support educators while learning to use ENCORE in significant and situated ways. Professional development is connected to several forms of certification and recognition; therefore, the activities also embed assessment and evaluation strategies. Nonetheless, recognition taps into an original approach which is a further component of the ENCORE approach.

5- **Open Recognition.** Since ENCORE courses are digital-by-design, the single user or informal communities of user can implement an open recognition process, to certify the skills that will be acquired by the students. The Open Recognition system stimulates a sense of initiative and entrepreneurial attitudes, mindset, and skills in learners, educational staff, and other workers, in line with the Entrepreneurship Competence Framework. It facilitates open, non-formal

learners to interact with the ENCORE system and to get credit for their creations. In this regard, it facilitates the flow and co-creation of knowledge between higher education and vocational education and training, research, the public sector, and the business sector

[To know more about the ENCORE components, see the educational videos HERE]

Through this approach, the project aims at guiding teachers towards a proper design of courses with learning outcomes linked to skills that will help students facing the macro-trends of **digitalisation**, **climate change**, and post-COVID **economic recovery challenges**.

The pedagogical guidelines introduce the ENCORE approach.

The figure 1 illustrates the several components of the ENCORE approach.
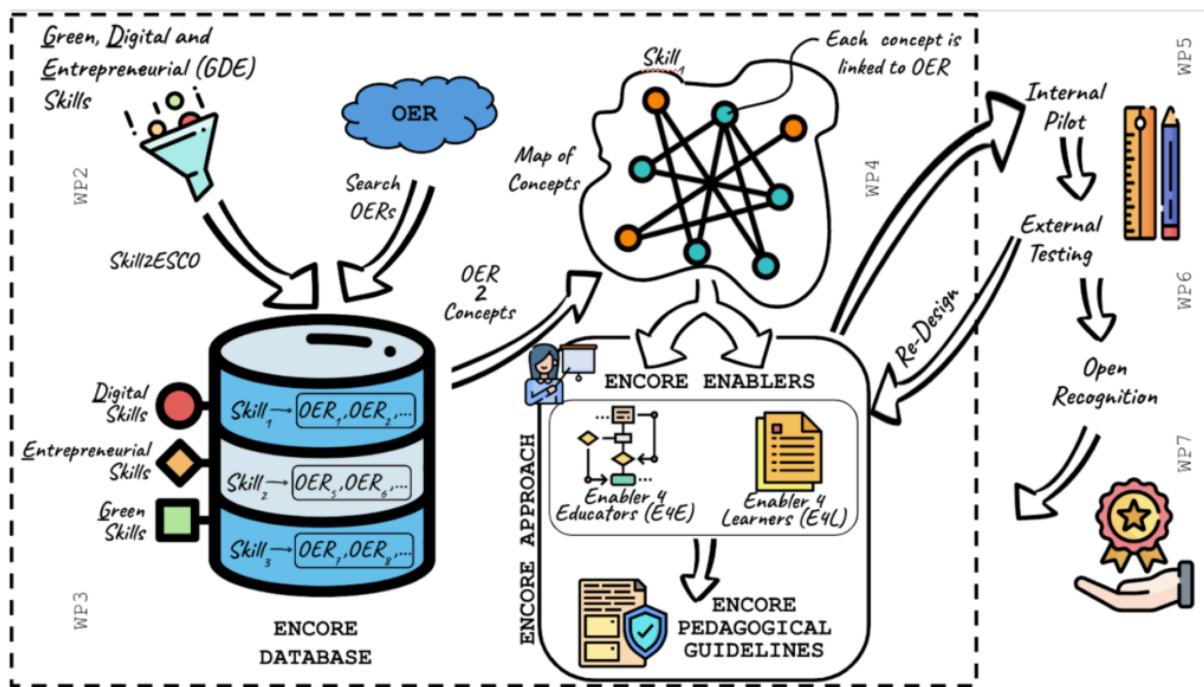
Figure 1. Components of the ENCORE approach.

Digital, Green, Entrepreneurial Skills: Why are they so important?

The ENCORE approach embraces three relevant frameworks of competence which are crucial for lifelong learning and for the society, as far as it has been envisaged by the EU policy making.

The Key Competences for Lifelong Learning (Directorate-General for Education, 2019) is the actual starting point to consider relevant areas of intervention within the context of a society built upon the basis of lifelong learning. The recommendations embedded in this document identifies essential competencies for personal fulfilment, a healthy lifestyle, employability, active citizenship, and social inclusion. These competencies are complementary and interconnected, with digital competence and other Key competencies being highlighted as interconnected domains. Literacy competence, which includes distinguishing and using different sources, is crucial for evaluating online content and its sources. Citizenship competence, which includes acting as responsible citizens and participating in civic and social life, is linked to media literacy, which focuses on accessing, understanding, and interacting with both traditional and new forms of media. Personal, social, and learning-to-learn competencies

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are also addressed, such as managing one's learning and career, supporting physical and emotional well-being, and creating value in today's world. Entrepreneurship competence, which focuses on creating value, can be combined with digital competence, particularly creatively using digital technologies. Netiquette, which includes cultural awareness and expression, multilingualism, and plurilingualism, is also included. The new examples aim to highlight how these interconnections might be encountered in digital environments.

Within this context, three relevant frameworks emerged, being considered central for digital transformation, the green transition and an inclusive but also innovative society.

The Digital Competence (Vuorikari et al., 2022) is based on at least ten years of exploration in the context of EU policy making and programmes for the digital transformation of the EU region. The European Policy Agenda supports digital skills for all and aims to foster a high-performing digital education system. The framework encompasses a vision of the requirements to live in technologically advanced societies. It also provides a base to develop and measure digital competence, aiming to reach 80% of the population with basic digital skills and 20 million ICT specialists by 2030. The updated version considers the knowledge skills and attitudes needed by citizens in the face of emerging technologies like AI, VR, and datafication. The 2.2 update of DigComp focuses on examples of knowledge, skills, and attitudes applicable to each competence, with 10-15 statements provided for each competence. The updated framework does not alter descriptors of the conceptual reference model or change proficiency levels. More than 250 examples highlight new and emerging themes, making them useful for curriculum planning and course content development. These examples address relevant themes in today's society, such as misinformation, datafication, citizens interacting with AI systems, emerging technologies, environmental sustainability concerns, and new contexts. The updated examples are not exhaustive and are not developed on proficiency levels. Additionally, they are not offered as an assessment instrument or self-reflection tool for competence development.

The Entrepreneurial Competence (Bacigalupo et al., 2016), is supported by the EntreComp framework developed by the Joint Research Centre and DG Employment, Social Affairs, and Inclusion. It focuses on developing competencies through entrepreneurial value creation, breaking down boundaries between education, work, and civic engagement. The framework applies to formal, non-formal, and informal learning contexts, promoting entrepreneurial learning and fostering an inclusive society. It comprises three competence areas: Ideas & Opportunities, Resources, and Into Action, with eight progression levels focusing on creating entrepreneurial value with external support, autonomy, responsibility, and impact.

The European Commission recognized entrepreneurship as one of its eight key competencies for lifelong learning in 2006. The Entrepreneurship Competence Framework, developed by the JRC in partnership with DG Employment, Social Affairs, and Inclusion, addresses entrepreneurship, learning outcomes, and proficiency levels. It aligns with the Commission's priorities on "Jobs, Growth and Investment" and the Europe 2020 initiative Agenda for New Skills for New Jobs. The framework is governed by a multi-stakeholder approach, with DG Employment, Social Affairs and Inclusion and JRC leading management and quality assurance. The EntreComp: The Entrepreneurship Competence Framework report is available for reuse under the European Commission's reuse policy, but users must acknowledge the original source, respect conditions, and avoid distorting the original meaning. EntreComp, published in June 2016, has been developed by the JRC and other stakeholders to raise awareness and facilitate adoption. The user guide, EntreComp into Action, is an animation by the European Training Foundation that introduces the framework and its value. The video series, EntreComp video series, and the "Being Entrepreneurial Canvas" are available as A3 templates. The EntreComp at Work offers insights into the challenges faced by Labour Market Intermediary

Organisations (LMI) in supporting sustainable employment. The EntreComp Playbook offers orientation tools for experimentation and creating personalised entrepreneurial teaching and learning maps.

The Green Competence (Bianchi et al., 2022) was the latest to be developed. It is based on the so called GreenComp framework, a shared competence framework for educators and learners to integrate environmental sustainability topics into educational systems. In the early 2000s, European countries transitioned from knowledge-based to competence-based education systems, focusing on sustainability education. The UN Decade of Education for Sustainable Development (DESD) platform emphasised the importance of sustainability education in SDG 4. Lifelong learning should incorporate sustainability competences across disciplines to train systemic thinkers and ethical agents for change. GreenComp, a non-prescriptive EU competence framework, offers a conceptual reference model for raising awareness, designing learning opportunities, and assessing support for learners. Teaching approaches can incorporate digital technologies, experiential learning, and whole school approaches to promote sustainability culture and professional learning. The framework includes 12 competencies, organised into four areas: embodying sustainability values, valuing sustainability, supporting fairness, promoting nature, embracing complexity, systems thinking, critical thinking, problem framing, envisioning sustainable futures, adaptability, exploratory thinking, acting for sustainability, political agency, collective action, and individual initiative. The EU biodiversity strategy for 2030 emphasises the importance of education and training in achieving climate neutrality by 2050. GreenComp serves various purposes, including curricula review, teacher education program design, self-assessment, policy development, certification, assessment, monitoring, and evaluation. GreenComp supports education and training systems in shaping systemic and critical thinkers for the planet's present and future. It provides a model of sustainability competence areas, a common reference for educators, an initial list of competence components, a basis for dialogue, exchange of practices, and peer learning, making the competences portable and promoting mobility in European society. The European sustainability competence framework was developed through a mixed-method research process involving 75 experts and stakeholders. It incorporated sustainability education, lifelong learning, youth representation, educators, policy representatives, and NGOs. Four competence areas and 12 competences were identified, and a revised draft proposal was consolidated. The framework was refined and validated with Member States. GreenComp, a widely endorsed framework, targets all people and covers sustainability competences. It doesn't address subfields like responsible production, circular economy, or education levels. Future developments require systemic change, investments in research, innovation, laws, and global value chains for a sustainable future.

A relevant reflection after this presentation is that any educator should consider how to introduce through her educational interventions at least one of the above-mentioned competences to align with the EU contextual development. The ENCORE approach can become a relevant support in this endeavour.

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Facilitating ENCORE usage: Educators Professional Learning

Advancing the context of lifelong learning evolves in relation to a green, digital and entrepreneurial need of competence in our societies is a challenge for the educators (including university teachers and VET trainers). Staff development in education is major focus for all institutions in this context, and particularly for universities and institutions engaged in adult education at the crossover with open and digital learning (Raffaghelli, 2014b; Vladimirschi, 2018). Providing educators with effective professional development opportunities has become crucial, though this is not a matter of just offering training. For example, in the case of faculty development, there are evidences that successful development programs combine different pedagogical methods ranging from experiential learning to peer mentoring and coaching, and formative feedback (Steinert, 2020). Furthermore, effective programs usually offer opportunities to build upon previous learning activities and leverage on methods which emphasise problem-based approaches and experiential learning (Meyer & Murrell, 2014). Also, transforming practices require cases and resources that the educators can explore and try (Ranieri et al., 2018, 2019), to trigger reflectiveness and new positionings relating complex and ill-defined problems such as an ethical approach to the AI in education or the green transition (Kuhn & Raffaghelli, 2023). For example, a highly criticised approach in the integration of digital technologies is considering them as a solution for all kinds of educational problems (Sancho-Gil et al., 2020). Such a critique includes the problem of sustainability and human agency (Selwyn, 2023). Therefore, system supporting professional learning requires a critical approach to any technology, that puts the educational and hence human problems first, analysing technologies not only for their outputs, but also for their infrastructure, the way it is embedded and that promotes human agency.

Therefore, the ENCORE system needs to be embedded into educators practice and institutional life as an instrument that must be experimented, commented, stressed and criticised, along circles of reflection and meaning making. In this regard, we build on the approaches of design for learning (Conole, 2013a; Raffaghelli, 2014b): stemming from ill-defined solutions and with the exploration and situated adoption of technologies, educators and learners are able of activate *design-thinking* (Design Council, 2019) that transform their practice and promote human agency. We main, in this regard, a situated and negotiated adoption of technology for relevant problems envisaged by the same users, not imposed by the institution or by the developers.

[To know more about the pedagogical basis of our approach, look at the ANNEX II]

Specifically, we will complete the full ENCORE with a number of learning scenarios, developed in real educational contexts by real educators testing the system.

Also we recommend a number of formats to deliver workshops, webinar or self-paced learning activities that will support educators' engagement and exploration of the ENCORE. The formats offer the learning scenarios, as well as resources for learning on ENCORE, self-assessment tests, templates supporting learning design.

Therefore, ENCORE becomes a tool that mediates educators' design-thinking and triggers professional learning.

Strategies to integrate ENCORE in your institution

The ENCORE project offers an open approach to its usage, depending on the institution or the single experts willing to integrate the approach into educational interventions.

A good starting point is asking questions that are a driver of problematisation, and hence of understanding about the ideal strategy to approach the materials.

Here are a number of questions for educators:

1. Why do you think using OER is useful/important/significant/effective?
2. What do you think are the "principles" "rules" for using OER effectively?
3. What actions should your organisation, or similar to yours, take to encourage/stimulate the use of OER?
4. How do you think the a) design, b) implementation of training-learning, teaching/learning activities would change with the use of OER?

Here are questions that might trigger the learners' interest:

1. have you ever used OERs?
2. Which type of OERs have you used?
3. On what occasion/for what reasons?
4. Were you satisfied with the research?
5. How did you use them?
6. Did you experience difficulties in research/use?
7. Compared to your experience, do you find it easier/effective to use OERs or "more traditional" resources and why?

These questions can be used to brainstorm and support decision making relating the level of practice you would like to use ENCORE. The possibilities are many: small educational institutions might be willing to try OERs to develop their courses or increase the quality of the resources in their training offer, while a huge higher education institution might like to support a strategy to embrace open education. At the level of the trainer/educator, the decision could be to redesign a course to renew its approach; or engage the learners in inquiry activities through the ENCORE database.

In each of the cases, the ENCORE project aims at introducing a multi-layered approach supporting educational reflection and transformation. The activities can be manifold: labs for the development of technical skills, environment and multimedia resources for self-learning, coaching, specific subject field case studies, seminars and professional learning communities. It is envisaged as multi-layered for it supports educational activities corresponding to different theoretical levels of professional learning, that is: Individual, community, and Social, as recommended in other experiences aimed at e-learning uptake (Ranieri et al., 2017). Table 1, re-elaborated from Ranieri et al., 2018, shows these combined set of components.

Table 1. ENCORE Multi-layered approach.

Theoretical Level	Description and pedagogical assumptions	Professional Learning activities
Individual (Formal Learning) **ONLINE / ONSITE WEBINARS**	**Assumption:** direct instruction and guided practice are still a primary form of addressing professional training needs, at a level of "knowing and understanding". **Learning outcome:** general and specific knowledge related to the ENCORE system (particularly Open Education, Educational Enablers and Objectives-based Design) as a first step for professional development.	**Coaching and technical labs** Guidance and support on pedagogy and technology through face-to-face seminars and individual sessions for advising educators on the instructional design adopting ENCORE into their virtual learning classes, and on-site labs on the features of the ENCORE system.
Individual (Self-Paced Learning) **ONLINE**	**Assumption:** the possibility to self-manage the rhythm of the learning process and to access to LEARNING SCENARIOS for implementing knowledge and developing skills is of crucial importance for adult learners. **Learning outcome:** specific knowledge and appropriate abilities to apply and translate knowledge into innovative practices of teaching.	**Multimedia resources for self-learning** Online contents with the ENCORE system and LEARNING SCENARIOS with explanations and suggestions on content delivery (when planned), design of online activities, management of communication and strategies of evaluation; also templates on how to shape DIGITAL CLASSROOMS using the MOODLE plugin.
Individual (Problem-based Learning)	**Assumption:** to improve practice towards expertise, it is necessary to transfer methodological knowledge and skills to new situations that encompass reflection on challenges and solutions' development related to the specific domain. **Learning outcomes:** critical, meaningful and reflective knowledge with increased capacity to use and apply knowledge and skills in the specific disciplinary context.	**Specific-subject field case studies** A number of LIVE CASES produced by the institutions or through VIDEOS on ENCORE USER-EXPERIENCES focusing on specific-subject related teaching challenges which educators usually face in the different disciplinary fields. The case is reported highlighting problems and solutions, but also engaging the users in problem solving processes.
Community (Networked Learning)	**Assumption:** Once individuals develop their own practices, the sharing of them within a community of peer enhances learning processes based on participation and forms of conversation leading to deeper reflection and improved practices. **Learning outcomes:** emotional to intellectual aspects with positive implications for motivation, development of professional identity and innovation of teaching practices.	**Professional learning communities:** Community build-up through shared CASES OF ENCORE USAGE and OPEN RECOGNITION. The communities can liaise to the UNIPD system OR the ENCORE website, but they can also create internal spaces for smaller or internal communities. They should have access not only to innovative practices but also resources (materials, tools and contents developed).

Social (Organisational Learning & Development)	**Assumption:** The participation in a broader network to disseminate, communicate and share practices encompass benefits for the individual in the context of a process of organisational development. **Learning outcomes:** expanded scholars' professional network and enriched pedagogical practices with benefits for satisfaction, reputation, and professional practice; innovation and quality in teaching as part of an organisational process.	**Institutional Events and Dissemination:** The Teaching and Learning Centers or HRM units can set up institutional events to promote the debate on AI-driven, Open Education, building over the ENCORE outcomes and voiced by the participants.

Technical note: Both the Online and the Onsite activities can build over a pool of Moodle resources created by the UNIPD team that can be exported (through Backup) to other Moodle and/or Wordpress websites.

The role of learning scenarios

Learning scenarios are tools that support educators to observe expert practice and enact them to explore their educational problems making more grounded decisions to plan/implement their unique, situated practices.

In a nutshell, they are examples of possible and/or real practice. Therefore, they introduce a context, available resources, and an educational problem that is relevant for a particular audience (and not necessarily universal). Such resource caters to the learner expert knowledge without excessive abstraction, to orchestrate an educational solution that in any case build over the embedded theory of learning within the expert knowledge. Some of the relevant principles that all the ENCORE scenarios will bring to the fore are listed below:

- Clear Learning Objectives: Formulate learning objectives or outcomes. These objectives help both teachers and students understand what is expected and provide a roadmap for the learning journey.
- Student-Centred Learning: Place the students at the centre of the learning process. This means tailoring teaching methods and content to meet the needs and interests of individual students.
- Active Learning: Encourage active engagement by learners. This involves activities such as discussions, group work, problem-solving, and hands-on experiences, which promote deeper understanding and retention of information.
- Collaboration and Communication: Encouraging collaboration among learners and fostering effective communication between them and the educator, as vital components of successful pedagogy.
- Assessment and Feedback: Regular assessment and timely feedback are essential components. Assessment methods should align with learning objectives, and feedback should be constructive to support students' improvement.
- Inclusivity and Diversity: Stress the importance of creating inclusive and diverse learning environments that accommodate different learning styles, backgrounds, and abilities.
- Critical approach to Technology Integration: Enhance the learning experience through tools such as online resources, learning management systems, and interactive multimedia.

Technology does not come first, though: it encompasses reflection and ethical choices with emphasis on sustainability.

- Reflection and Adaptation: Educators are encouraged to reflect on their educational practices and be open to adaptation. Continuous improvement is a key aspect of effective pedagogy.
- Lifelong Learning: Emphasise the importance of instilling a love for lifelong learning in students, helping them develop skills and a mindset for ongoing self-improvement.
- Ethical Considerations: Educators should adhere to ethical standards in their teaching practices, respecting learners' rights and maintaining a fair and unbiased approach.

In the following section we introduce a specific approach to build the scenarios basing on the ENCORE affordances and pedagogical approach.

Further scenarios extracted from the progressively along the creation of the ENCORE system can be found in ANNEX III.

Objective-based design: Bloom's Revised Taxonomy

The importance and value of using OERs is evident from what has been highlighted so far. However, it is important to emphasise that - both to make the best use of OERs and to improve teaching/training and learning - it is essential to adopt and choose them to start from one's own educational/training/instructional design.

