Enriching Circular use of OER for Education

ENCORE Pedagogical Guidelines

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Lead author	Juliana E. Raffaghelli
Other authors	Francesca Crudele
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Executive Summary

This document introduces the ENCORE approach to institutions as well as to educators and trainers, interested in using it. The ENCORE Approach integrates AI-driven tools to retrieve relevant Open Educational Resources (OERs) and enhance teaching and learning. Its primary goal is to guide teachers, trainers, and educators—especially in Higher Education and Vocational Education and Training—in designing courses with learning outcomes directly linked to the skills required to tackle contemporary challenges such as digitalisation, climate change, and post-COVID economic recovery. To this end, the approach emphasizes collecting and organising resources through the lens of the Digital, Green, and Entrepreneurial (DGE) frameworks developed by the EU Commission. Therefore, ENCORE offers a way to develop digital, green, and entrepreneurial competences in a transforming society. The ENCORE approach is structured across at least three technological layers—a DGE-based search engine, a database aggregating OERs under the DGE skills, and educational enablers that support learning design through pedagogical concepts like Bloom's Revised Taxonomy—.

However, engagement with the ENCORE approach necessitates support. Indeed, educators can be accompanied to create context-specific learning scenarios, as professional learning is grounded in practice and social interaction. Sometimes, institutions will have little time to implement such support; and sometimes, they will be willing to devote more time and deeper exploration with educators and trainers. Also, self-paced learning might be considered as a strategy.

Therefore, this document will provide guidance. Beyond providing information about the key components of the ENCORE approach, we offer three perspectives for institutions, educators, trainers to adopt it: a) a Crash Course for senior trainers and professoriate in Higher Education Institutions; b) an Intensive Course prepared for junior trainers, pre-service teachers and educators, that guides them not only to understand ENCORE but to design for learning with the ENCORE technological features; c) a Self-paced course, elaborated for all categories of educators, who can find their way to engage with the ENCORE affordances.
Additionally, we provide tools to assess the impact of understanding and using Open Education, supporting a more conscious and informed approach in this direction. This section includes self-tests and surveys to measure OER adoption and open practices, as well as to support reflection on DGE competencies and the overall acceptance and effectiveness of the ENCORE Approach. These resources help educators and trainers track progress, reflect and refine their teaching practices, and measure the influence of open practices and technologies in education.

Hopefully, the appropriate application of ENCORE within strategic institutional contexts will encourage educators and learners to reflect on teaching and learning practices, fostering meaningful learning experiences and professional development.

In a nutshell, with the present document we aim not only to explain and motivate the use of ENCORE. In time, ENCORE principles might be a driver of a collaborative human-machine environment.

Staff Development to Embrace ENCORE

Staff development in lifelong learning institutions has become a crucial endeavour to support quality (Francis, 1975). Over time, the concept evolved, contextualizing itself within the development of formal and informal practices centered on student-centered design, self-reflection, and participatory and institutional engagement (Lewis, 1996). Consequently, ongoing theoretical reflections on balancing these core components have progressively solidified into a broader program encompassing personal teaching skills, organizational development, and the integration of research, teaching, and third-mission activities (Fedeli et al., 2020; Lotti & Lampugnani, 2020; De Rossi & Fedeli, 2022).

For Faculty Development (staff development in the area of Higher Education) from the Bologna Process to the Europe 2020 strategy, joint efforts have been made to promote policies and environments that foster the development of educators' skills. The idea has taken shape that, through coordinated FD actions — whether in organized forms or within dedicated centers — a culture of quality can be cultivated, becoming a means to build a more complex and effective teaching system (De Rossi & Fedeli, 2022). However, recent reports, such as those from the EFFECT project, European Forum for Enhanced Collaboration in Teaching (2019), promoted by the European Union as a framework for initial and continuous training of university faculty, have highlighted the persistent lack of national FD strategies and professional development initiatives. On an organizational level, the university system is therefore urged "to rethink its identity and mission to provide adequate responses to the new needs and skills required by the world of education, the workforce, and global society" (Di Palma & Belfiore, 2020, p. 283; De Rossi & Fedeli, 2022).
In response to this feedback, many universities, especially at the international level, have started to implement programs aimed at professional development. For example, the Federation of Dutch Universities has introduced a certification for university teachers (University Teaching Qualification - UTQ) after achieving specific competencies in teaching design, strategies, and methodologies (Lampugnani, 2020). In this context, the University of Padua launched the "Teaching4Learning@Unipd" (T4L - https://www.unipd.it/teaching4learning) program in 2016, aiming to introduce active learning methods and place students at the center of the educational experience (De Marchi, 2023, p. 13). In 2021, a multidisciplinary Monitoring Group was established to analyze the effectiveness of the structured program and provide recommendations for continuous improvement, integrating the collected data with organizational practices and promoting a data-driven quality culture (Raffaghelli et al., 2021). Specific and ongoing training appears to be a suitable response for the comprehensive development of these necessary skills and meta-skills.