It is well known that design methods and models are many and highly varied. One frequently used model deemed appropriate in this context - also to support the design of ENCORE for Educators Enablers - is *design for objectives* or *objective-based design*. To adopt an objective-centred model means to take objectives as the regulating factor of the entire educational and training process. In this sense, the contents, resources, activities, and methods proposed to learners are considered valid insofar as they are consistent with the objectives, and the assessment, which is defined from the outset, must be aligned with the identified objectives.

The trainer/teacher/educator can design starting from questioning and answering the following questions: What objective(s) do I intend to pursue? What objectives do I want to set for the learners? -> Through which educational/training/instructional experiences can I achieve these objectives? -> How can I effectively organise these experiences? -> How can I determine whether these objectives have been achieved? (cf., Tyler, 1949) However, this "pathway" is not to be understood in a rigidly static and linear manner but rather as a dynamic and self-regulating process in which the moment of evaluation becomes a new situation analysis from which a different formative itinerary takes off.

In the context of *objective-based design*, there are several so-called taxonomic classifications characterised by different degrees of complexity and articulation; the most popular is the one created by Bloom (Bloom, 1956). In the context of the ENCORE project, we opted for planning appropriate learning goals/objectives while interacting with the ENCORE pedagogical enablers by adopting Bloom's Revised Taxonomy developed by Anderson, Krathwohl et al. (Anderson et al., 2001).

Very briefly, Bloom's Taxonomy distinguishes six main categories (or superordinate levels) of objectives: remember, understand, apply, analyse, evaluate, and create (for their definition, see the "Level" column in the table below). Each of these six levels, in turn, involves different "cognitive

processes": the nineteen cognitive processes identified further clarify the limits of the categories (in the table, they are those underlined in the "Verbs" column). The taxonomy is ordered according to an ascending hierarchy from simple to complex; indeed, the categories are considered to differ in complexity: remembering is less complex than understanding, which in turn is less complex than applying, and so on. On the other hand, taxonomy is not ordered according to a cumulative hierarchy, but categories can overlap with each other; most processes can be learned and applied simultaneously or even in reverse order (Anderson et al., 2001; Munzenmaier & Rubin, 2013; Conklin, 2005).

A statement of a learning objective contains a verb (an action) and an object (usually a noun). The verb generally refers to [actions associated with] the intended cognitive process; the objective generally describes what a teacher/educator/trainer expects or intends learners to learn. It may be helpful to consider preceding each objective with something like: "Learners shall be able to…", "Learners will…". As stated by Krathwohl (2002, p. 213): "Statements of objectives often omit "The student shall be able to" phrase, specifying just the unique part (e.g., "Remember the economics law of supply and demand."). In this form it is clear that the noun phrase is "law of supply and demand" and the verb is "remember")".

Table 2. Bloom's taxonomy with exemplar activities for learning and assessment.

Level	Cognitive processes/Verbs	Learning Activities	Assessment Activities
REMEMBER Retrieving relevant knowledge from long-term memory.	<u>Recognising</u> <u>Recalling</u> List Identify	Identify key words Watch presentations and/or videos Lists Reading materials Creating timelines Memory activities and games Flashcards Matching tasks Labelling tasks Crossword puzzles Recite	True and false questions Fill-in-the blanks Multiple choice Matching exercises Quizzes Label Clicker questions Labelling diagrams, charts, or images

UNDERSTAND Determining the meaning of instructional messages, including oral, written, and graphic communication.	Interpreting Exemplifying Classifying Summarising Inferring Comparing Explaining Clarify Predict	Think-Pair-Share Guided-Reciprocal-Peer-Learning Summaries Concept maps Mind maps Case studies Demonstrations Group discussions Flowcharts Diagrams Exemplifications Peer Instruction Jigsaw Strategy Social annotation Three-step interview Gamification Kolb's Learning Loop	Quizzes (Conceptual Quizzes) Provide examples Short answers Concept maps Clicker questions Multiple choice Tests Paraphrase (in simpler terms)/Explain in your own words Essays Create a summary Infographics Diagrams One-Minute Paper Presentations Muddiest point Teach-Back
APPLY Carrying out or using a procedure in a given situation.	Executing Implementing Respond Provide Carry out Use	Flipped classroom Concept maps Exercises Calculate Demonstrations Lab experiments Case studies Creating examples Role-playing Short answers Maps Peer Instruction Gamification Performances Problem-solving tasks Kolb's Learning Loop	E-portfolios Lab reports Simulations Short answers Problem-solving task Tests Presentations Exercises

ANALISE Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.	<u>Differentiating</u> <u>Organising</u> <u>Attributing</u> Select Integrate	Think-Pair-Share Mind maps Guided-Reciprocal-Peer-Learning Concept maps Case studies Compare and contrast (with Euler-Venn diagram, tables, charts) Identifying similarities and differences Debates Discussions Flowcharts Graphs Group investigation Problem-solving tasks Problem-Based Learning Report Social annotation Analyse causes and effects Data analysis Socratic Seminars Three-step interview Roundtable Kolb's Learning Loop	Problem-solving task Case studies Research paper Data analysis projects Analysis paper One-Minute Paper Critical thinking scenarios or dilemmas Literature analysis
EVALUATE Making judgments based on criteria and standards.	<u>Checking</u> <u>Critiquing</u> Determine Judge Reflect	Pros and cons lists Use of exemplar Debates SWOT analysis Concept maps Mind maps Compare and contrast (with Euler-Venn diagram, tables, charts) Journal Decision-making tasks Review paper Rating tasks Survey Questionnaires Peer Review Lesson Study Microteaching Kolb's Learning Loop	Review paper Debates Decision-making tasks Argumentative essays Discussions Peer review and feedback Peer assessments Report

CREATE Putting elements together to form a novel, coherent whole or make an original product.	Generating Planning Producing Assemble Design Create	Brainstorming Business Model Canvas Research projects Performances Decision-making tasks Develop new solutions or plans Design prototypes Invention or innovation projects Creative writing Project-Based Learning Presentations Kolb's Learning Loop	Research proposal Business plan Grant proposal Innovation pitch Develop criteria to evaluate performance, assignments, product or solution Outline alternative solutions Create lesson plans Design challenges Portfolio development Creative presentations Authentic assessment Lesson Study Microteaching Design and build working models or prototypes

Note. The point of view is that of the students, hence "learning activities". The definition of levels and cognitive processes (those underlined in the corresponding column) are those of Krathwohl (2002).

The Table 2 represents a simplification made to propose to a broad audience, also of "non-insiders", a way of approaching the "world" of design and to support the design of ENCORE for Educators Enablers. The table is therefore intended to give direction clearly without claiming to be exhaustive, and, more importantly, the relationship between learning and assessment activities is not to be understood as 1:1. As is also evident from the table, learning activities and assessment activities can overlap between levels, just as, taking an open-ended question as an example, it can decline at different levels depending on how it is formulated and what it requires of the student: that he/she remembers something, that he/she has understood something, that he/she knows how to apply it, analyse it, and so on. The table above must be understood as an exercise that can vary widely and must be contextualised. Clearly, it is not possible to reduce the complex and sophisticated process of teaching and learning within a box.

In addition, Bloom's Revised Taxonomy has its limitations and associated risks.

Overemphasis on the cognitive domain: Bloom's Revised Taxonomy primarily focuses on the cognitive domain of learning; it may neglect other important domains like affective and psychomotor domains, which are crucial for a comprehensive education.

Simplification of learning: The taxonomy provides a linear and hierarchical representation of cognitive skills, which may oversimplify the complex nature of learning. Learning is often nonlinear and multifaceted, with learners engaging in various cognitive processes simultaneously.

Difficulty in differentiation: Distinguishing between different levels within the taxonomy (e.g., differentiating between "analyse" and "evaluate") can be challenging, leading to subjectivity and inconsistency in assessment and evaluation.

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Inflexibility: Overreliance on Bloom's Revised Taxonomy can make educators overly prescriptive and limit their ability to adapt to the unique needs of individual students and diverse learning contexts. It may also stifle creativity and innovation in teaching.

Limited focus on creativity and critical thinking: While the taxonomy includes higher-order thinking skills like analysing, evaluating, and creating, it may not adequately emphasise creativity, critical thinking, problem-solving, and other important 21st-century skills.

Cultural and Contextual Bias: The taxonomy may not fully account for cultural and contextual differences in learning. It may not be as applicable or relevant in non-Western or non-traditional educational settings.

Potential for narrowing curriculum: Educators may become too focused on achieving specific taxonomy levels, potentially sidelining broader educational goals and holistic development.

In conclusion, while Bloom's Revised Taxonomy can be a valuable framework for establishing and assessing educational objectives and thus a valuable tool for educators/teachers/trainers, it should be used judiciously and in conjunction with other educational strategies and frameworks to address the limitations and risks associated with its use.

Objective-based design in action

In the next section (*Design for Learning: Inspirational Templates*) you will find templates to develop your own learning scenarios, by interacting with the ENCORE system. Before starting with this exercise, please bear in mind that the system adopts Bloom's Revised Taxonomy to establish the learning goals and activities.

You have already found examples of verbs in the table above (Table 3). Here, we provide an example of possible scenarios and interactions with the ENCORE system to get inspiration:

Table 3. Bloom's taxonomy with possible scenarios and interactions with the ENCORE system.

Level	Verbs	Learning Activities	Assessments
LEARNING GOAL: Recognise and recall relevant information on leadership in organisations. [ENTREPRENEURIAL COMPETENCE]. Scenario: Prof. Maria T. teaches an undergraduate course from the area of social sciences. She introduces a new topic connected to leadership in organisations through a lecture. She's willing to support the access and recall of relevant information, which could be used in further activities.			
Which ENCORE resources could I search for? Presentations, documents, podcasts, and/or quizzes dealing with leadership in organisations			
REMEMBER Retrieving relevant knowledge from long-term memory.	List Recognise Recall Identify	Watch presentations and/or videos Create a list of keywords Memorise Keywords Label/complete an incomplete scheme	True and false questions Fill-in-the blanks Multiple choice Labelling, diagrams, charts, or imagines

LEARNING GOAL: Understand the carbon footprint and Energy Consumption in an industry procedure. [GREEN COMPETENCE] Scenario: Andrea R., a young entrepreneur in the field of green energy, is engaged in a VET initiative in the area of sustainability and green competence. She wants to support the understanding of the carbon footprint/energy consumption in a procedure.			
Which ENCORE resources could I search for? Videos with demonstrations, documents, podcasts, checklists, and rubrics connected (or as exemplars to build on) to carbon footprint/energy consumption.			
UNDERSTAND Determining the meaning of instructional messages, including oral, written, and graphic communication	Summarise Exemplify Compare Explain	Make a summary Search for examples of good and bad practice Compare and identify the several practices Create a Mind map on good and bad practice Explain to a peer the good and bad practices relating the procedures by using the mind map	Checklist on the Summary (all relevant elements are present) Rubric to analyse the quality of the practices found and presented through the mind map Peer-assessment exercise using the rubric
LEARNING GOAL: Apply prior knowledge on educational planning to check the quality of the published plans. [ENTREPRENEURIAL COMPETENCE] Scenario: Peter J., an expert educator and professor at a public university, teaches in a Master Course on Social Pedagogy. He introduces a problem connected to adult education and digital competence in elders' self-care that requires the analysis of the educational offerings of a number of institutions that publish materials on the web. The students have to apply their knowledge on educational planning to check the quality of the published plans.			
Which ENCORE resources could I search for? Quality checklists, rubrics, cases relating to the evaluation of educational plans.			
APPLY Carrying out or using a procedure in a given situation	Use Execute Implement	Problem-solving tasks Search for case studies Evaluate the case through the use of a template Complement the template	Rubric adopted to analyse the relevance/appropriateness/completeness of the case selected Presentation in group
LEARNING GOAL: Analyse cases of low, medium, and high stakes AI according to the EU guidelines on AI and how this applies to the field of advertising. [DIGITAL COMPETENCE] Scenario: Markus W. is an expert on the ethics of technology who collaborates at a national training consortium. He is delivering an online course on ethics in advertising and customer profiling. He aims at supporting the development of skills to analyse cases of low, medium and high stakes AI according to EU guidelines on AI and how this applies to the field of advertising.			
Which ENCORE resources could I search for? Cases (on several formats, namely, webpages, documents, videos) on AI usage in industry, public services, healthcare, etc.			
ANALISE Breaking material into its constituent parts and detecting how the parts	Select relevant cases of AI from a pool of cases of advertisement	Case studies Compare and contrast (with Euler-Venn	Report with a classification of low, medium, and high stakes AI in marketing.

relate to one another and to an overall structure or purpose.	Differentiate the low, medium and high stakes AI cases Attribute a score and concept to the case and produce a report that will be annotated/ commented by peers	diagram, tables, and charts) Identifying similarities and differences Report Social annotation	Correct identification of cases. Participation in social annotation

LEARNING GOAL: Evaluate whether a social robot has been appropriately set to intervene in a possible treatment scenario. [DIGITAL COMPETENCE]
Scenario: Alejandra R. is a coach working on social robotics' implementation in health care. She is planning a training with health care providers that should understand the robots' features and affordances, considering their implementation in diabetes treatment. The participants should evaluate whether a social robot has been appropriately set to intervene in such treatment scenario.

Which ENCORE resources could I search for?
Videos/podcasts on social robots that illustrate concepts and exemplar cases of application/usage of social robots. Argumentative quality rubrics or checklists.

EVALUATE Making judgements based on criteria and standards.	Check the appropriate setting about language and emotional signs Judge quality setting Reflect on missed elements Critique constructively the approach and plan improvements	SWOT analysis Rating tasks Presentation of results through an argumentative essay Discussion: a) online forum; b) debate in class	Argumentative essay quality Discussion argumentative quality Debate participation

LEARNING GOAL: Generate a collaborative proposal that shows how the green transition is happening in terms of management and organisational processes. [GREEN, ENTREPRENEURIAL, DIGITAL]
Scenario: Giuseppe B. is an academic teacher working at a Management Engineering course focused on the green transition. He has introduced a number of products that are facing changes in concept, design, workflows, and potential consumers due to their transformation into a green approach. The students are invited to solve a problem leading to a collaborative proposal to show how the transition is happening in terms of management and organisational processes. The students will engage in a contest with other university's students based on a video presentation.

Which ENCORE resources could I search for?
Cases/problems based on the green transition (in several formats, e.g., podcasts, videos, documents, presentations).
Templates to generate sketches, schemes, workflows, and video presentations.

CREATE Putting elements together to form a novel, coherent whole or make an original product.	Discuss cases Design workflows and schemes to set the relevant elements of transformation Produce a proposal Present in a video presentation	Brainstorming Business Model Develop new solutions or plans Presentations	Business model appropriateness The design challenge's outcome Portfolio of sketches, schemes, workflows and final video-presentation. development Creative presentations

Design for Learning: Inspirational Templates

You can use the following templates to explore ENCORE, or to invite other educators to engage with the system.

Activity 1: using OER to prepare teaching

Learning Scenario Title_____

Learning Scenario Description_____

Please insert here the narrative description of your imagined Learning scenario. The paragraph could be about 150-300 words. Be as specific as you can, including geographical localisation, disciplinary field, the content taught, the names of the techniques and activities adopted, etc. Use the following checklist to see if your description is OK:

- We explain the context in which the scenario is placed: why the teaching/training activity requires new ideas for you to reorganise teaching and why you think OER could be a good approach.
- We explain how we search for an OER to prepare our teaching: keywords, query, contacts, interactions, platforms, documents.
- We explain how we interact with the ENCORE platform and what we find.
- We explain how could we improve our planning/design for learning (as a form of preparing teaching) with an open educational approach.

Activity 2: using OER for teaching

Learning Scenario Title_____

Learning Scenario Description_____

Please insert here the narrative description of your imagined Learning scenario. The paragraph could be about 150-300 words. Be as specific as you can, including geographical localisation, disciplinary field, the content taught, the names of the techniques and activities adopted, etc. Use the following checklist to see if your description is OK:

- We explain the context where the scenario is placed: why the teaching/training activity requires new resources for you to better teach and why did you think OER could be a good approach.
- We explain how we search for an OER for teaching: keywords, query, contacts, interactions, platforms, documents.
- We explain how we interact with the ENCORE platform and what we find.
- We explain how could we improve our teaching with with an open educational approach.

Activity 3: Using OER to evaluate

Learning Scenario Title_____

Learning Scenario Description_____

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Please insert here the narrative description of your imagined Learning scenario. The paragraph could be about 150-300 words. Be as specific as you can, including geographical localisation, disciplinary field, the content taught, the names of the techniques and activities adopted, etc. Use the following checklist to see if your description is OK:

- We explain the context in which the scenario is placed: why the assessment activity requires new resources for you to better evaluate/assess your students and why you think OER could be a good approach.
- We explain how we search for an OER for assessment/evaluation: keywords, query, contacts, interactions, platforms, documents.
- We explain how we interact with the ENCORE platform and what we find.
- We explain how we could improve our assessment/evaluation activities with an open educational approach.

Activity 4: using OER with your students

Learning Scenario Title_____

Learning Scenario Description_____

Please insert here the narrative description of your imagined Learning scenario. The paragraph could be about 150-300 words. Be as specific as you can, including geographical localisation, disciplinary field, the content taught, the names of the techniques and activities adopted, etc. Use the following checklist to see if your description is OK:

- We explain the context in which the scenario is placed: why you think your student need to interact, retrieve, and use OERs.
- We explain how we search for an OER for assessment/evaluation: keywords, query, contacts, interactions, platforms, documents.
- We explain how our students might interact with the ENCORE platform (steps, instructions, etc.).
- We explain how our students might improve their learning with an open educational approach.

Activity 5: using OER by your students

Please insert here the narrative description of your imagined Learning scenario. The paragraph could be about 150-300 words. Be as specific as you can, including geographical localisation, disciplinary field, the content taught, the names of the techniques and activities adopted, etc. Use the following checklist to see if your description is OK:

- We explain the context in which the scenario is placed: why you think teaching and learning within your course might benefit of teaming up with your students in search and use OER..
- We explain how we search for an OER for assessment/evaluation: keywords, query, contacts, interactions, platforms, documents.
- We explain how we, in collaboration with our students, might interact with the ENCORE platform (steps, instructions, etc.).
- We explain how we, in collaboration with our students, might improve their learning with an open educational approach.

A focus on Entrepreneurial, Digital and Green Skills

Take a look at any of the prior scenarios, and please explain, adopting any of the possibilities (OER for planning/designing, teaching, assessing and evaluating, and learning) how you will/could integrate entrepreneurial skills into your course.

Design for Learning: Inspirational Cases of ENCORE USAGE

Several Scenarios have been collected within the project ENCORE, along the way of discussing and developing the ENCORE approach.

This section will be completed upon the basis of the Educathons and pilots to be further implemented in the project. You can explore ANNEX III to see the width of approaches and experiences while triggering design-thinking through the scenario-based exercises. You can also take a look at ANNEX IV to understand the type of data we are collecting to improve this section while testing and "stressing" the ENCORE system.

An upcoming chapter: Discussing Certification and Recognition

This chapter liaises with the activity of Open Recognition. On the whole, we envisage the following Open Digital Badges credentials for taking part in educathons and pilots, which could be of inspiration for other institutions.

As for the ENCORE Badge Ecosystem, and basing on the ORCA system to promote professional practises in AI-driven Open Education, it is foreseen the following ecosystem:

Table 4. Open Digital Badges Ecosystem.

Open Digital Badge	Activity UNIPD	Open Activity on ENCORE	Approach to recognition	Evidence of professional learning to be recognised
1- OE-Aware Understanding Open Education and the contribution of AI to it	Took part in one of the Pilots/ Educathons and accomplished reflecting activities - Automatic release by Moodle System	?		Presence at pilot/educathons and self-evaluation pre-post plus reflection.
2- OE-Explorer Practice: engaging with open education.	Took part in one of the Pilots/Educathons and accomplished practical activities of extracting and selecting a number	Either way, interacted openly with the ENCORE system to extract and	Automated release by Moodle system, also through evidence of	As (1) +Printscreen of OER collections at ENCORE, Syllabus with OER integrated (doc or link).

	of OER from the ENCORE system.	select a number of OER. Can identify licences and good quality OER. and peer review.	interaction presented through the ORCA system (if there is a direct interaction with the ENCORE system), given through (self?)	
3- OE-User: Practise: planning for open educational practises (OEP)	Took part in one of the Pilots/Educathons and accomplished practical activities of designing the syllabi with the integration of extracted OER from the ENCORE system	Either way, interacted openly with the ENCORE system, extracted OER and generated a course. .	Automated release through Moodle presenting an outcome. More valuable open recognition through ORCA system given through (self?) and peer review.UNIPD teachers or other ENCORE trainers can work as reviewers.	As (1) and (2) + Printscreen of virtual classroom, pictures, or report
4- OE-Expert: Practise: implementing OEP	Took part in one of the Pilots/Educathons, designed activities integrated to the syllabi, and implemented them in class.	Interacted with the ENCORE system openly, designed activities visible to the syllabus, and implemented them in class	Recognition can be provided via Moodle. More valuable open recognition can be released through the ORCA system, uploading key evidence, and through (self?) and peer review. UNIPD teachers or other ENCORE trainers can work as reviewers.	As (1) ,(2) and (3) + Videos, reports, articles, pictures, report of activity in class
5- OE-Promoter.	Took part in one of the Pilots/Educathons, implemented activities and engaged other peers or students in open educational practices after interaction with the ENCORE system. Implemented students' enablers	Interacted Openly with the ENCORE system. Implemented activities and engaged other peers or students in open educational practices after interaction with	Open recognition can be released through the ORCA system, uploading key evidence, and through (self?) and peer review. UNIPD teachers or other ENCORE trainers can work as reviewers.	As (1) ,(2) , (3) and (4) + Students' outputs, reflections, pictures, articles

		the ENCORE system. Implemented students' enablers		

SELF-TEST "How Open I am"/"How Open I could be"

The self-test will be part of pilots and educathons, and will be used to understand the impact on professional learning and identity through the exposition to the ENCORE approach.
It is based on the following self-reflection statements taken from DigCompEdu (DigCompEdu, JRC 2017), expanded through the Open Digital Framework (JRC 2016, 2019).
Nonetheless, as I referred this morning, statements from Open Recognition are not present and could be an excellent integration:

1 Finding and using open licences in digital resources

1. I do not know what an Open Educational Resource (OER) is
2. I can identify the licence of an educational resource
3. I openly licence the educational materials I produce
4. I appropriately reference the OER I use (whether I adapt the resource or not)
5. I tag OER properly to increase their findability and searchability
6. I share the OER I create and adapt with others
7. I support my institution in the implementation of OER as an open education
8. practice

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2 I adopt Open Educational Practices in my teaching in order to make it more inclusive

1. I do not know how to apply Open Educational Practices (OEP) in my teaching
2. I apply the principles of OEP in my teaching, e.g. using and sharing OER, using MOOCs and free and open online courses as support material or reference
3. Besides applying the principles of OEP in my teaching, I take into account the access and accessibility of the teaching materials that I produce, in order to cater for those learners with special needs
4. I do not only make my teaching material accessible to those learners with special needs, but also use open formats (e.g. LibreOffice) and open source software whenever possible when I produce my teaching material
5. I not only apply OEP principles in my teaching but also openly share my teaching practices with other colleagues by using digital technologies, e.g. recording and publishing podcasts or keeping an updated blog or collaborating in open platforms or social networks
6. I create different learning pathways for the OER that I produce with the aim to enable the personalisation of the learning process
7. I adopt different OEP in my teaching and support my institution to open access to content (OER) and courses to all learners

3 I publish my work with Creative Commons Licences and make available my data whenever possible

1. I am not familiar with the concept of open access/science or open data
2. I understand basic concepts of open access/science and increasingly use open access repositories or journals to gather evidence for my creative work
3. I publish my research/innovation/creative work in open access journals whenever the journal/company choice depends on me
4. I make my research/analysis data available as open data whenever is possible.
5. I consider myself an open scientist/analyst and am involved with open science/open government/open source communities
6. I support my institution in the design of and compliance with policies that promote and/or reward academics/analysts/officers who embrace open research/innovation practices.
7. I aim for principles of open research/innovation and collaboration to be applied in all research/innovation projects I am involved with, whenever appropriate and feasible

3 I publish my work with Creative Commons Licences and make available my data whenever possible

Conclusions

The Open Education movement could be deemed as a "Trojan Horse" (Conole, 2012) to introduce reflection on teaching and learning processes in connection with a developing learning culture, steering to quality in lifelong learning. We also introduced evidence that adopting systems that offer affordances to actively engage with open contents and to rethink design for learning can provide relevant opportunities for educators to transform, or at least reconsider details that can be improved in their practices. Nonetheless, we claimed that despite the widespread discourse on the benefits of openness and the positive support by the policy context do not do the trick. In this regard, we also considered several strategies to introduce ENCORE as a tool to mediate professional learning.

ENCORE, with its data and human-driven components, encompasses a reflection on:

- Understanding how data-driven systems work, their potentials and limitations, and the way we can interact with them to make the most of such technologies.
- Examples of situated educational interventions and practices that can support further creativity.
- Generating spaces for reflection on open educational practices, as part of an overarching model of quality at institutional level.
- Recognize and reward efforts for open teaching promoting open learning.
- Connect open teaching to the generation and circulation of open educational resources.

As we emphasised in this report, much is to be done, and the efforts of the educational community to implement projects, to evaluate them, and to share case studies could enable more reluctant institutions to think both critically and creatively about the technological uptake. However, this must be a slow process, for it is a human process of transformation, above all.

ANNEX I

What do we mean by openness? A term that continues to expand

Open Educational Resources (OER) are "learning materials that are published online by the copyright-holder under a Creative Commons (CC) licence that permits others to *retain, reuse, modify, remix, and redistribute*" (the 5Rs) these materials (Wiley & Hilton, 2018). Materials in the public domain are also considered OER since they are no longer protected by intellectual property laws or because their creator has released all rights to them (The William and Flora Hewlett Foundation, 2013). In addition to defining the permissible uses of the original work, all CC licences require users to provide acknowledgment to the creators by linking back to the original source (op.cit, 2018).

The concept of OER was coined during the UNESCO's 2002 Forum (UNESCO, 2002) on the Impact of Open Courseware for Higher Education in Developing Countries, as concept to make sense of the impressive amount of educational content being offered freely and openly for anyone to use through the Internet. The White Paper by the William and Flora Hewlett Foundation stated that "the idea behind OER is simple but powerful" because "[...] these digital materials have the potential to offer many more individuals throughout the world access to quality education and give people everywhere equitable access to our collective knowledge" (The William and Flora Hewlett Foundation, 2013, p. 4). The potential of the concept was mainly connected to access and quality education for all, a well-known concern for UNESCO. From then on, the use of OER has been considered a valid strategy in order to renew educational practices (Conole, 2013b), on the basis of the discussion about learner-centred approaches supported by access to free knowledge, beyond the curriculum (Brown & Adler, 2008; Constantino & Raffaghelli, 2021).

Open Educational Resources were quickly embraced as a key strategy in the democratisation of education, Openness in Education was defined as an "emerging paradigm of social production in the global knowledge economy" (Peters, 2008, p.10). Later in 2012, Sir John Daniel, then President & Chief Executive Officer of the Commonwealth of Learning, declared that "*Open education broke open the iron triangle of access, cost and quality that had constrained education throughout history and had created the insidious assumption, still prevalent today, that in education you cannot have quality without exclusivity*" (Daniel, 2012, p. 1)

The most enthusiastic declaration on open education was made at Cape Town in 2007 (https://www.capetowndeclaration.org/); as the web document stands,

"We are on the cusp of a global revolution in teaching and learning. Educators worldwide are developing a vast pool of educational resources on the Internet, open and free for all to use. These educators are creating a world where each person on earth can access and contribute to the sum of all human knowledge. They are also planting the seeds of a new pedagogy where educators and learners create, shape, and evolve knowledge together, deepening their skills and understanding as they go".

This was preceded and followed by scholarly research literature that giving support to the following statement: openness could be the *via maestra* to make quality education finally accessible for all. What was once restricted to an *élite* could be now given for free to the masses, who could respond in time by enhancing open knowledge for a personalised pathway of lifelong learning.

In fact, in the long way after conceptualisation proposed by UNESCO, several experiences and systematic approaches emerged about the mere use and sharing of OER, towards understanding them as a central piece of a philosophy of Open Education (Andrade et al., 2011; García, 2023; Ossiannilsson & Creelman, 2012; Vladimirschi, 2018)

According to the extensive review on OER in Conole (Conole, 2013b, pp. 225-243), the expansion in the number of OER projects, as well as the number of people involved and the number of resources available was exponential after less than a decade. By January 2007 the OECD identified over 3.000 open courseware available from over 300 universities worldwide; latest estimations count 20.000 courses and 500 million OER (Pantò & Comas-Quinn, 2013). In repositories such as MERLOT (http://www.merlot.org/, Multimedia Educational Resource for Learning and Online Teaching.), Connections (http://cnx.org/) a, sharing resources and knowledge building supported by the William and Flora Hewlett Foundation, the Maxfield Foundation, and the Connexions Consortium; and OpenLearn (http://www.open.edu/openlearn/) a project supported by the Open University of UK; and OERCOMMONS (https://oercommons.org/) a freely accessible online library that allows teachers and others to search and discover open educational resources and other freely available instructional materials) among many others, offer hundreds of thousands of pieces of content or materials representing thousands of freely available learning hours (Hénard & Roseveare, 2012). The EU Commission jumped into this trend by opening, in 2013, the European Portal "Open Education Europe '', a portal that should mainstream sparse practices and ideas according to the EU policy priorities (Raffaghelli, 2014a).

Though the Open Education Europe portal was discontinued in 2014, breaking in several platforms and dedicated spaces such as EPALE (the space for adult learning in Europe, https://epale.ec.europa.eu/en) or ETWINNING (the space for schools exchange and community building, https://school-education.ec.europa.eu/en/etwinning), this initial effort continues to be relevant at the policy making level, set clearly in the EU renewed space for open education which has been embedded in the broader policy for open science through the EU Science Hub (https://joint-research-centre.ec.europa.eu/what-open-education_en). Over this basis, a more recent definition by the EU states:

"Open education is a way of carrying out education, often using digital technologies. Its aim is to widen access and participation to everyone by removing barriers and making learning accessible, abundant, and customisable for all. It offers multiple ways of teaching and learning, building and sharing knowledge. It also provides a variety of access routes to formal and non-formal education, and connects the two" (Inamorato et al., 2016, p. 10)

Independently of whether institutions are engaged in OER projects or not, OER was expected to affect curriculum, pedagogy and assessment. Bold emphasis was put on the idea that the OER movement could to accelerate changes in the traditional teaching role and the evolution of more independent learners (OECD, 2007). As we will see in the following sections, the story was more complicated, and the OER movement had to deal with issues like quality, usage, appropriate attribution of the several layers of materials that can be included into an OER, the OER granularity (from a single video resource to a whole course), the digital infrastructures to make OER sustainable, and nonetheless, being part of a broader movement embracing open education as philosophy and pedagogical approach.

Therefore, the initial enthusiastic declarations should be taken "*cum grano salis*" since the open education movement should overcome any affirmation as a technology-facilitated access to knowledge. As a matter of fact, (Knox, 2013, p. 821) criticised the OER movement under five perspectives: (1) under-theorisation of the term 'open'. (2) endorsement by the OER literature of a two-maintained and disaggregated. (3) I will highlight a diminishing of the role of pedagogy within the OER vision and the promotion of a learner-centred model for education. (4) This stance will be aligned with humanistic assumptions of unproblematic self-direction and autonomy. (5).

Open Educational Resources: a long story made short.

OER Past

A study by Jordan & Weller (2017) highlighted that recognising that though there is no singular root of 'open' in a context of historical evolution, tracking patterns in the history of open education movement helps identifying the various ways in which ideas about open education have influenced the state of the field today. They proposed a thematic timeline to give people unfamiliar with the area an accessible introduction to the history of the discipline, the concept of openness, and avenues for additional research. This research identified eight relevant topics (op.cit, 2017, p.3) that evolved in the last 50 years, from Open Education in Schools as key to access and inclusion through educational systems; distance education and open learning as a topic emerging during the 80s; E-learning and Open Access Publishing, following in the 90s; Open Educational Resources, as topic dominating the scene during the first decade of 2000, and connected to Open Educational Practices appearing soon after the concern by researchers and policymakers on the risk of producing but not adopting and embracing the full potential of OER to promote access and inclusion; the Social Media turn during the last part of the 2000s as a pick of enthusiasm connected to the users-generated content and circulation; and finally, MOOCs as relevant transformation supported by the technological advancements in digital infrastructures and computing encompassing the massive and global engagement in courses mainly based on the delivery of content. This research does not further on the more recent developments connected to AI-powered instruments such as better search engines, automated quality analysis, classification and mapping helping the educators to navigate the abundance of resources, from one hand; and the policy debate and strategies, as well as the more philosophical debate on what we can actually consider as open in terms of an democratic educational practice.

We will consider the past of OER to understand the several positions, following Weller's et al (ibidem) suggestion.

Let us make a start by considering the following quotation:

If the nineties were called the e-decade, the current decade could be termed the o-decade (open source, open systems, open standards, open access, open archives, open everything). This trend (...) reasserts an ideology that has tradition traceable all the way back to the beginning of networked computing (Materu, 2004, p. 5)

Openness in education is not an entirely new principle; it is worth to recall the American movement of "open classroom" that flourished in the 60s and 70s, the idea of "deschooling society" by Ivan Illich (Illich, 1971), as well as adults education concepts by Freire ([1970] 2000), let alone the UNESCO campaign in the 70s "Education for all" as well as the United Nations' Universal Declaration of Human Rights in 1948 expressing that "Education shall be free, at least in the elementary and fundamental stages" (United Nations, 1948, Art.26, para.1, quoted by D'Antoni & Savage, 2009, p. 148). Even earlier thinkers have been considered. Peter & Deimann (2013) made an historical reconstruction that traces back ideas on openness on embryonic forms of open adult education along modern Western history. They mention the late Middle Ages with public lectures and experts rented by independent learners as the basis of the Universities; the Renaissance with the emergence of the fabulous invention of Johannes Gutenberg and printing, allowing the creation of public libraries; and the industrial revolution with Enlightenment and self-education. Arriving to the XIX and XXth century, the public school, open and for all, could be considered at the basis of the modern societies' project of development. As just an example, it is worth remembering Thomas Jefferson's famous principle that "ideas should freely spread from one to another over the globe" (cited by Unsworth, 2004, online). Recently, the most

quoted case is that of the British Open University, founded in the 1960s, which removed every barrier of access to higher education admitting students without formal qualifications. Peter & Deinmann also quote the model of the public University of Buenos Aires, a case standing on a former national reform early in the XXth century (1918) and tightly connected to socio-political values. In the case of Italy, several educationists and educational philosophers have been appointed; in fact, Banzato (2012) traced back the open educational movement in Italy to the ideas of Antonio Gramsci (1947), to the movement of "Cooperazione Educativa" (1951), or the famous school of Barbiana (1967), among others.

Along this *ex-cursus* it becomes evident that values that were the kernel of the Enlightenment, that is, *liberté, egalité, fraternité* (freedom, equality, fraternity); the same that shaped socio-political movements of contemporary age, putting the basis for democracy; are embedded in all the discourses of openness(Peters & Britez, 2008). Moreover, making knowledge as the highest humankind's achievement accessible and shareable is at the bottom of educational philosophy, whose aim is to make societies progress (Wiley et al., 2014).

In the last 20 years, what has really changed is the pace and means by which the philosophy of openness is put into practice within the educational settings: this is in fact the result of the rise of ICTs and the connected digital culture. Therefore, while the pedagogical debate had already developed key ideas regarding openness, the technological affordances, as well as other socio-cultural representations of the digital revolution, were deemed a springboard for the current meme of opening up education (Nascimbeni, 2020; Wiley et al., 2014).

The Internet progressively influenced the patterns of access to information during the '90s-2000, while the OER movement was at its infancy. The pro-social web (or so-called "Web 2.0") has spawned wholly new methods of consuming and producing web-based information and services. There was a buzz about the "wisdom of crowds," human self-organised groups that through collaborative processes could support innovation and alter not only scientific discoveries or jobs, but also forms of communication in daily life (Weller, 2014). There have been significant milestones encouraging openness in a variety of fields. The first was Linus Torvald's Open Source, which launched the Unix open code in the 1990s and early 2000s, laying the groundwork for a global community of programmers to contribute to a common, universal good (code supporting free operating systems for personal and networked computing). The Open-Source movement bolstered the Open Access (OA) movement, which meant progressively opening scientific (and later all types of knowledge) to everyone (Suber, 2009). The debate kept on developing in the direction of not tolerating restrictions in the access to publicly funded scientific information.

The increasing accessibility and transparency of content throughout the 2000s, on the other hand, gave rise to intellectual property concerns as one of the most significant drawbacks of the Open Access movement. The result is the Creative Commons Licences, which aim to modify the notion of "all rights reserved" by permitting combinations of four conditions (Attribution, Share Alike, Non-Commercial, and No Derivatives). These combinations create new opportunities for making one's work accessible, thereby facilitating its open accessibility.

Copyright had evolved in the direction of protecting educational resources so that only those who own the rights to them can use them without permission or without paying a fee. In a nutshell, the contemporary "fever" for openness in education stemmed from the MIT's OpenCourseWare (OCW) opening to all in 2001. This was the base to launch the concept of Open Educational Resources which UNESCO embraced with strong claims (UNESCO, 2011). It was hence followed by Open Educational

Practices as advancement (Andrade et al., 2011); and to the "hype" of Massive Open Online Courses (MOOCs) (Stracke et al., 2019)

In a more or less evident manner, these concepts are challenging formal education and particularly Higher Education, while at the same time are putting the basis for a new educational landscape in VET. Figure 1 introduces a representation of the history of openness in Education as depicted by Peter & Deinmann (op.cit., p. 11), that allows us to understand the phenomenon's depth and length.
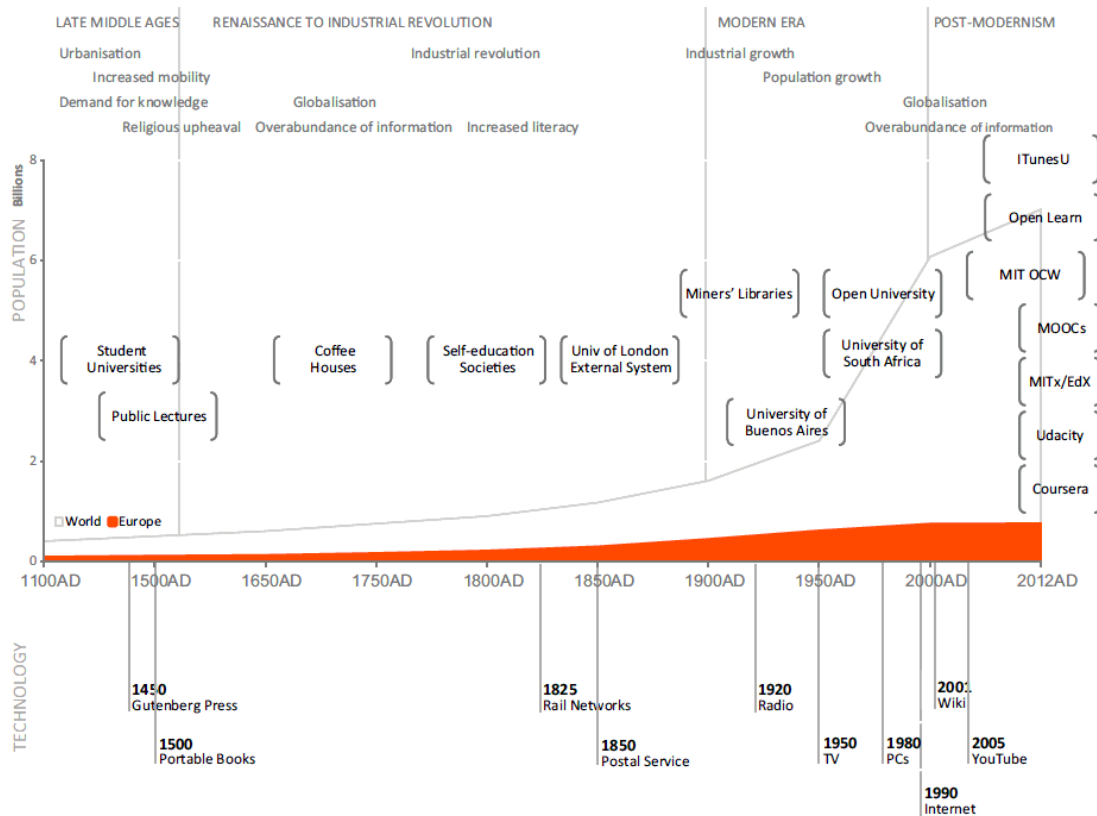

Figure 1. A timeline for the idea of openness. From: Peter & Deinmann, 2013 p. 11.

The digital revolution hence pushed the boundaries of users' expectations with regard to accessibility: having free access to a wealth of information leads users to get engaged where they can participate, not by achieving content, but mainly by communicating with others and creating their own content. This puts strong basis for openness: from one side, there is a utopia of participation and equity through access; from the other hand, new business models that are based on restricting participation and top-down control of knowledge and services could not survive. In fact, within the educational field new ways of communicating through the web resulted in new ways of learning, beyond institutional spaces and reinforcing both collaborative (peer-to-peer) and independent learning (Seely Brown & Adler, 2008). The formal educational institutions, from school to higher education, were stroke by the dynamics of the networked, social media: the educational debate along the last decade has been just responsive to the need of integrating and acknowledging informal and non-formal learning processes, being the risk not only drop-out but also the poor alignment with the socio-economical requirements for development. Open education in fact provided a strong conceptual base for educational researchers, practitioners, and policy makers to figure out the landscape of educational shift; the blurring borders of formal education, and the educational practice itself as a "cross boundary" object of study, which limits are fluid and permeable to different logics and politics (Oliver, 2015).

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OER Present

The OER present is characterised by a sort of "winter" in which the principles of Open Education are part of a sort of obvious educational landscape, which is not evidently coherent with the technological infrastructures and practices adopted to produce and share what we can consider as open educational resources. Though much emphasis is put on the technological and practical implications that encompass the poor circulation and usage of OERs, it entangles several contradictions that have been clearly identified in the critical literature. In the following, we will try to understand how this landscape unfolds.

Moving from Open Educational Resources to the Open Educational Practices concept. A relevant EU project's presentation in the beginning of 2010 stated "*although open educational resources (OER) are high on the agenda of social and inclusion policies and supported by many stakeholders of the educational sphere, their use in HE and adult education (AE) has not yet reached the critical threshold which is posing an obstacle to a seamless provision of high-quality learning resources and practices for citizens' lifelong learning efforts. This has to do with the fact that the current focus in OER is mainly put on building more access to digital content. There is little consideration of whether this will support educational practices and/or promote quality and innovation in teaching and learning*". Ehlers (2011) further underlined that the literature coming from *"publicly-funded and foundation-funded OER initiatives worldwide",* demonstrated that the then *"well-known OER initiatives"* where focused *"on the creation and publication of OERs". Use and reuse are still somewhat underrepresented; strategic aspects like business models or incentive strategies for creation use and reuse are not broadly touched upon*". Ehlers urged to intervene on the development of a model integrating the OER life-cycle, namely, the creation, use, sharing and reuse of OER for individuals, organisations and policy. Such a model move from a phase in which the focus was put on accessing the OER, "to a phase in which the primary aim is to embed OER into learning and teaching practices". Such a model was hence proposed in the context of the above-mentioned project, called OPAL, and introduced the Open Educational Practices which should "support the (re)use and production of high quality OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path" (OPAL report, 2011). Hence, the focus of OEPs was more on the governance of communities adopting OERs (policy makers, managers/administrators of organisations, educational professionals and learners) rather than on the content generation.

The OEP concept was embedded in the literature very quickly, and it is nowadays assumed as an approach that support policymaking, institutional and individual activity (https://en.wikipedia.org/wiki/Open_educational_practices).

In line with OPAL concern, the OLNET (http://www.olnet.org/, Open Learning Network), supported by The William and Flora Hewlett Foundation as a partnership project between The Open University, UK and Carnegie Mellon University, USA, is a relevant case of networking to promote an international research hub for aggregating, sharing, debating and improving Open Educational Resources (OER). OLnet, aims to gather evidence and methods about how we can research and understand ways to learn in a more open world, particularly linked to OER, but also looking at other influences. It is currently active and having funded relevant networks promoting open scholarship, like the GO-GN network to support initial research training (PhD) as open scholars(Iniesto et al., 2023). The OLnet project has tried to develop tools, like the "Evidence Hub" and the Seminars and Visiting Fellowships to provide an environment to systematically interrogate the Open Education movement, as well as represent and map the collective knowledge and memory of the Open Education community. The case of OpenLearn (https://www.open.edu/openlearn/) is also interesting for it has not only created an extensive database of resources for open education, but also tried to analyse the impact of "openness" at

institutional level; formulating a set of recommendations that go from generating the platform for OER to designing for OER (Conole, 2013b; Wiley & Hilton, 2018). Three past project cases which furthered on the logic of generating and using OERs as extended communities (Raffaghelli, 2014) were OERTest project focused on the recognition of learning achieved through the usage of OER (Camilleri et al., 2015); the LUOERL (Learners Use of Online Educational Resources for Learning), which focused the learners' appropriation of their generated content (Bacsich et al., 2011) and the POERUP project (Policy making to the use of Open Educational Resources) which focus was the development of institutional strategies to trigger educational innovation through the use of OER (Conole, 2012). The cases cited all supported the idea of *producing and consuming* OER, to understanding the ways in which OER are (if) used. In many of the concluded studies and projects, like the case of OERtest and the LUOERL project, the evidence shows a) still weak culture of adoption towards innovative/quality open practices; b) little analysis of how learners adopt OER and which kind of impacts have them in their personal/professional careers, with most of the evidence collected in studies with undergraduate students and in Higher Education OER platforms. In 2013, after a decade of OER projects, the EACEA's concern about moving educational practices to the digital age was crescent:

Substantial progress has been achieved in all Member States in the field of ICT for education since the launch of the Lisbon strategy. Almost all education and training institutions are equipped with and networked through ICT. However, more needs to be done to realise the full potential of ICT for supporting innovative pedagogical developments, generalised access to lifelong learning, and the acquisition of key competences. This will maximise the return on current investments in ICT supported learning. Despite the progress made in the field of ICT and education, there is a serious lack of systematic and practical uptake of new technologies and creative pedagogies in formal education. Educational institutions are not reaping the benefits of ICT as an enabler to modernise learning and teaching practices (*LLP Call for Proposals 2013 – Policy Priorities*: http://ec.europa.eu/education/llp/doc/call13/prior_en.pdf, p.43).

The case of MOOCs occupied the following debate between 2010 and 2015. The MOOCs (Massive Open Online Courses) had been given an impressive attention since late 2011(Raffaghelli et al., 2015; Sheets et al., 2012). From the Siemens' early experiences in 2008, several proposals have been launched from US and Canada; during 2013 Europe officially joined the movement with the project "OpenupEd", and the European portal "Open Education Europe" (both aggregators of some hundreds of MOOCs produced in EU, no technical or pedagogical support; it is to be noted that many of the MOOCs there appeared are originally delivered through the main American platforms like Coursera). The model expanded very fast and was considered as a springboard for Higher Education change due to the revolution it could encompass regarding key issues as accessibility, openness, excellence of teaching staff tightly connected to very successful research and business activities (Brown et al., 2012; Knox et al., 2012). The original experience by Siemens were quickly followed by more marketable and less romantic initiative such the ones conducted by Coursera and other American platforms yield a classification of MOOC initiatives in late 2012. The diversification between xMOOCs (based on the excellence of the lecturers with a rather traditional delivery method) and cMOOCs (the original proposal by Siemens, based on the principles of Connectivism are adopted in the pedagogy of the MOOC) was hence set (Yuan & Powell, 2013). Later on, Clark discussed the former classification proposing as many as 8 types of MOOCs (Clark, 2013). It was also claimed that the high quality of contents, produced by prestigious academics, as well as the open access to them, put the basis for "quality for all" (C. M. Stracke, 2017). Beyond the enthusiastic response of thousands of students and teachers, and the presence of prestigious universities behind the initiatives, the criticism raised a year after the initial launch, while the first designers started to reflect about the pedagogical drawbacks ,

and the first learners went through their MOOC experiences (Ghislandi & Raffaghelli, 2013; Macleod et al., 2015; Topali et al., 2021).

The trend of scholarly publications grew exponentially from the beginning of 2013 till today. Along the evolution of both scholar and policy making discussion on the issue it is possible to see how the attention is moving from the organisational innovation to the participants' perspective. Amongst the initial criticisms raised against the value claimed by the first MOOC implementers for the sustainability and quality of the approach, the issue of drop-out became crucial. An smart analyst of Higher Education (Phil Hill, "eLiterate") early observed that any MOOC should to provide…"*an experience and perceived value that enables higher course completion rates (most today have less than 10% of registered students actually completing the course)"* (Hill, 2012)*.* Another important concern was the pedagogical design of MOOCs, which led to the a scholarship focused on the pedagogical approaches and the elements supporting their design (Macleod et al., 2015). Also, the contributions of scholarly literature focused the need to pass from the analysis of MOOCs as model to the impact it can have on learners and institutions, across diverse learning cultures (Liyanagunawardena et al., 2013; Mor & Koskinen, 2013; Topali et al., 2021). As a matter of fact, work and employability after MOOCs was considered central, and not achieved totally since the first beneficiaries of this typology of courses were white males with high levels of educational achievement, already employed (Calonge & Shah, 2016; Castaño & Rodrigues, 2021). In any case, there was also attention with regard to the opportunity to support self-paced learning aimed at professional development, particularly in the case of teachers (Misra, 2018). Nonetheless, the meta evaluation of the research trends (Gasevic et al., 2014; Raffaghelli et al., 2015) yielded concerns about the quality of the same research carried out at least in the initial periods of MOOC development, supporting the thesis explosion of national MOOC platforms (FutureLearn in UK, Eduopen in Italy, Udemy in Germany, FUN in France) and of institutional experiments at the university level, globally, was more due to the experimentation of a business model than to the evidence of openness and participation envisaged by the first leaders of the movement, particularly Stephen Downes , George Siemens and Dave Cormier (Cormier, 2008). In brief, we argue that though the MOOCs made a relevant contribution to the debate on openness, their specific structure and characteristics were problematic since its inception to support a broader philosophy of openness. As in the case of OER, the literature has advanced in several directions, from creating frameworks to validate MOOCs quality (C. M. Stracke, 2017) to considering them critically in terms of effective forms of open education (Decuypere, 2019; Knox, 2017). In this last sense, decolonizing MOOCs delivery approaches (from the Global north "quality" to the Global South "need of consume knowledge"); as well as the curriculum (embedding epistemic injustice, lack of diverse knowledge, overrepresentation of the Western culture); and the use of English a unique language to deliver contents (Adam, 2020; Bali & Sharma, 2017; Knox, 2017; Liyanagunawardena et al., 2013). Moreover, another relevant criticism faced by MOOCs related massive data collection and its impact on students' privacy(Prinsloo et al., 2019). Research overall and data collection specifically in MOOCs had become popular, and led to the prosperation of data-driven analysis later called "learning analytics" (Siemens, 2013). However, several ethical problems were progressively discussed and led to stop certain practices linked to the naïve belief that the accessed data could be easily explored and adopted by many for the advancement of the educational research (Griffiths, 2020; Pardos et al., 2016; van der Zee & Reich, 2018). Both OER and MOOCs face contestations against the real beneficiaries of data collection and usage (Amiel et al., 2020).

After the mentioned developments in research and practice in OER and MOOCs, at official, policy making level, the focus has been on supporting research and practice that aligns with a broader idea of openness. Pioneering institutions like Open Universities (the Open University of the UK, the Open University of Catalonia, the Open University of the Netherlands, etc.) disseminate good practices and

project is relevant for EU policy makers and other educational institutions, since it provides a clear basis for institutions and practitioners assessment (including self and peer-assessment) of ongoing levels and areas of openness. The 10 dimensions are interrelated and encompass different degrees of openness. These dimensions could hence support the visibility of areas of progress within a holistic strategy, promoting intra, inter, and cross-border collaboration, explore new practices, and revise their practices at all levels to embrace openness. By focusing on these dimensions, higher education institutions could hence strengthen networked practices, learner and institutional development, and social change.

Secondly, a number of recommendations have been elaborated to support the institutions to develop their strategies for openness (Inamorato, 2018). In this regard, the EU aims at inspiring policymakers to develop a strategy at European, national, and regional levels. The mentioned report suggests a systemic, holistic approach to open education, based on over 20 studies early carried out by the JCR. The research, conducted through a qualitative process, underlines that Open education is crucial for universities to deliver public mission, address social inclusion, and become more accountable to society. It also recommends the adoption of the OpenEdu Framework, designed in consultation with stakeholders, as an instrument that can support institutions open education and provides suggestions for university decision-makers. Furthermore, it is strongly emphasised the connection between such recommendations and the European Commission's initiative on innovative teaching and learning through new technologies and open educational resources.

In a nutshell, for this study, developing ecosystems for open education (OE) in the EU, where different policies can be found, implemented through a multi-stakeholder approach, could act systemically to advance open education in Member States. More specifically, the research suggests that the European Commission should take on the role of a key enabler of open education in Europe, while Ministries should work in partnership with national and local stakeholders to make open education a reality.

 Thirdly, specific instruments were offered to implement and assess the progress on specific areas of open education (Tarkowski et al., 2019). A relevant case is the usage of open digital textbooks, that might encompass social inclusion by facilitating access to study materials. A Methodological Guide was created to evaluate digital education reforms, (particularly open digital textbooks), using an independent evaluation of a Polish program. This experience demonstrated that evidence exists for impact assessments on open education, with only 10% of 450 reforms evaluated. Recent research explores digital competence frameworks, entrepreneurship, digital capacity building, learning analytics, MOOCs, computational thinking, and education technology integration policies.

The Methodological Guide aims to evaluate open digital textbook initiatives by examining costs, savings, and their impact on learning outcomes. It involves analysing the regulatory and legislative framework, publishing market, student demographics, and the penetration and use of new resources. Therefore, the argumentation relating to the relevance of this evaluative action lies on an analysis of return of investments. This is based on calculating the impact of open digital textbooks on education system outcomes, measured through content analysis, curriculum match, pedagogical models, and practices. The guide points out that cost-effectiveness of open digital textbook initiatives should be deemed crucial for public administration, as it combines intervention costs and its impact on the education system. In connection with this, data collection should be planned before the intervention begins to determine key trends. It is also bold in assuring a direction for future efforts by the European Union, in terms of moving towards new financial instruments, such as Payment-by-Results (PbR), which "allows public procuring bodies to purchase social impact based on pre-defined outcomes, including access to education" (Tarkowski et al., 2019, p.5). This Guide is useful for policymakers in their future endeavours.

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In the same vein, the study offering practical guidelines for implementing open education practices in higher education (Inamorato, 2019), aims at increasing understanding of each of then dimensions of open education based on the OpenEdu Framework. The guidelines emphasise not only the usage of the mentioned framework, but actions aiming at the evaluation of progress in Open Education. Clearly, this is part of the EU Commission effort through the JRC Knowledge Base on Open Education, to address common frameworks of action, which are measurable in policy terms, later on. The guidelines are designed for academic staff, including lecturers, researchers, faculty coordinators, technicians, librarians, and students' services personnel, so they should encompass wide access and understanding of what open education means not only ideally but also in practice. These instruments caters to the above mentioned audience an idea of open education as a "digital approach to education that aims to make learning accessible, abundant, and customizable" involving "multiple teaching methods, knowledge sharing, and various access routes". Guidelines encourage academics to use open educational practices to promote inclusion and innovation. By shifting mindsets and promoting open knowledge production, teaching, and collaboration, open education can lead to more inclusive systems in higher education. The progression model empowers academics to lead institutional changes and advocate for open education practices.

Current practices in the adoption of open education display the several approaches and models, which we will explore in the following section.

Strategies to open-up higher education: Some cases

The OpenCases study, conducted by IPTS and the University of Bath(Souto-Otero et al., 2016), examined education institutions' approaches to opening up education. The report analysed open educational practices in teaching, research, and operations. The study examined institutions' focus on developing business models around Open Educational Resources (OE). Networks and Higher Education Institutions (HEIs) primarily rely on institutional/public funding, impacting their involvement and sustainability. Case studies highlighted the importance of considering accounting units for financial analysis, as OER generation may have lower costs for universities than learners' savings.

 From this study, it was evident that:

- Open teaching and research initiatives are primarily focused on MOOCs due to their wide audience, despite their low rates of accomplishment.
- Participation in open education (OE) initiatives is voluntary, with low career progression incentives.
- Academics have more incentives to participate in open research, but take-up is limited due to lack of knowledge and reputational incentives.
- Open research initiatives mainly use open access repositories, open data repositories, and open software production.
- Preserving and updating OER is a future area of focus.
- Open operations, such as tasks and open technologies for participatory decision-making, are less common.
- Accreditation is not formalised and in general their effect on employability is not measured.

However, the study concluded that Open Education (OE) has increased institutional visibility, improved reputation, and academic visibility. However, completion rates remain low and academic credit on learning from OE experiences is less common. The OE movement faces challenges in maintaining social

justice and widening participation in higher education. Increased funding, regulation, and inclusion in university rankings can encourage HEIs to participate in OE initiatives.

Another relevant collection of cases come from an overview of open education policies in the European Union, focusing on 28 Member States (Inamorato et al., 2018). The study analysed national-level policies focusing on open education and contributes to it through the OpenEdu framework, mentioned before in this section. It interviews policymakers and experts, explores needs and barriers, presents research results, and identifies policy suggestions at EU and Member State levels, focusing on implementation, impact, key barriers, and EU-level developments. The study highlighted that key barriers for open education uptake include low ICT-readiness, policy priority, fragmentation, institutional support, cultural change resistance, lack of awareness, low open education capacity, and the absence of an open licences national recognition scheme. Instead, the enablers include clear policy priorities, awareness-raising, capacity-building, and online platforms. As a relevant recommendation, it was suggested that the EU should increase awareness and frequency of studies and peer-learning activities, and implement a systematic approach, such as an open education census, in a MS-EU partnership.

To further in this analysis we also took into consideration the OpenCases minicatalogue produced to display several approaches to embrace open education at institutional levels(Lazetic et al., 2015).

The OpenCases mini catalogue is a collection of 50 mini cases from the OpenCases study, conducted by JRC IPTS and the Department of Education at the University of Bath. It aims to showcase the various open education practices in higher education institutions and other European Union Member States. The catalogue is part of the OpenEdu project, which explores the drivers and barriers for universities to open education. The project is part of the OpenEdu Project, which also includes five studies with external partners: Moocknowledge, OpenCred, OpenSurvey, OpenCases, and BMOpen. These studies aim to provide essential data for building an evidence-based picture of open education trends in European Member States and demonstrating what steps are needed to push the field forward.

We elaborated a Table (1) which summarises the lifelong learning level, the target included in the case and the topics covered.

Table 1. Level of LLL, the target and the topics covered in different cases.

Case	Type of Institution (University, organisation, …)	LifeLong Learning Level & Topic	Target	Topics
ETH Zurich (German: Eidgenössische Technische Hochschule Zürich)	University	Continuing Education, Professional Development Development of TORQUEs, MOOCs and its adoption of an Open Access Policy for research dissemination	Researchers and post-graduates	Improve quality of teaching and learning practices using new education technologies and pedagogies (flipped classroom approach, use of videos and social networks etc.).

Universities of France	Policy making, Continuing Learning	Continuing Education, Professional Development FUN - France Université Numérique, that aims to contribute to modernisation of the French higher education strategy 'Campus d'@venir33' and FUN MOOC platform provides courses from French higher education institutions.	Higher education institutions	Reach French speaking participants internationally, including in developing countries.
OER Universitas (OERu)	Consortium of higher education institutions	Higher Education and Continuing Learning Adoption of open education by educational institutions worldwide and recognition of its member institutions	free learners, higher education institutions	Support and inform the implementation of the OERu.
Delft University of Technology (Delft)	University	Higher Education and Continuing Learning The design of incentives and support structures to stimulate universities and enable academics to be engaged with open education.	Students, Higher education institutions	Support open research dissemination - creation of a repository for academics
Universidad Carlos III de Madrid (UC3M)	University	Higher Education and Continuing Learning OpenCourseWare (OCW) and E-Archivio, the university's Open Access repository	Teachers, students	Support open research dissemination, explore the impact of participation in its open education initiatives on learners

AGH	University	Higher Education and Continuing Learning Use of open licensing and adoption of open source software. Creation of resources that can be used in the context of blended learning, but which can also be shared for other purposes.	Secondary school students, Undergraduates	Support open education approach from secondary school to University.
Virtual University of Bavaria (BVU)	Network of universities and polytechnics	Higher Education and Continuing Learning Sharing of free online courses and tutoring services to enrich programmes and help students to organise their studies more flexibly.	Undergraduates	Foster cooperation between higher education institutions to improve efficiency of the higher education system and reduce duplication of efforts in the area of distance and online teaching.
OpenupEd	non-profit partnership	Institutional and Professional Development free OpenupEd MOOCs and a free recognition option	Higher education institutions	Promotion of a specific European view of openness in education based on eight features that go beyond the usual free (gratis) education (Openness to learners, Digital openness, Learner-centred approach, Independent learning, Mediasupported interaction, Recognition options, Quality focus, and spectrum of diversity).
ALISON	for-profit social enterprise	Higher Education	Students and higher education institutions	Fill the gap where there is a perceived

		Courses designed by various online publishers and universities into targeted work-related skills training.		lack of workplace skills in their target audience.
Social Science Department- Trento University	University	Higher Education Professional Development Awareness regarding innovation in the Higher Education pedagogical models	Teachers	Introduction of innovative pedagogical approaches via the technological "affordances", as part of HE new models

OER Future

"*It takes a **leap of faith** for the teachers to understand that sharing their educational content benefits the entire education system: appropriate training on legal and technical-operational issues is still necessary. Institutions should encourage and reward those who share their own materials and those who reuse other people's content, and also support publishers that produce quality learning content and promote widespread sharing and dissemination*" Pantò & Comas-Quinn, 2013, p. 18 (our emphasis).

Our emphasis in this quotation regards the idea that academics (and other educators) allegedly require a leap of faith to integrate open practices as part of the own repertoire. Our point here is that the context of discussion of Open Educational Resources (OER) and the later evolution toward Open Educational Practices (Ehlers et al., 2011); as well as the hype of MOOC as part of the open education movement, created the context to move on the issue of academics' and educators professional development (Inamorato, 2019; Raffaghelli, 2014a). In fact, if educators are the catalysts for pedagogical quality in lifelong learning, it should be considered how they learn to participate in the OER production cycle (use, remix, create and share) and how they are (and could) taking part in the open education movement (Nascimbeni, 2020; Raffaghelli, 2014c; Vladimirschi, 2018). It is on these bases that we could think how quality is addressed by openness. In fact, to promote openness in education, students and educators should engage with the philosophy of open education. However, as we purported, openness is still more a slogan than a practice, and developing open literacies is not a widespread practice. Engaging with open practices requires expertise, support, time and commitment and universities and institutions need to provide both the support for developing the expertise. We can consider that a new frontier of open education will lie on the careful engagement with educators, beyond exploring new digital technologies and infrastructures that encompass easier access to open educational resources. While the attention on openness continues to grow, open education will embed open science and viceversa, in a dialogue between research and innovation (building knowledge) and the ideas embedded in responsible research and innovation where education plays a crucial role to cater scientific research to the wider public (Hernández-Leo et al., 2023; C. Stracke et al., 2020).

Also, a relevant problem as well as opportunity for openness will be posed by AI tools, in a context where research is still emerging. In a Webinar delivered through the OEGlobal network (Open

Education Global, 2023), Paul Stacey referred to a number of problems against AI-generated content as actual Open Content. For example, Wikipedia, a collective source of knowledge which is basically crowdsourced, could be the most important single source in the training of AI models. This puts forward that though AI looks as self-sufficient and might be monetised, the sources are public and open licensed (Stacey, 2023). We dealt with this problem in relation to open data, where there is much enthusiasm in producing and sharing public government and research open data (Santos-Hermosa et al., 2023). As a result, we could ask ourselves whether the effort of producing open educational resources might lead to private gains. As Wolfson, from Creative Commons point out (2023) AI Generative tools *"improperly remove copyright management information from the code in its training data, in violation of the Digital Millennium Copyright Act, and reproduces code in its training data without following license agreement stipulations like attributing the code to its original author"*

This will lead to much attention to regulations and fair usage of open content overall, and of open educational resources specifically, as we suggested at the beginning of this document. Particularly, the educators need to be aware that AI-generated content is not necessarily open content, and cannot be considered us such unless there is acknowledgement of the sources adopted, at the least.

ANNEX II

Engaging Educators and Students in the Open Education Movement

In all sectors of business and socio-cultural activity, a "networked" professional life has raised at increasing speed and is nowadays a relevant component of any form of professional activity, including that of educators (Díez-Gutiérrez & Díaz-Nafría, 2018; Ranieri, 2019).

Educators tend to use a variety of tools, some of which are provided by their institution and others they have selected themselves, building their own "lifelong learning ecologies" (Sangrà et al., 2019; Tabuenca et al., 2013). Openness and open practices are just one dimension of such search for resources. Addressing educational quality, as expressed above, is not something that will occur only by informing or explaining the changing situation with regard to the academic profession. Instead, professional development strategies should be implemented to support academics in passing from a situation as outsiders of open (quality) educational practices, to becoming insiders.

Educators Professional Development at the cutting edge

The preparation of quality teachers, as the single most important factor affecting student performance (Rivkin et al., 2005), gained attention since the beginning of the ET 2020 strategy (https://education.ec.europa.eu/about-eea/strategic-framework), the framework setting the goals of the European Education Era. In 2010, such framework highlighted the complex role of teachers as mediators/facilitators within a changing educational system that aims to respond to a rapidly evolving world. It was hence considered extremely relevant to develop a culture of reflection and research on all areas of professionalism required to develop lifelong learning (Caena, 2011) within equitable and efficient educational reforms. Since those initial considerations, the European discourse focused on common principles for European teachers' competences and qualifications, as well as on improving teacher training (European Commission, 2005 and 2007, cited in Caena, 2014). The document of 2005 sets three broad competence areas for well-qualified, mobile teachers as lifelong learners: (i) working with knowledge, technology and information; (ii) working with fellow human beings; (iii) working with and in society. Instead, the document of 2007 recalls the focus on general, transversal competences for LLL. The 2007 report, however, highlights the lack of consistency and coordination between different aspects of teacher education, low budgets for professional development, and few incentives to promote teacher motivation and retention, a claim yet renewed by the TALIS research (OECD, 2019) about the transition of teachers from traditional conceptions of teaching towards innovation (as the use of socio-constructivist approaches to teaching). Problems of age, the lack of an university training and proper continuing training; as far as conflictual dynamics of educational institutions, and the loss of social status, makes teaching a frustrating experience, with its implications at personal and professional level (Beijaard et al., 2004; Desimone, 2009).

Within this scenario, the role of teachers is recognised as crucial to the quality of education and student learning. Decades of research show that teachers largely determine the quality of instruction, which strongly affects students' learning and outcomes (Darling-Hammond et al., 2005, 2017). The need to improve the quality of teacher education, both initial and in-service, is internationally identified as a primary education policy (OECD, 2005, 2019), especially in Europe (European Commission, 2007; European Council, 2009a, 2014, 2017).

In the context of teachers' professional life cycle, there are at least five stages of learning and shaping teachers' professionalism: the years of initial training, where formal academic training should be

provided; the induction to the role, where specific supervision and support are necessary as part of training; continuing formal education as new academic, formal advanced training opportunities are introduced; teachers' professional development as informal/non formal learning on professional environments; and the years of retirement, where teacher, becoming a supervisor or educator, learn from the own activity as researcher/trainer (Raffaghelli, 2014c).

In this context, teachers' Continuous Professional Development (CPD), also known as in-service professional development, is recognised as a key factor in improving the quality of education and learning (Darling-Hammond, 2017; Desimone, 2009; Caena, 2014) and a crucial component of teacher quality and professionalism (Guerriero, 2017). Teacher CPD, as in general CPD, is considered a crucial issue because "achieving a professional-level mastery of complex skills and knowledge is a prolonged and continuous process" and "professionals must continually update their skills, as the body of technology, skill, and knowledge advances" (Ingersoll & Collins, 2018, p. 205). Teachers' skills need to be continuously updated, in a changing context, where their expertise and peer collaboration, as expressed above, are the kernel of motivation and performance. In fact, as A. Hargreaves has indicated, professionalism in teaching implicates new forms of relationships and collaboration with colleagues, students, and their parents, beyond traditional authorities (Hargreaves, 1997). This requires independent thinking, problem solving, and of course, a close connection with the development of societal problems and science in/with the society, through the development of "lifelong learning ecologies" (Morer et al., 2021).

This declaration marks the beginning of a new age in teacher preparation, one that prioritises the development of teachers' professional skills within supportive institutional settings. Teachers should be able to access both materials and opportunities for interaction with colleagues inside them, as part of a paradigm that emphasises teachers' creativity as a cross-cutting feature of educational innovation.

In conclusion, teachers quality and professionalism is clearly attached to the ability to select and adopt quality resources as means of active teaching methods. Investing in relevant, innovative, and effective CPD is therefore recognised as a key priority (see also Sustainable Development Goals in United Nations, 2015). The importance of CPD and the need for greater involvement in it is perceived not only at a "top" level but also at a "bottom" level. At the top level, CPD is at the centre of the strategy for innovation and improvement of the education system at the international level (United Nations, 2015; OECD, 2018, 2019; UNESCO, 2016), as well as in Europe (European Commission, 2017, 2020; European Council, 2009a, 2009b, 2014, 2017, 2020). At the bottom level, teachers themselves express a high need for CPD (OECD, 2014, 2019).

Linking Creativity and the social dimension of Professional Development

Adaptability is what we mean when we talk about creativity: what an individual shows when they take on new challenges and come up with novel solutions.

Someone is being creative when they come up with something new (a product, a solution, a work of art, etc.) that has value to society or culture. This simplistic explanation covers potentially tens of thousands of nuances. In truth, there is a wide variety of definitions in the literature, but situated knowledge and problem solving is for sure a resounding note (M. Peter, 2009). What is considered "new" might vary depending on the inventor, the society, or the field in which the novelty happens. Furthermore, there are numerous interpretations of the term "valuable" to describe what is considered to be of high quality. Whatever the situation may be, creativity necessitates the creation of unique, practical outcomes (Ifenthaler, 2013).

The individual's ability to integrate different points of view and knowledge that is produced in different contexts is a crucial factor in the generation of knowledge, new practises, and new products. To do so, one must cultivate a novel personal synthesis, one that draws on novel methods of abstraction or generalisation (Raffaghelli, 2014c). According to Schön, reflection on practise is an essential part of this type of activity (Schon, 1984).

Despite the emphasis put by the Western culture on the isolated creation and geniality, creativity appears to be triggered by forms of communal, collective intelligence where the creative process is meant to be social, in keeping with a rising understanding of knowledge as socio-cultural creation (Cremin, 2016). Understanding creation and co-construction of knowledge was a widespread concern for adult learning. For example, sharing knowledge within communities to improve the professional practice was popularised by Lave and Wenger, through their perspective of "Communities of Practice" (CoP) (1991). If practitioners have enough common ground to mutually engage themselves, if they have a good dose of diversity that leads to rich informal learning experiences, motivating professional relationships can be built with other peers and, furthermore, an increment of creativity can be the result (Wenger, 1999). This is the base of Communities of Practices, groups that are fundamentally linked by their interest in sharing the own professional practices in changing organisational contexts as source of constant innovation:

"*The ability to include both structures and dynamism, to walk the line between chaos and order, is a characteristic that makes communities of practice a likely locus of creativity*." (Wenger, 1999:289).

We could consider the Community of Practice (Wenger, op.cit) as such an environment to foster every single perspective in a process of problem solving, but also meaning making towards organisational and professional innovation; as we declared before, this should be linked to creativity as a social phenomenon. When an individual decides to participate as an active member of a CoP, he/she is unconsciously declaring him/herself the need of being part of spaces where reality can be modulated through new ideas, hence generating new professional practices. Furthermore, the process of knowledge building inside a Community of Practice is based on the collaboration and dialogue between the members, creating a dimension of peer collaboration that fosters motivation. This motivation is also the engine of succeeding in experimentations, new activities and discourses. Under this view, communities of practice can be considered both a point of arrival and a starting point for one's creativity. In addition, the creative process can be reified through an outcome that can be used outside the community, in which it was produced, as "boundary object" (Wenger, op.cit), with new CoPs and organisations.

Also, the Activity Theory, stemming from cultural historical psychology led by Vygotskij emphasised social activity as the kernel to become creative. For this school of thought, to generate new synthesis that goes beyond "problem solving" towards expanding the field of the problem and finding new ideas, it appears that environments that permit users to share their best practises with peers who have different experiences but common interests are stimulating (Engeström, 2008).

These definitions have been applied to teachers professional development. Teachers interactivity inside specific learning environments should enhance information sharing, promote and reward teacher creativity and group-initiated practice improvement while minimising problems daily problems, like dealing with increasing bureaucracy (Raffaghelli, 2014c). Therefore, we hypothesise that embracing Open Education through the discovery of technologies supporting such an effort should be implemented through activities that favour social learning and collaboration. Professional learning activities within groups should support a) teachers' reflection on their pedagogical practices and their impact on students and b) the teachers' own digital skills to become more and more active citizens of

the digital age, as key dimensions of professional development. In fact, connecting teachers through the use of several learning spaces, with the process of creation of Open Educational Resources, could be a leading trend in teachers' professional development (Tosato & Raffaghelli, 2011; Vladimirschi, 2018).

The process of reusing, revising and remixing a resource can be a key strategy to generate focus of activity required to foster the social activity; but, while discussing and learning about the key dimensions that a resource needs to have to be shared, remixed and reused, we hypothesize that teachers acquire instruments for enacting the social dimension of creativity, with very concrete products of their practice that are new OER and the related open educational practices.

OER: students' points of view

Open Distance Learning (ODL) has the potential to generate additional educational and economic values due to changing student needs, increased competition, political and economic conditions, and new educational and technological approaches (Mphahlele & MAKOKOTLELA, 2020). This paper reviews the literature on students' participation in ODL institutions and the challenges faced when using Open Educational Resources (OERs). ODLs aim to democratise higher education by breaking barriers such as location, distance, financial pressures, and social problems, while empowering marginalised African populations. To effectively use ODLs, a Ubiquitous Learning Environment (ULE) should be created by course managers and designers. Students may require digital literacy, digital citizenship, and digital equity to use OERs effectively.

Digital literacy involves understanding the digital environment, evaluating actions, and co-creating content. Digital citizenship encompasses the norms of behaviour regarding technology use, but not all students have equal access to these opportunities. Digital etiquette involves using technology in ways that minimise negative effects on others and using technology when it is contextually appropriate. Digital equity involves equal access to digital tools, resources, and services to increase digital knowledge, awareness, and skill. However, there are significant disparities in access to high-quality technologies and inequities in how different groups of students acquire technology. Barriers experienced by students due to digital equity include outdated, unreliable computers and limited internet access, negatively impacting their access and utilisation of OERs.

This paper highlights the imbalance between Open Educational Resources (OER) provision and usage, arguing that most OER are in English and Western culture, which limits their relevance and risks consigning less developed countries to users. The study uses the CoI Framework to reflect on students' participation and access of OER in Open Distance Learning (ODL) institutions of three countries: Indira Gandhi National Open University (IGNOU), Mauritius University of Mauritius (UoM), and South Africa University of South Africa (UNISA). The authors argue that OERs should go beyond accessing information and facilitate the creation of communities of students actively engaged in exploring, creating meaning, and confirming understanding. They believe that OERs should include essential elements of CoI (cognitive presence, social presence, and teaching presence) to enhance student participation in ODL. To enhance student participation, lecturers should create or repurpose OERs to provide social, cognitive, and teaching presence, profile older students, and ensure compatibility with majority or not all students' technological tools.

Additionally, lecturers should stimulate students' digital literacy and citizenship by enabling them to use all languages in the multimedia universe and other digital platforms. Further research is needed to explore the impact of OER on student participation and strategies to address challenges related to digital literacy, citizenship, and digital equity.

It has been also pointed out that OERs can save students money on educational expenses and help them complete more courses (Clinton-Lisell, 2023). Withdrawal rates for students in courses with OER textbooks are 29% lower than those with commercial textbooks, possibly due to students being more likely to remain enrolled without the cost of course materials. Two studies have found that students enrol in more credits if at least one of their courses uses OER. Tinto's integration model of college student success is a valuable framework for research in OER, focusing on social integration.

Lower socioeconomic students have higher grades with OER adoption, but they are less likely to afford expensive textbooks. Institutions may not be able to remove all barriers for social integration for nontraditionally aged and online students, but instructors and administrators can provide financial support. This was explored on a study on seven campuses to examine OER efficacy and interactions between student age, course modality, and materials, focused on the Maryland Open-Source Textbook (MOST) initiative, which supported faculty in adopting Openly-Licensed Textbooks (OER) for courses. The study involved 9,475 student grades or withdrawals from OER and commercial resources, and analysed the impact of online education (OER) on students' grades, withdrawal rates, and enrollment intensity using mixed-effects models. Results showed a positive effect for traditionally-aged students, but no reliable effect for nontraditionally-aged students. The study also found significant effects of student age and course modality, with older students enrolled in fewer credits and online students having fewer credits. The overall positive main effect of OER on the number of credits was likely driven by nontraditionally-aged students in face-to-face courses. The quantitative nature of the dataset lacks rich student voices, and more nuanced examinations, such as interviews or focus groups, could provide more insight into student experiences. OER can reduce the financial burden of college education, benefiting students financially without unwanted academic consequences.

As in the case of teachers, Students' Generated Content could be a relevant approach to support the students' engagement with open education. The beginning of the XXI century was rich of discourses about students' participation in the generation of content have dominated the scene of personalisation and engagement in education. This debate has been connected to the quality of education as part of a participatory, multiperspective, multilevel and contextualised process. (Ehlers, 2009). Consistently, in the European approach, quality is considered through the different values and perspectives (producers/deliverers/users of education), and the different levels of the educational process (Ehlers , 2004) . Furthermore, the trends of research in this group emphasises the notion of quality as a participatory process where the learners/users' vision is fundamental. The perspective of the user generated content quality framework stresses the idea of quality as part of dialogue and participation within an organisational learning process (EFQUEL, 2007) (Ehlers, Helmstedt, & Bijnens, 2011) that support the generation of a "quality culture" and of "peer reviewed" quality (Auvinen & Ehlers, 2007).

Open Educational Resources usage (or even better, Open Educational Practices) are based on access to the extensive available resources, but attempt to go beyond, towards institutional strategies to use and re-use content. In this sense, Learners' generated content can be a part of Open Educational Practices: if academics decide to open their own contents, the students can versioning and integrate the own production as part of a final product that can be further used by new students, in a recursive cycle of practice (Pérez-Mateo, Maina, Guitert, & Romero, 2011). We would like to build on this idea, considering that the openness of educational practices can motivate students to learn and participate

on the whole process of quality, (even the dissemination and re-use of the digital contents they produce) becoming insiders of the Quality Culture. For example, Raffaghelli & Ghislandi (2013) through a DBR-Design Based Research addressed the theoretical question regarding the development of quality literacy and the motivation generated among students by their participation in open educational practices through learner generated content. Studying learning phenomena in the real world rather than in the laboratory, namely open educational practice to improve the quality of eLearning, they considered the transformative value of the students' engagement into the generation of content that could be later opened to further cohorts of students. Their analysis covered:

1. Level of participation, based on Number of students having participated voluntarily on the total number of students.
2. Collaboration for the definition of criteria of evaluation, based on intertextuality and discursive interactions in the online forum.
3. Consistency of responses during the evaluation phase with the original criteria of evaluation, based on the discourse analysis of evaluation forms. Students' impressions about their meta-learning through the participatory evaluation, based on answers to direct questions (interview/questionnaires)

The preliminary results confirmed high levels of engagement and collaboration between students, as well as consistent patterns of participation; the kernel of the motivation is generally given by the students' awareness of openness (which means transparency and visibility) . This form of participation relates to the engagement of students into the quality culture beyond the specific contents they should learn. In fact, the process of participatory evaluation of Learners Generated Content has been transformed into the occasion for reflection on the quality of the eLearning experience. Deepening on these assumptions, the preliminary results of this study, obtained from thick descriptions of the students' interactions and comments during the process of learning generated content, as well as the participatory evaluation, supported the idea that educational quality is embedded in a participatory, open culture. This approach works mostly in what Ehlers has denominated the potential quality, which is to say, ground for a final outcome of quality. As this author claims, a comprehensive empirical validation of the described concepts has so far not been undertaken. Therefore, we suggest empirical research questions …" (Ehlers, 2007:106-107) Our effort has been in fact put on the implementation of an approach based on openness and participation, from one perspective: the one of students in a joint venture towards quality of eLearning in Higher Education.

Student-generated OER in assessment is another interesting OER approach. It uses OERs from existing repositories to create open resources for other learners. This collaboration between academics, professionals, and students crowd-sources knowledge creation, fostering an authentic learning experience (LX TEAM, 2021).

Integrating pedagogical approaches in content generation is based on constructive learning. It is crucial for educators and assessment professionals to define assessment requirements and maintain alignment with learning objectives. Open educational practices, such as curating content using existing Open Educational Resources (OER), reusing and mixing, licensing, and publishing, are essential. Raising awareness of the value of creating and publishing OER is crucial, as is providing technical scaffolding for students to upskill and maintain the quality of the final product. Student-generated videos are also used in assessment design, requiring students to create and share their work as OERs. The University of Western Sydney and University of Southern Queensland have both used content authoring tools to develop Open Educational Resources (OER) for assessment purposes. The University of Western Sydney's 3-stage model involved students building, reviewing, and publishing OER, while the University of Southern Queensland's approach involved students generating open textbooks for early years

educators. However, more revolutionary approaches connected the idea of students adopting OERs as part of a political engagement with their education. The Fallist protests in 2015-2017 (Cox et al., 2020) in South African universities aimed to decolonize higher education institutions and provide free education. However, the national higher education system remained inequitable for the poor, people of colour, and marginalised groups, including women. The Digital Open Textbooks for Development (DOT4D) project aimed to understand the benefits of digital open textbook publishing for supporting localised content development, curriculum transformation, and cost alleviation. The project aimed to address economic, cultural, and political misrepresentation in South Africa's higher education system and explored the potential of open textbooks as a solution to inequalities in traditional textbook provision. The DOT4D project used Nancy Fraser's trivalent lens to analyse inequality in economic, cultural, and political dimensions. It emphasised the need for affirmative and transformative approaches to Open Educational Resources (OER) and OEP. Open textbooks could reduce costs and improve learning outcomes while addressing political injustice required content creation approaches, policy reform, and national discussions. Addressing these dimensions has been crucial for participatory parity in higher education. This study employed a mixed methods research approach, including interviews with five UCT open textbook authors, a BTFPR survey for 13 grantees, and DOT4D project field notes. The interviews aimed to address injustices faced by academics in their classrooms, while the BTFPR survey examined barriers in creating open textbooks and students' access to materials. The data is analysed using Nvivo qualitative analysis software, focusing on social justice. The findings suggested that open textbooks promoted a more socially just approach to materials creation and provision in the South African Higher Education system. The research highlighted social injustices in South African Higher Education (HEIs), with students and staff facing economic barriers, burdens on lecturers, and lack of student voices in shaping learning resources and curricula. Digital open textbooks could address these injustices by providing affordances, overcoming cultural misrecognition, and allowing academics to design teaching activities that included student content. However, transformative responses were needed to challenge existing power relations and alter fundamental structures perpetuating these injustices. Transformative approaches involved institutional or government introduction of formal systems and processes, investment in resources, and quality assurance processes.

However, the most relevant approach to students' participation was probably that of Student voice, which we will analyse in the following.

Student-Teacher Partnership: the student voice perspective and the student-driven OER

"Partnership is a process for developing engaged student learning and effective learning and teaching enhancement. At its heart, partnership is about applying well-evidenced and effective approaches to learning, teaching and assessment with a commitment to open, constructive and continuous dialogue. Partnership involves treating all partners as intelligent and capable members of the academic community" (Advance, HE).

Student-as-partner (SaP) practices are emerging in today's universities as a means to offer a more participatory agenda and transform institutional cultures in an increasingly business-oriented higher education context (Gravett et al. 2021). Cook-Sather and Luz (2015) affirm that partnership can be interpreted as a threshold concept, namely a 'conceptual door' or 'portal' that, once crossed, lead to a transformation of an object's internal view, a subject's landscape or even a different worldview (Meyer and Land, 2006). With this in mind, Cook-Sather & Luz (2015) argue that the introduction of

partnerships between students and staff represents a paradigmatic change and means pursuing a truly democratic education.

An essential focus of the so-called "Student Voice" movement is precisely to promote democracy through education (Meyer & Land, 2006; Fielding, 2004). From this perspective, democracy must be lived out in daily experience to become a 'habitus of mind' for each individual, as argued by various authors with expertise in the field. In this regard, Fielding (2012) emphasises that democracy is much more than a collaborative mechanism: it is above all a way of living and learning, at the basis of which is a shared commitment to freedom, equality, mutual respect and solidarity.

Therefore, the concepts of authority and participation need to be revisited within educational contexts in order to offer students a space in which they can manage their own work and share leadership.

As Angus (2006) explains,

"In democratic organisations—indeed in any organisations in which there is genuine leadership rather than merely managerial coercion—such organisational shaping is never just a top-down process but is an engaged process involving all organisational players. The dialectical, relational view of leadership as a process incorporates the human agency of all members of the organisation. […]. Such leadership arises not from coercion and manipulation, but from relational collaborative, participatory processes" [Smyth, 2006; p. 372].

Based on Fielding's (2006; 2012) reflections, for universities to foster more democratic learning environments, students need to be empowered as active and participatory agents and work in partnership with academics and administrators (Serbati et al. 2022). According to Fielding (2012), the most authentic partnership between students and staff takes the name of Intergenerational Learning as Lived Democracy: a transformative relationship where a joint commitment to the common good is put into practice. This is the best model of a relationship between students and teachers to build a democratic contract, to teach and learn democratic citizenship, to promote democracy as a way of living and learning together.

In this perspective, many authors (Fielding, 2012; Bovill et al., 2011) have noted that students are able to actively contribute to the academic community, by working, for example, with academics in designing courses and curricula through the adoption of participatory and collaborative methods (Bovill et al., 2011; IJAD, 2021). In this perspective, the role of students as key players and co-creators is relevant in teaching and learning and curriculum design, but becomes even more important in planning academic development initiatives for teachers to improve their pedagogical skills with the aim of 'improving the practice, theory, creativity and/or quality of teaching and learning communities in higher or post-secondary education' (IJAD, 2021).

As Bovill, Cook-Sather and Felten suggest, it is important to carefully analyse the academic context and identify the most appropriate co-creation opportunities. Among others, a well-known and popular approach is called "Hearing the Student Voice". The aim of this approach is to collect and use student feedback to develop and improve the quality of courses and curricula. Students are engaged in reflective processes for continuous change in education, as stakeholders and legitimised actors who can provide meaningful information to academics to decide how to act to improve quality. For students to feel safe in sharing their comments and to truly belong to the community, it is necessary to create an environment in which dialogue and mutual exchange between students and teaching staff can take place constructively and effectively, and then be transferred into concrete actions (Campbell et al., 2009). For students, being heard means becoming an active part of the academic community and contributing to their motivation and commitment (Campbell et al., 2009) However, in order to make

this approach work, it is important to guide teachers in rethinking the pedagogical design process in order to find a new balance with students (Bovill et al., 2011).

As we said, the student voice approach can be defined as "collective contribution of the presence, participation, and power of diverse students [...] in educational planning, research, and reform" (Cook-Sather, 2014, p. 132) and its advocates that students should have the right and power to engage in much of the decision-making traditionally dominated by teachers or administrators.

There are many possibilities to implement a student voice approach in the structures, actions, choices that institutions and academics do from curriculum design to daily teaching practice; one of them is adopting resources that are, by nature, democratic, such as open educational resources (OER).

This is applicable in practice for instance in the decision-making for the adoption of textbooks (Cook-Sather, 2006; Fine, Torre, Bums, & Payne, 2007), which are constantly evolving due to advances in digital technologies that allow for open licensing and free distribution of content (cf. Denoyelles, Raible, & Seilhamer, 2015). Open textbooks have indeed emerged as an alternative to traditional copyrighted textbooks. Open textbooks differ from traditional textbooks because a) they can be distributed without license fees and b) they can be modified by teachers without the permission of the original authors. As an example of an open educational resource (OER), open textbooks can include other OERs within them (e.g. images) and can also be subdivided for partial redistribution as smaller, targeted resources (e.g. individual chapters). Open textbooks turn out to be a tool of great interest to students and teachers as they represent a resource that facilitates free access for those who cannot afford the high cost of teaching materials traditionally used during courses of study (Paulsen & St. John, 2002). A recent study found that many students do not purchase traditionally used textbooks due to their high cost. This inability on the part of students causes concerns about their university progress and they claim that free access to learning materials would help them perform better in their academic career (Senack, 2014).

However, in order to introduce Open Educational Resources available to all students, academic challenges need to be addressed that require greater inclusiveness and sensitivity to students' needs (Woodward et al., 2017). A recent study conducted by Woodward et al. (2017) investigates how the Student Voice perspective can be applied in the evaluation of potential open textbooks for adoption at the institution's Department of Educational Psychology and Technology at Brigham Young University, both at the master's and doctoral level. In detail, the study was conducted in courses where enrolled students generally prepare for careers in instructional design, educational technology, or educational research. The students who participated in the study assessed which open books could be adopted in terms of quality and applicability of content and pedagogical value. This process was facilitated by the help of an expert. The results of the study indicate that the quality of textbooks can encompass a variety of dimensions for students and that not all textbooks perform the same in terms of content, pedagogy, and design. The study therefore brought to attention the potential of including student voice in the assessment of open alternatives to traditional textbooks, at two levels: first of all, giving students the opportunity to participate in the adoption and adaptation of open textbooks enables greater democratic participation and value of students' points of view; secondly, the use of open resources allows the inclusion of all those who want access to cognitive knowledge.

As we mentioned above, there are several ways in which students can become active participants both in and out of the classroom. The textbook adoption is one example of a practice that provides opportunities for faculty and students to engage in deeper collaboration and re-imagining of the learning process and the content. Academics, libraries, and students can create new projects and initiatives to redefine the way in which OER influences the world of higher education and beyond.

In a broader sense, OERs offer students the opportunity to take an active role in their own learning process. In fact, the term 'open' allows the relationship between teacher and student to be conceived in terms of collaboration, mutual commitment, and reworking of the learning materials that can be used during study. From this perspective, students can choose and modify teaching and learning materials, becoming responsible for their own learning process. Through open pedagogy, students can therefore create information for instance via wikis, mix audio-visual content, write, or review text materials, create additional content with their peers, and create course assignments through the use of technology (Hilton & Mason, 2016). In this sense, technology allows the sharing of the responsibility of the teaching and learning process and encourages students to take responsibility for their own learning process by interacting with open materials and content. Researchers Baker & Ippoliti (2018) conducted a study to demonstrate how students can actively collaborate with libraries and other entities on campus in order to offer their views on materials at Oklahoma State University (OSU). In particular, the university encouraged student participation to increase awareness and value of open educational resources as well as the implementation of these to maximise student success and learning opportunities.

Therefore, collaborating with students in the creation of OERs using different media - textbooks, articles, audio, video, websites – and adopting open pedagogy represents an important component to democratise education, promoting inclusive access to higher education while maintaining and improving the quality of their learning process.

ANNEX III

An exploration of Learning Scenarios in Digital, Entrepreneurial and Green Competence

In the following, we will explore the results of two workshops that aimed at a progressive development of learning scenarios.

We will introduce the Workshop's Plan as first element, followed by the Learning Scenarios got, and a synthesis of the relevant data displaying the scenarios' main characteristics.

Workshop I

The characteristics of the workshop are reported in Table 1.

Table 1. Activities, Resources and Tools and Outcomes of the workshop conducted.

Time	Activity	Resources & Instruments	Expected Outcomes
0.00	Introduction	Classroom and Zoom space Shared slide deck	Understanding the workshop approach and foundations
0.15	Individual exercise: imagining a learning scenario were resources are needed	A form to explore individual representations about possible scenarios of OER search and usage	Designing a learning scenario adopting a form guiding the activity
0.30	Group work: Scenario Selection & Group improvement	A shared space on a GDoc where the participants discussed and collaboratively adjusted a preferred scenario. In this regard, the process of peer-reviewing helped the participants to improve the final proposal.	Selecting a relevant scenario and improving the design through a group perspective
0.15	Group work: Peer-review I	Posters and post-its	Exploring peers work and strategies to reflect about own scenario
0.30	Break		informal networking
0.15	Group work: Peer-review II	Posters and post-its	Exploring peers work and strategies to reflect about own scenario
0.45	Group work: Scenario improvement	Shared GDoc/Padlet	Improving the final proposal
0.30	Plenary Session	Classroom and Zoom space	Discussing about the insights gained, difficulties in conducting the tasks, impact of the peer-review exercise to reflect about the quality of the learning scenario

[To learn more about the profiles, approaches and type of expected participants, see Annex II]

In the following, you will see some of the learning scenarios and the way OER are integrated into them.

Scenario 1

Table 2. Scenario 1.

Achieving data justice in education	
Skills' Area	Digital
Educational context	Professional learning - Continuing Training
Target	Teachers & Educators
Pedagogical granularity	Workshop (Low granularity)
Topic	Data justice
Expected learning achievements	**Knowledge.** Teachers/Educators will know: approaches to data justice, benefits and pitfalls; Taylor's (2017) framework for data technologies' design and governance; Capability framework (Sen, 2009) and freedom-based approach; Data feminism (D'Ignazio & Klein, 2020) and seven inequities. **Hard and soft skills.** Teachers/Educators will be able to: use interactive Data Ethics Canvas, from the Open Data Institute; reflect and debate on Ethical Approaches to data; collaborate in group; design a learning module on data justice in their classrooms/educational contexts.
Learning activities	Reflection and debate. Learning design (groupwork).
Resources	A theoretical Module and a presentation A digital environment or inputs to discuss (online forum) A template to design for learning (see for example: https://docs.google.com/document/d/1dJ3Tzf6skwwwMvNt3bGX0UuJ98C1xTuAC-gxWXNVVPs/edit)
Learning scenario	

This learning scenario relates to a workshop where the teachers/educators are invited to explore the concept of data justice and the different interpretations of this complex idea. They are hence led to reflect on possible applications and to design for learning in their contexts of teaching/educational activity.

For that, we consider the different approaches to data justice, looking at their benefits and pitfalls. We then focus on Taylor's (2017) framework for data technologies' design and governance. The framework is a capability (Sen, 2009) and freedom-based approach that examines how data technologies influence the kind of lives that people deem valuable to live. As a complement to the notion of data justice, which is mainly a conceptual one, both, data feminism (D'Ignazio & Klein, 2020) and seven inequities held in power are going to be described as actionable analytical tools to address issues of data justice when working with research in the classroom. In addition, we present the interactive Data Ethics Canvas, from the Open Data Institute. Hence, there is an activity of reflection and debate (that can happen in an online forum). Later on, there's a group activity of learning design, that can end up in the adoption of a template to design a module on data justice in their classrooms/educational contexts.

The activities are based on three main types of resources:
A theoretical Module and a presentation to support the introduction to the workshop
A digital environment or inputs to discuss
A template to design for learning (see for example:
https://docs.google.com/document/d/1dJ3Tzf6skwwwMvNt3bGX0UuJ98C1xTuAC-gxWXNVVPs/edit)

What does the educator expect to retrieve from the ENCORE platform?
One critical aspect is to find open educational resources relating/supporting: a) pedagogical design; b) evaluation of learning activities: c) data justice examples/cases.

How could the ENCORE system be explored to find the needed resources?
Keywords: data literacy, data justice, education, data visualisation a) pedagogical design; b) evaluation of learning activities; c) data justice examples/cases.

Scenario 2

Table 3. Scenario 2.

Improving business skills of higher education students	
Skills' Area	Entrepreneurship
Educational context	Professional Learning - Initial Training
Target	VET students - last year of scientific high school
Pedagogical granularity	Workshop/Seminar (Low granularity)
Topic	Entrepreneurship
Expected learning achievements	**Knowledge.** Students will know: the concepts of entrepreneurship and business model; the Business Model Canvas. **Hard and soft skills.** Students will be able to: collaborate in group; design their business model using the BMC.
Learning activities	Reflection Developing projects - business model (groupwork)
Resources	Presentation. Videos (images) and websites on the business model canvas or experiences of entrepreneurs using the BMC. Business Model Canvas

Learning scenario
The training activity takes place in a high school. The students are studying the last year of scientific lyceum. The training activity lasts 6 hours and it is dedicated to introducing the topic of entrepreneurship, including a group work activity. The group work activity, lasting 4 hours, includes the use of Business Model Canvas. The last hour of the training workshop will be dedicated to the presentation of the works of the learners. For the presentation of the theoretical part, the trainer will use ppt presentations and videos already available online. The trainer will also use the BMC.
What does the trainer expect to retrieve from the ENCORE platform? The trainer would expect to find some new resources on the ENCORE platform for presenting the concept of the BMC and a virtual BMC, so that the students could work online on it. Also, it could be useful to have some new ideas for having the students making the presentations and allow the other participants to interact/vote/give feedback online.
How could the ENCORE system be explored to find the needed resources? Keywords: Business Models, Business Model Canvas, SWOT analysis, customer segments

Scenario 3

Table 4. Scenario 3.

From Software Modeling to Software Realization	
Skills' Area	Digital
Educational context	University 1st Degree
Target	150 students at the second year of the bachelor degree
Pedagogical granularity	Software Engineering course at the Computer Science Degree [Medium (Module/Unit)]
Topic	Technological Sciences
Expected learning achievements	**Knowledge & Soft Skills.** Project definition and specification. **Hard skills**. Project work realisation and testing.
Learning activities	Reflection. Developing projects - software project [groupwork]
Resources	Modelling Exercises, Project Examples, Coding Exercise, Quizzes, Modeling Tools, Programming Tools.
Learning scenario	
The scenario is in the context of the Software Engineering course at the Computer Science Degree. The class is composed by 150 students at the second year of the bachelor's degree. The goal is to teach students how to specify and realise a new software project. Groups of 3 students are formed and they work all together for the overall project work. The Teacher provides all the needed material and guidelines to define a new idea, model and realise it. The project is divided in 3 phases: (1) project definition and specification, (2) project realisation, and (3) project testing. During the three phases the teacher provides slides used during the frontal lectures, examples of past projects to give students ideas for defining their project idea, tutorials in a set of specific modelling and programming languages that are indicated for the project realisation. The team members work together from the starting point until the end of the project delivery. The teacher also provides indication on the tools (for modelling, development and to document the overall project in specific deliverables) to be used during the learning scenario.	
What does the trainer expect to retrieve from the ENCORE platform? Tools for modelling, development and to document the overall project in specific deliverables.	
How could the ENCORE system be explored to find the needed resources? Keywords: Model Driven Engineering, Software Specification, Software Development, Deployment	

We also analysed the quantitative data to generate representations that supported awareness on the most common learning scenarios' focus. Indeed, we discovered that active learning methods are less frequent in Entrepreneurial activities, and Green skills are less targeted overall. Such a result led us to consider a second workshop where the scenarios would be based specifically on Green competences. Finally, also the industry context of professional learning was more difficult to explore. We circulated this information within the partnership to get further learning scenarios from the partners.

The following graphs introduce the results, and are presented as Open Data to this LINK

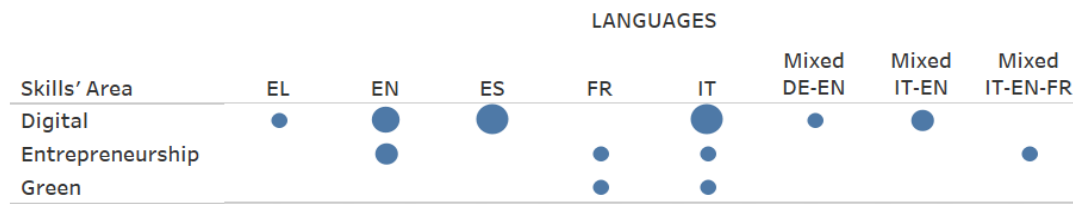## Languages adopted for the Teaching/Learning Activities

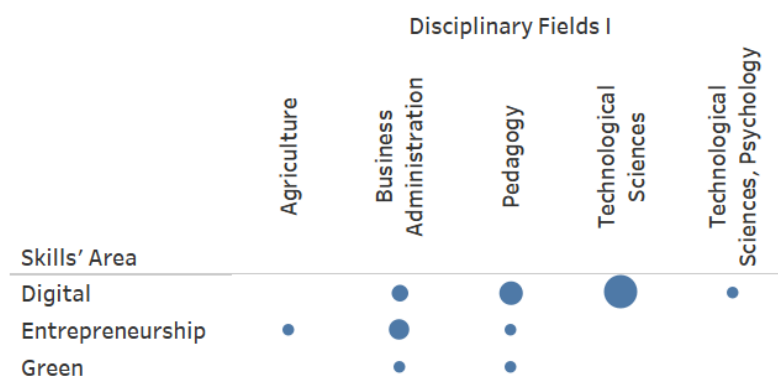Figure 1. Graph languages for the skills' area.

Disciplinary Fields

Figure 2. Graph Disciplinary Fields for the skills' area.
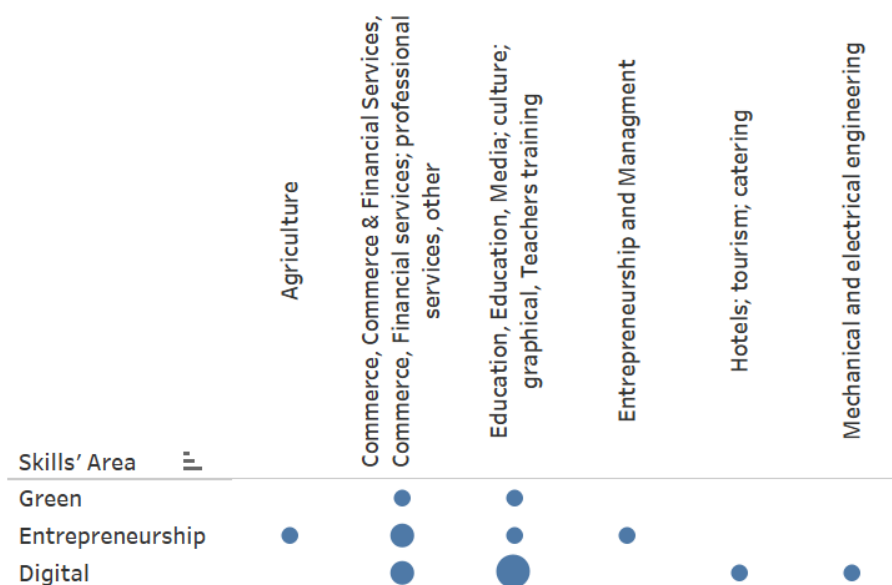
Professional Categories

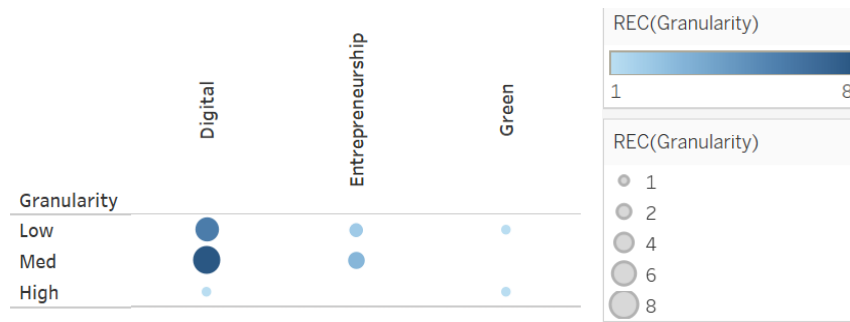Figure 3. Graph Professional Categories for the skills' area.

Level of Granularity

Figure 4. Level of Granularity for the skills' area.

Participants' profiles
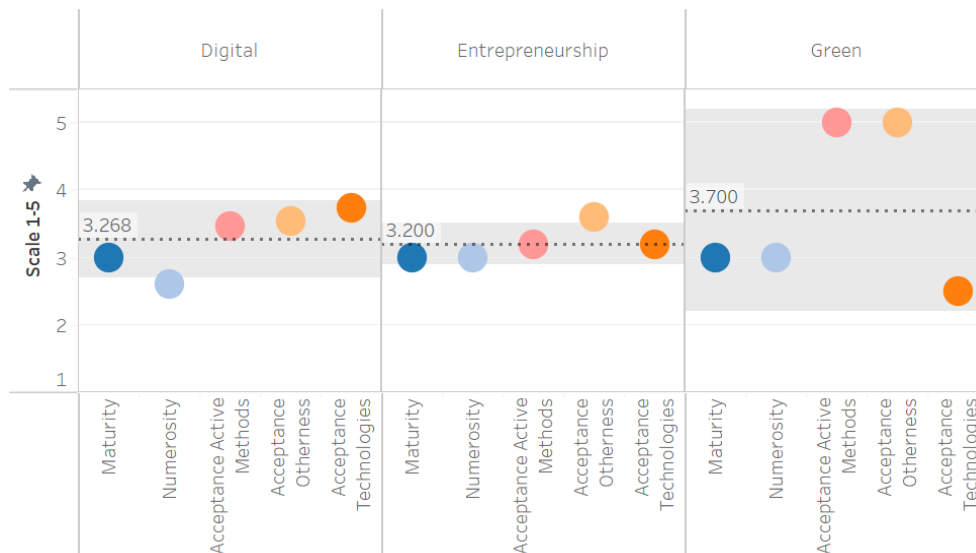
Scale 0-5 [Very High =5, High=4, Medium=3, Low=2, NA=1]

Figure 5. Graph Participants' Profiles for the skills' area.

Teachers & Trainers' profiles
Scale 0-5 [Very High =5, High=4, Medium=3, Low=2, NA=1]
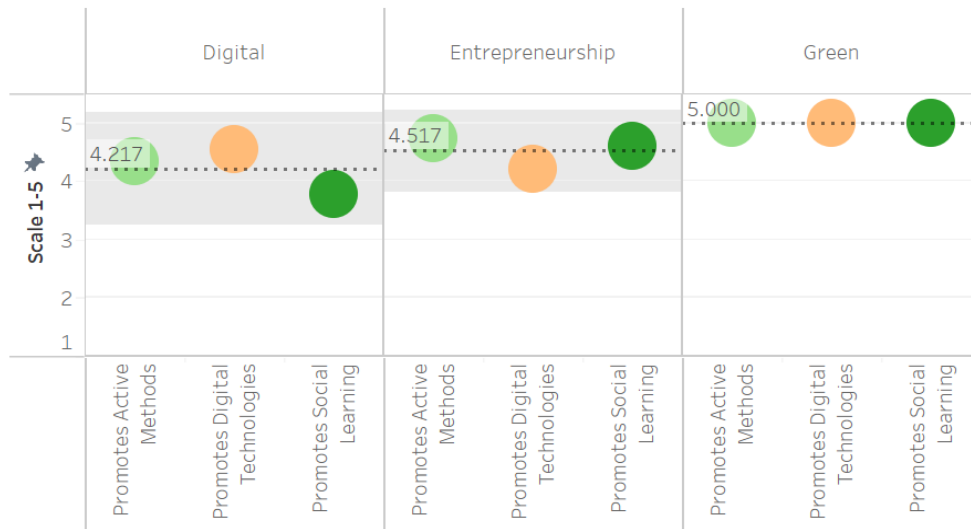
Figure 6. Graph Teachers & Trainers' Profiles for the skills' area.

Type of Achievement
Scale 0-2 [Prevalent=2, Present=1, NA=0]
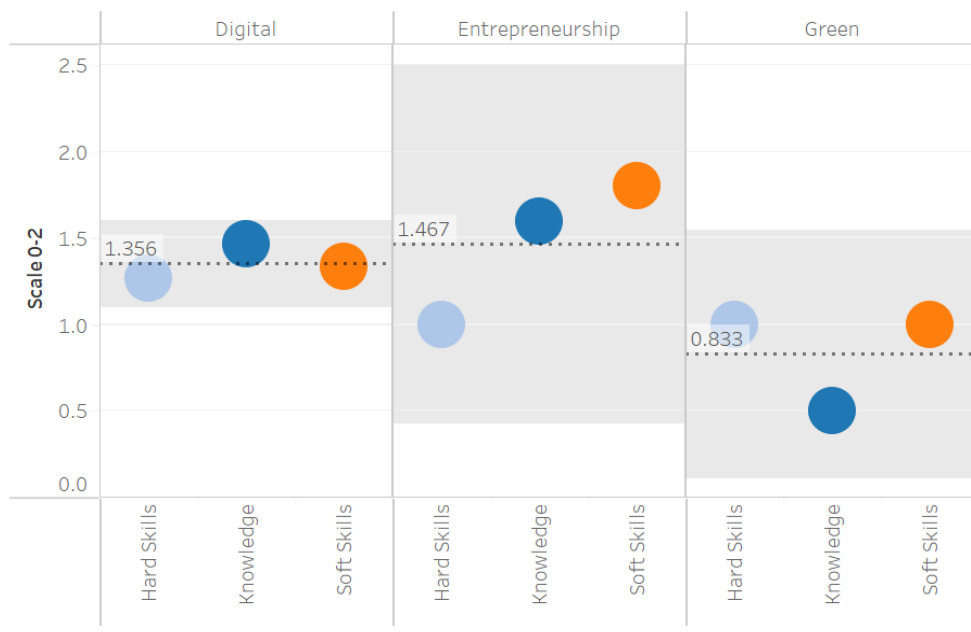
Figure 7. Graph Type of Achievement for the skills' area.

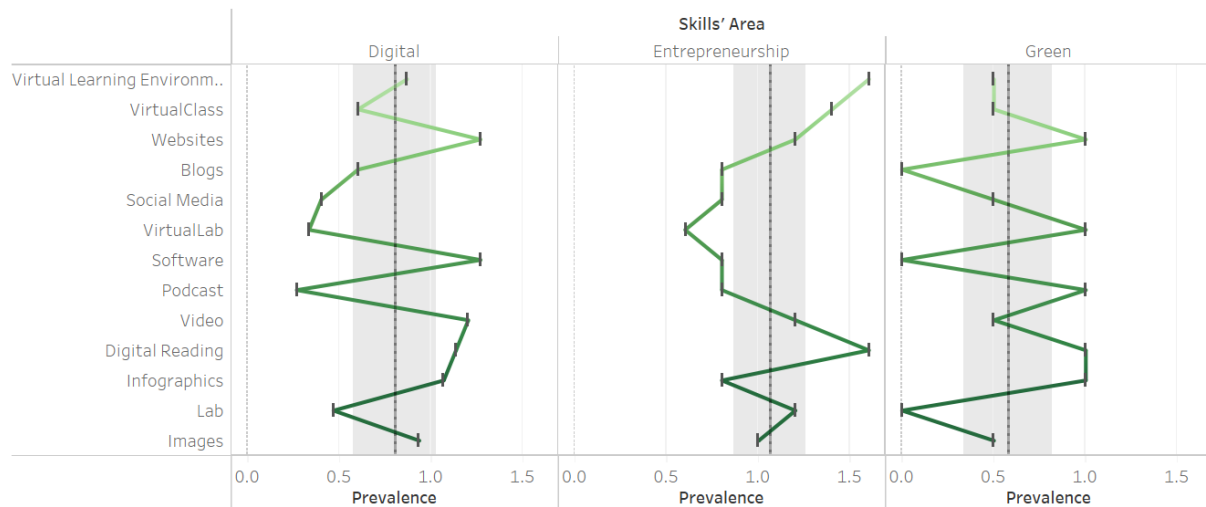## Type of Learning
Scale 0-2 [Prevalent=2, Present=1, NA=0]
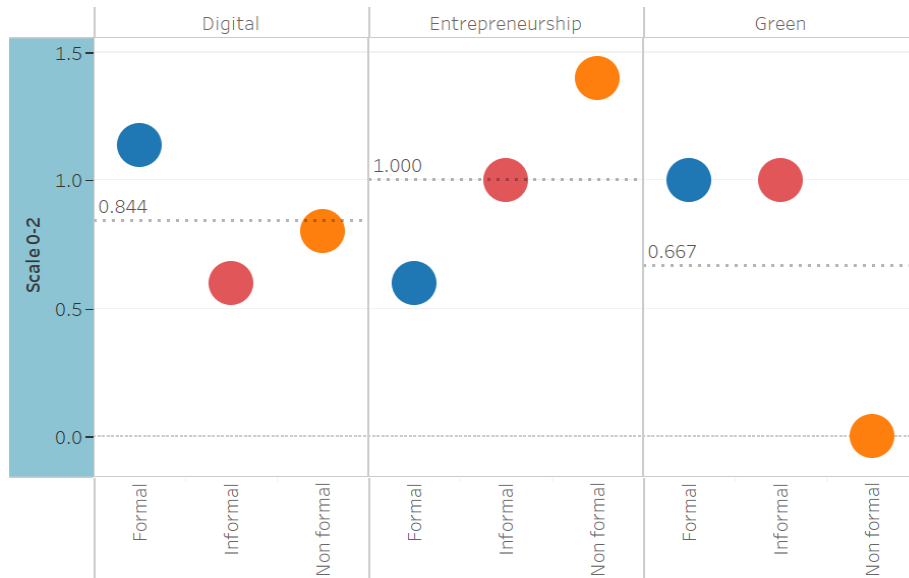
Figure 8. Graph Type of Learning for the skills' area.

Type of Learning Activity
Scale 0-2 [Prevalent=2, Present=1, NA=0]
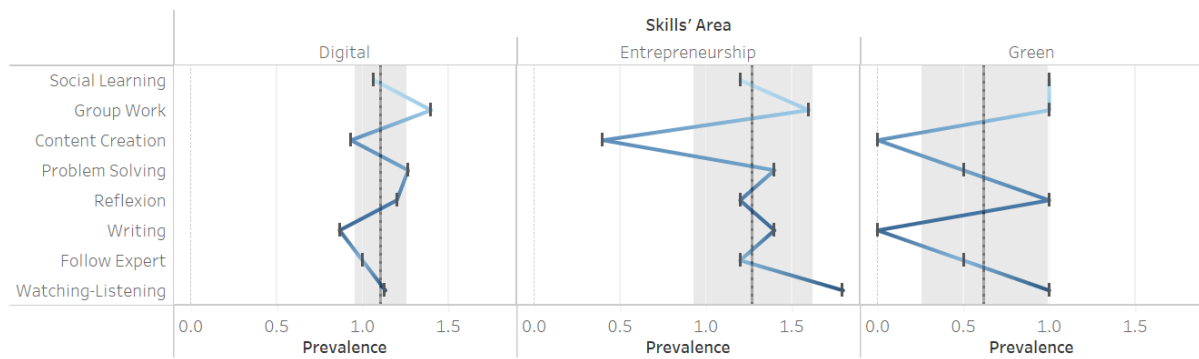
Figure 9. Graph Type of Leaning Activity for the skills' area.

Type of Resources
Scale 0-2 [Prevalent=2, Present=1, NA=0]

Figure 10. Graph Type of Resources for the skills' area.

Workshop II

A workshop of three hours was implemented, within the context of ENCORE partners' meeting to develop further learning scenarios based on a user experience on the ENCORE system, including: search and analysis of OER collections; planning an activity based on the OERs adopting the Educational Enablers.

The characteristics of the workshop are reported in Table 5.

Table 5. Activities, Resources and Tools and Outcomes of the workshop conducted.

Time	Activity	Resources & Instruments	Expected Outcomes
0.00	Introduction	Classroom and Zoom space Shared slide deck	Understanding the workshop approach and foundations
0.45	Individual exercise: furthering the learning scenario started at Workshop I	A form to explore individual representations about possible scenarios of OER search and usage	Improving the initial learning scenario adopting a form guiding the activity
0.30	Break		
1.00	Group work: Scenario Selection & Group improvement	A shared space on a GDoc where the participants discussed and collaboratively adjusted a preferred scenario.	Selecting a relevant scenario and improving the design through a group perspective, with a focus on GREEN and ENTREPRENEURIAL skills
0.30	Plenary Session	Classroom and Zoom space	Discussing about the insights gained, difficulties in conducting the tasks, impact of the peer-review exercise to reflect about the quality of the learning scenario

Scenario 1

Table 6. Scenario 1.

Case-Based Learning for Evaluating Business Models for Software Applications	
Skills' Area	Entrepreneurial
Educational context	University
Target	Students of a Computer Science Degree
Learning objective(s)	Evaluate and choose the best business model for a software application in terms of economic feasibility and impact
Learning scenario description	
In this learning scenario, university students from the Computer Science domain learn how to evaluate and select the optimal business model for a software application, considering economic feasibility and impact. Real-world case studies are presented to students illustrating how business models can be applied and emphasising the importance of economic feasibility. In teams, students are assigned distinct case studies, compelling them to conduct in-depth analyses, identify strengths and weaknesses, and prepare presentations for their peers. Over the course of the scenario, students learn about business model components and economic feasibility metrics. Case studies and material with the metrics can be found from OERs. They present their findings and recommendations, eventually choosing the most fitting business model for their respective case studies.	
What does the trainer/teacher/educator expect to retrieve from the ENCORE platform?	
The expectation is to find resources that include business models or metrics for evaluating economic feasibility.	
How could the ENCORE system be explored to find the needed resources?	
Keywords: business model.	
What the trainer/teacher/educator found in the ENCORE platform?	
We explored the map of concepts to search for OERs that relate business model with the digital domain/case studies. One OER is found and evaluated by looking at the related link: https://ocw.mit.edu/courses/15-566-information-technology-as-an-integrating-force-in-manufacturing-spring-2003/. The OER is not recent but includes a complete course, with multiple resources including slides, references, lecture notes and assignments. Within the lecture notes we found good references for theory (such as models). These resources are both related to business (entrepreneurial) and digital fields. Within the assignments we also found indications on how to describe business aspects in the digital domain that could be used in the scenario. We also analysed a second OER that is a book (textbook): https://library.oapen.org/bitstream/id/e180ab7e-2424-4506-9b93-e8f243f3ac65/2012_Book_ManifestoOfTheNewEconomy.pdf. It provides material for reviewing concepts that are relevant for the scenario introducing different concepts that can be used by the students for evaluating the business models. Some case studies are also described.	
How could the trainer/teacher/educator improve his/her planning/design for learning (as a form of preparing teaching) with an open educational approach?	
The ENCORE platform supported us in identifying potential open educational resources for integration into our course.	

Scenario 2

Table 7. Scenario 2.

Teaching SDG # 12 : responsible consumption and production	
Skills' Area	Green
Educational context	University
Target	Students of a Master Program in Product Development
Learning objective(s)	Design a system that fosters responsible consumption

Learning scenario description

The teaching is a module made out of 5 lectures that focuses on how the "9R" principles can be used for the development of a product for responsible consumption. There is a need to reorganise the teaching activity as the concept of "responsible" consumption needs to be clarified or explained, and to be impacted "by design" with new products and services.
We started by creating our learning objectives:
LO1: Design/Create a system that fosters responsible consumption
    L1.1. Describe key definitions of responsible consumption
    L1.2. Explain how the 9Rs how the "9R" principles can be used for the development of a product for sustainable consumption.
    L1.3. Apply design principles that foster responsible consumption
    L1.4. Evaluate the ability a product to foster responsible consumption

What does the trainer/teacher/educator expect to retrieve from the ENCORE platform?
The expectation is to find resources that relate to "responsible consumption".

How could the ENCORE system be explored to find the needed resources?
Keywords: responsible consumption, sustainable development goals

What the trainer/teacher/educator found in the ENCORE platform?
We found 33 resources. For the "Plan" phase, we selected an OER and "consumption" as concept. We started to create a path setting the relationships among the general LO (learning object) and the sub LO, with the learning activities. We then started to connect assessment to the LO and the learning activities. We then started to map the "resources" to our learning activities.

How could the trainer/teacher/educator improve his/her planning/design for learning (as a form of preparing teaching) with an open educational approach?
The open educational approach can be a valid approach to have and reuse up-to-date resources, to open up one's teaching.

Scenario 3

Table 8. Scenario 3.

Artificial intelligence and Sustainability	
Skills' Area	Green
Educational context	VET training
Target	Students
Learning objective(s)	Judge ethical and sustainability implications of AI techniques in the development of products and services.
Learning scenario description	
Consulting resources selected by the trainer - concerning to AI basics, Energy consumption basics, and Relationship between technology consumption and sustainability - students will be able to: L1.1 Understand the energy consumption of AI techniques L1.2 Compare among different training methods that are cost effective L1.3 Judge the adequacy to exploit AI for different kinds of tasks	
What does the trainer/teacher/educator expect to retrieve from the ENCORE platform?	
To prepare for this teaching activity, the instructor begins by searching for Open Educational Resources (OER) that can enhance the learning experience. Keywords such as "AI energy consumption," "cost-effective AI training methods," and "AI applications in energy" will be used. [Additionally, the instructor reaches out to experts in the field through professional networks and academic forums to gather relevant resources and insights.]	
How could the ENCORE system be explored to find the needed resources?	
Keywords: AI energy consumption, cost-effective AI training methods, AI applications in energy	
What the trainer/teacher/educator found in the ENCORE platform?	
Upon interaction with the ENCORE platform, the instructor discovers a wealth of OER materials, including video lectures, research papers, interactive simulations, and case studies. These resources cover various AI techniques such as deep learning, reinforcement learning, and transfer learning in the context of energy management. Furthermore, the platform provides forums for educators to discuss best practices in teaching this subject, fostering a collaborative environment.	
How could the trainer/teacher/educator improve his/her planning/design for learning (as a form of preparing teaching) with an open educational approach?	
To further improve the planning and design of the course with an open educational approach, the instructor could curate a customised learning pathway using the OER materials found on the ENCORE platform. This pathway can be tailored to different levels of expertise and include real-world examples and projects related to the local tech industry. Moreover, fostering student engagement through discussion forums and collaborative assignments could enhance the learning experience. The use of OER not only enriches the educational content but also promotes affordability and accessibility for students, aligning with the goal of teaching cost-effective AI techniques for energy management in this tech-savvy region.	

Table 9. Scenario 4.

Developing a Project	
Skills' Area	Entrepreneurial
Educational context	University
Target	Students
Learning objective(s)	Develop a successful business model
Learning scenario description	
Student teams use design thinking and creativity methods to develop a promising idea from a validated problem/need situation. Building on this, they learn how to develop a successful business model from their idea using interview techniques, value proposition design, business modelling, lean startup, and prototyping Strength-oriented group work in complementary. The course focuses on the topics of creating a project based on entrepreneurial skills, with methods like Problem framing, User research, Interview training, Persona development, Ideation, Business Model Canvas, Pitch Training, Prototyping. The course will start with a problem deep-dive. Through extensive research, it will be studied a problematic issue to identify the source of the problem. The next steps will be mapping the customers and users of their solution and creating a product or service vision. In the pitch training, participants will learn how to present the aggregated data in a concise audience-oriented manner. Further every team, once formed, will undergo several mentoring sessions on business model creation. The basis for these sessions is the sustainable business model canvas.	
What does the trainer/teacher/educator expect to retrieve from the ENCORE platform?	
The expectation is to find resources that relate to our topics, analyse the resources found and choose one of them and save it.	
How could the ENCORE system be explored to find the needed resources?	
Keywords: Entrepreneurship, Social, Sustainability, Design Thinking	
What the trainer/teacher/educator found in the ENCORE platform?	
We found some interesting resources.	
How could the trainer/teacher/educator improve his/her planning/design for learning (as a form of preparing teaching) with an open educational approach?	
Thanks to an open educational approach learners will have more content to integrate the traditional learning path. Different perspectives to approach their studies. You can create a tailor made course with an individual learning experience.	

Future tracks

Interesting suggestions for improving the ENCORE platform emerged from the workshop. We have summarised them in the following points:

- increase the number of available keywords;
- give the possibility to be able to create a learning path without having selected a OER;

- increase the number of the key concepts associated with learning path/allow new ones to be entered manually;
- as reviewing the OER and associated resources sometimes can be so time consuming (e.g., when the resource is a complete course or an entire book), the system can help in enhancing the process of defining and refining the learning objective and in structuring the learning scenario accordingly (focusing on the activity and the assessment process) → To support this point, we have implemented these suggestions in the Pedagogical Guidelines (Objective-based design: Bloom's Revised Taxonomy).

Improved version of scenarios

The improved version of all scenarios yielded the following:

Learning scenarios - developed taking into consideration skill investigated, objective, and educational action - were designed for 69% on "digital" skills, 25% on entrepreneurial skills, and only 6% of cases (1 out of 16) on green skills (Table 10).

Table 10. Categorical variables: Type of DGE Skills, Level of Bloom's Taxonomy and Support to retrieve relevant resources.

Variable	Values	Freqs	%
Type of Skills	Digital	11	68,8%
	Entrepreneurship	4	25%
	Green	1	6,2%
LBT	Remember	7	21.9%
	Understand	16	50%
	Apply	4	12,5%
	Analize	3	9,4%
	Evaluate	2	6,2%
	Create	0	0%
Support perceived	High	3	18,8%
	Med	6	43,8%
	Low	7	37,5%

Regarding the predisposed learning objectives, about 70% of the cases dwelt on the first levels of Bloom's taxonomy, namely "remember" (22%) and "understand" (50%), and in fewer cases, less frequently, the higher levels of the taxonomy were pursued (analyse: 9.5%; apply: 12.5%, evaluate: 6%).

Regarding the participants' perceptions about the support of the platform and ENCORE, in terms of relevant resources to pursue their goal, about 44% of cases found a "low" level of support obtained, and 38% expressed some neutrality (indicated with "med"). In comparison, only 19% of cases (3 out of 16) reported a "high" result of support.

The corpus of responses given about the description of the intended learning goal was also subjected to linguistic analysis, using R software (https://www.r-project.org/), and a co-occurrence and frequency analysis using VOS Viewer (https://www.vosviewer.com/): thus, it was possible to trace and visualise the most frequently used words (Figure 11) and the clustering in nodes of them (Figure 12).
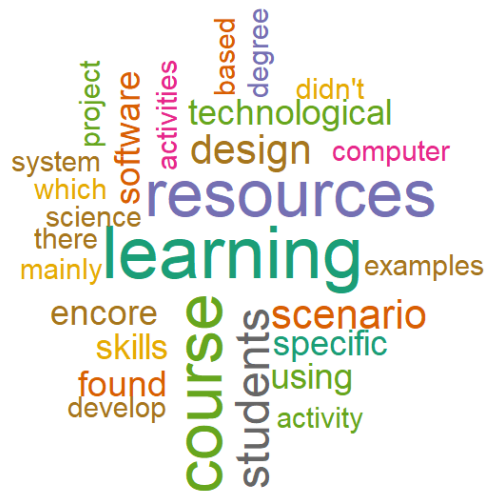
Figure 11. Wordcloud of the most frequent words.
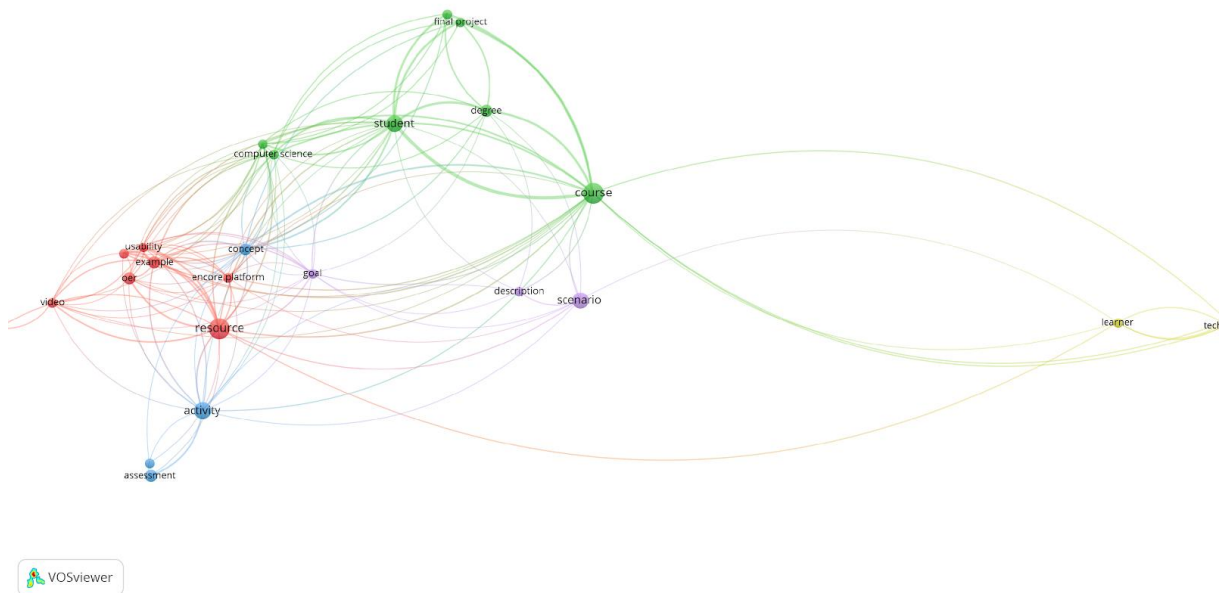
Figure 12. Clusters map.

From the most frequent words and clustering, it is possible to see that the most frequently used words are certainly "resources" (freq. 9), "learning" (freq. 10), "course" (freq. 9), and "students" (freq. 6), showing that we are working on the use and integration of resources in learning and teaching processes, as well as with the design of courses for students. The cluster map also highlights how the concept of "resource" (red cluster) is connected to the concept of "encore platform," "usability," and "example." This would support the idea that the ENCORE project also aims to offer good examples of resource detection and utilisation. The concept of "activity" (blue cluster) is much more connected to the processes of "assessment" and "concept" because we refer to a more practical implementation of theoretical reflection. The green cluster connects, among others, the idea of "course", "student", and "computer science", emphasising the aspect more related to using a computer science approach to design and conduct courses for students. Finally, the last cluster (yellow cluster) emphasises the concepts of "tech", "NLP", and "learner", referring to the more specific technology and model used in research to test learning. It is no coincidence that this cluster is directly related to the green cluster of "course," since we are always talking about practical application.

Through the support of R software, sentiment analysis was conducted on the same corpus, which is a text analysis technique that uses computational linguistics and natural language processing to recognize the polarity of a text corpus (positive, negative, and neutral sentiment). An initial reading of the results obtained showed that there were mostly neutral (87.5%) and minimally negative (12.5%) sentiments when it came to the effectiveness of the ENCORE project in achieving resources and supporting its goal (Figure 13). From this clear polarisation, later, applying the right emotional model to the script, the percentages of which feelings participants felt also emerged: trust (75%), joy (37.5%), and fear (12.5%). Emotions that could validate the idea of approaching a project in progress and with a thousand potentials (Figure 14).
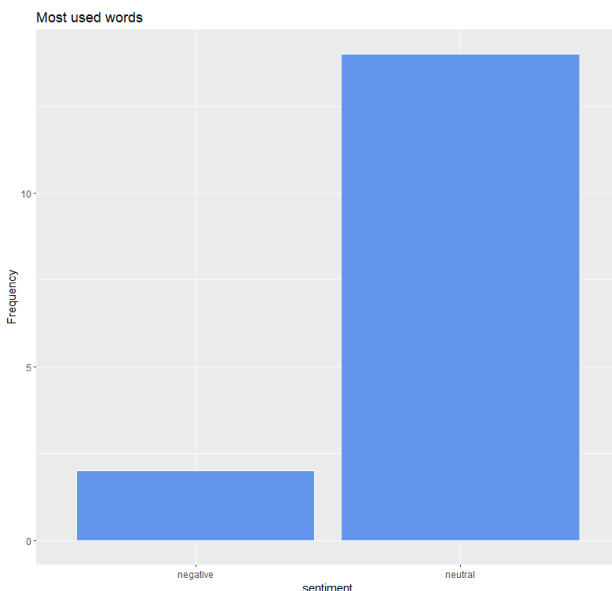

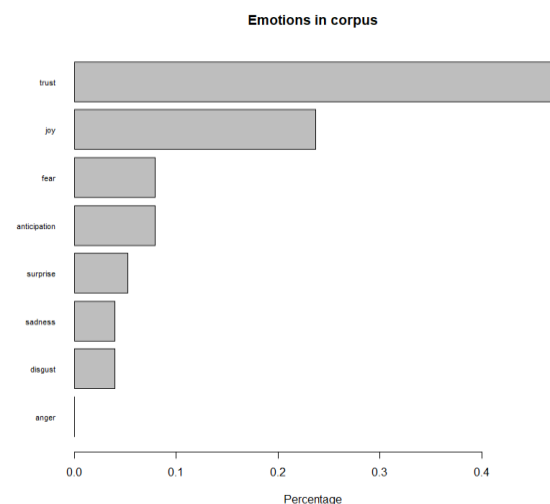Figure 13. Polarization Sentiments.   Figure 14. Emotions in corpus.

Ultimately, the corpus of responses with reference to the perception of the most relevant features found about ENCORE was collected and analysed linguistically and conceptually with the support of R

software. The corpus consisting of 545 tokens was cleaned through some steps of computational linguistics, and in the end, taking into account words with at least 5 characters and at least 3 occurrences, 14 words were considered. Among them, the 10 most frequently used are visible in the wordcloud below (Figure 15).

Figure 15. Wordcloud: 10 most frequent words.

These highlighted the idea that after the ENCORE pathway, the focus turned to finding resources, but more importantly to more accurately defining concepts and activities useful for both learning and assessment (see reference to the words "assessment" and "usability").

Then, integrating this initial linguistic analysis with a content analysis, some positive and some negative aspects were explored. In this body of diverse perspectives, where the focus was primarily on the exploration features of open educational resources (OERs) and their usability, a common concern about the low quality of these OERs themselves was read. Indeed, in some contributions, ENCORE's advanced search engine was mentioned as a valuable tool. It allowed users to discover potentially useful resources for their courses, and the filtering of OERs through the concept map proved useful in selecting the best resources for specific learning objectives. All valuable aspects for their instructional planning. In other cases, issues related to the availability of resources, affecting the usability of the platform, and the need for smarter features such as labels, colours, and restrictions to improve the planning process were discussed.

The critical issues are presented only as constraints from which to implement and improve the entire project. Despite the challenges, many elements were found to be useful for instructional design, and there is only improvement to be made.

ANNEX IV

Tools to build research-based pedagogical guidelines

Pedagogical Guidelines - Internal Piloting & Experience/Professional learning research - DELPHI

Plan	Activities connected to ENCORE internal meeting. At least 1 person per partner institution (12) takes part in the validation of pedagogical guidelines
Outcome	T5.1. "Validated set of pedagogical guidelines" + resources for the T5.2. "Training Materials for Staff Development"

WP5 Activity	Instrument	Dimensions	Items	Implementation	Participants	Resources
Validation of Pedagogical Guidelines - Delphi Structure and Approach	Individual Survey	Pedagogical Guidelines Whole structure and dimensions	LIKERT SCALE 1-5 Content Clarity Relevance and Completeness Accuracy and Validity Organization and Structure Usability and Readability Overall Impression OPEN Suggestions for improvement	Gotheborg Meeting: Survey GoogleForm with Access to the Pedagogical Guidelines	Experts from ENCORE project	Presentation OPEN EDUCATION + ENCORE SYSTEM Link to GoogleForm in progress Integrated relevant excerpts from the pedagogical guidelines document
		Open Education Past, Present, Future The Open Educator				
		OER: Educator point of view (The opportunity offered by OER) OER: Student point of view				
		The ENCORE approach		Gotheborg Meeting: Survey GoogleForm	Partner developers (PISA, SALAMANCA, FBK)	
	Workshop	Future Learning Scenarios Creation - Becoming an "Smart" Open Educator	Activity 1: using ENCORE to prepare teaching (GREEN) Activity 2: using ENCORE for teaching (GREEN) Activity 3: Using ENCORE to evaluate (GREEN, ENTREPRENEURIAL) Activity 4: using ENCORE with your students (GREEN, ENTREPRENEURIAL,	Gotheborg Meeting: Teamwork	All ENCORE partners, online and insite	Presentation Worksheets with templates

			DIGITAL) Activity 5: ENCORE usage by your students (GREEN, ENTREPRENEURIAL, DIGITAL)			
	Testimonials	Actual Practices and Future Learning Scenarios "Being an Open Educator"	How do you engage/have you engaged/do you plan to engage with OER in your educational/professional practice? What are/do you think are the good things, but also the trickythings in using OER in your educational/professional practice? What is the situation of Open Education in your institution or your region or country? What is the situation regarding the use of OER in your institution or in your region or country? How will you engage with ENCORE, with students, workers, or other educators?	Gotheborg Meeting, Interviews	One ENCORE partner per institution	Video-folder

Pedagogical Guidelines - Internal Piloting & Experience/Professional learning research - EDUCATHONS

Plan Onsite or online activities organised in at least 4 ENCORE institutions from January to February 2024. Ideally, the sample should be composed by faculty, students, trainers and trainees

Outcome T5.4. "Educathons" with embedded T.3 "Eval UTAUT" and accomplishing training materials for T.2

WP5 Activity	Instrument	Dimensions	Items	Implementation	Participants	Resources
Educathons	Registration Form	Contact info	Name, Surname, Gender, Age, Company, Educathon type	Prior to the Educathon	Guests from ENCORE partners	Link to GoogleForm in progress
	Ex ante evaluation: How Open I am?	Using Licences Implementing Practices	Self-test, 21 items (7x4) w feedback	Beginning of the Educathon		Moodle Environment: Presentation OPEN EDUCATION + ENCORE SYSTEM

	Collaborating with the Institution					Quiz Ex-ante Quiz Ex-post
	Open Recognition					
Ex-post evaluation: How open I could be?	Using Licences					
	Implementing Practices					
	Collaborating with the Institution	Self-test, 21 items (7x4) w/ specific and general feedback	Beginning of the Educathon			
	Open Recognition					
Ex-post evaluation: UTAUT survey	Overall questions	Do you think your teaching could change with OE and smart OER-ENCORE? Do you think your institution is ready to OE and smart OER-ENCORE? Which advantages for you as a teacher? Which advantages for your students? Do you think the OER were of actual educational quality (1-5 statements)? To which extent did you changed the pathway and resources gathered through the Educational Enablers? === Performance Expectancy Effort Expectancy Social Influence				Moodle Survey/ OR Googledoc
	UTAUT questions	Facilitating Conditions	End of Educathon			
Artefact	Learning Design Including ENCORE	Presence of OER Originality of OER integration Presence of integration of Green /	End of Educathon			Template Moodle Assignment to share LD

			Entrepreneurial / Digital Effectiveness of OER integration			
	Open Recognition	Learning Design Including ENCORE	Open Educator - Aware Open Educator - Explorer Open Educator - Practitioner Open Educator - Expert	After Educathon		OpenEducator badges

Pedagogical Guidelines - Internal Piloting & Experience/Professional learning research - PILOTS

Plan Online activities organised in at least 4 ENCORE institutions from February to April '24. Ideally, the sample should be composed by faculty, students, trainers and trainees

Outcome T5.4. "Educathons" with embedded T.3 "Eval UTAUT" and accomplishing training materials for T.2

WP5 Activity	Instrument	Dimensions	Items	Implementation	Participants	Resources
Pilots	Registration Form	Contact info	Name, Surname, Gender, Age, Company, Pilot type	Prior to the Pilot	Open Participation w support of partners	Link to GoogleForm in progress
	Ex ante evaluation: How Open I am?	Using Licences				Enriched Moodle Environment: Presentation/ H5P with OPEN EDUCATION + ENCORE SYSTEM Quiz Ex-Ante Quiz Ex-Post
		Implementing Practices				
		Collaborating with the Institution				
		Open Recognition	Self-test, 21 items (7x4) w feedback	Beginning of the Pilot		
	Ex-post evaluation: How open I could be?	Using Licences				
		Implementing Practices				
		Collaborating with the Institution				
		Open Recognition	Self-test, 21 items (7x4) w/ specific and general feedback	Beginning of the Pilot		

		Do you think your teaching could change with OE and smart OER-ENCORE? Do you think your institution is ready to OE and smart OER-ENCORE? Which advantages for you as a teacher? Which advantages for your students? Do you think the OER were of actual educational quality (1-5 statements)? To which extent did you changed the pathway and resources gathered through the Educational Enablers? === Performance Expectancy Effort Expectancy			
Ex-post evaluation: UTAUT survey	Overall questions UTAUT questions	Social Influence Facilitating Conditions	End of Pilot		Moodle Survey/ OR Googledoc
Artefact	Learning Design Including ENCORE	Presence of OER Originality of OER integration Presence of integration of Green / Entrepreneurial / Digital Effectiveness of OER integration	End of Pilot		Template Moodle Assignment to share LD
Open Recognition	Learning Design Including ENCORE	Open Educator - Aware Open Educator - Explorer Open Educator - Practitioner Open Educator - Expert	After Pilot		OpenEducator badges

NOTES:

The self-test will be part of pilots and educathons, and will be used to understand the impact on professional learning and identity through the exposition to the ENCORE approach. It is based on the following self-reflection statements taken from DigCompEdu (DigCompEdu, JRC 2017), expanded through the Open Digital Framework (JRC 2016, 2019).

The OpenBadges Recognition structure and the Self-test notes can be traced in this document.

The presentations might be made in open environments like Canva or GDrive in case there are difficulties of access to Moodle [Not recommended option]

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