In the area of teaching and training, within the changing context of lifelong learning, driven by the need for green, digital, and entrepreneurial skills in our societies, is opening the door to new challenges for educators and teachers. In this context, teachers' Continuous Professional Development (CPD), also known as in-service professional training, is a key factor in improving the quality of education and learning (Caena, 2014; Darling-Hammond, 2017). Regularly updating teachers' skills is critical, especially in rapidly evolving contexts, where selecting and adopting high-quality resources for active teaching methodologies is essential. Therefore, investing in innovative and effective CPD is a strategic priority (United Nations, 2015).
The training of teachers, including university educators and vocational education and training (VET) trainers, remains a crucial challenge as well as an important goal for all institutions in this context, especially when confronted with an open perspective (Raffaghelli, 2014; Vladimirschi, 2018).
We are immersed in an “open” reality (“The Open Definition,” 2024), where knowledge can be freely accessed, used, modified, and shared without restrictions. In the realm of education, this concept of

openness emerged over a decade ago as a promising avenue to maximize the potential of existing educational resources, promote more inclusive learning models, and support lifelong learning. In the ensuing decades, governments have consistently recognized the value of open education as a key driver for modernizing educational systems, reducing barriers to accessing quality education, and bridging the gap between formal and nonformal learning pathways (European Commission, 9th January 2025).
A central element of the concept of open education is OER, or Open Educational Resources (UNESCO, 2011). The recent growth of repositories containing freely available and reusable educational materials (Wiley & Hilton, 2018) has provided teachers with a vast wealth of information and the ability to personalize interactions with students while staying attuned to the demands of an ever-evolving technological landscape (Inamorato Dos Santos et al., 2016).

However, the professional development of educational personnel does not end with the mere use of tools or resources, nor with training alone. Instead, it involves the introduction of transformative practices, providing cases and resources for educators to explore and experiment with (Ranieri et al., 2018, 2019). These practices stimulate reflexivity and foster new critical perspectives on complex issues, such as the ethical use of AI in education or the ecological transition (Kuhn & Raffaghelli, 2023).

One of the most prominent criticisms of the integration of digital technologies is the tendency to view them as universal solutions to educational problems, without considering the implications for sustainability and human agency (Sancho-Gil et al., 2020; Selwyn, 2023). Such professional learning, therefore, requires a critical approach to any technology that puts educational and therefore human problems first and integrates technologies to promote human agency.
In this regard, the ENCORE system is designed to be incorporated into educators' practices and institutional life as a tool to be tested, commented on, emphasized, and critiqued, along circles of reflection and meaning-making. As we will explore below, the ENCORE approach lends itself to providing support for navigating the vast world of Open Educational Resources (OERs), connected to Digital, Green, and Entrepreneurial Competences to offer guidance for thinking about useful goals, reflecting on practices, designing courses, and spurring meaningful learning experiences and professional development.

This document outlines the main pedagogical guidelines, beginning with an explanation of OERs and open education and then focusing on their relevance in teaching. It also presents the ENCORE Approach in the professional development of educators in a post-pandemic and post-digital context, demonstrating how the system supports the discovery and implementation of OER connected to Digital, Gree,n and Entrepreneurial Competences.

Therefore, these guidelines offer a glimpse into the actual tools to implement educational interventions adopting the ENCORE Approach Final Version. We suggest reading this document jointly with the ENCORE Approach (Raffaghelli et al., 2023).

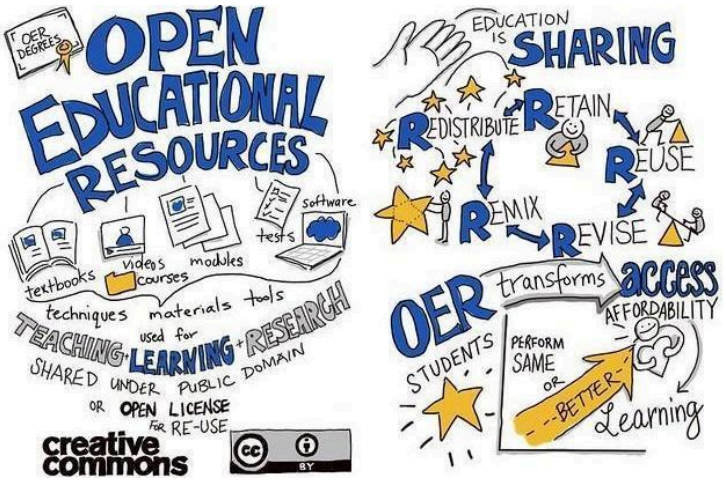
Why train educators at Open Educational Resources?

This is an initial question that every educator, university teacher, and VET trainer might ask themselves when talking about Open culture and the use of Open Educational Resources (OERs).

Training educators in Open Educational Resources (OERs) is a transformative journey that reshapes the very essence of modern teaching. The concept of OER was coined during UNESCO's 2002 Forum (see UNESCO, 2011) on the Impact of Open Courseware for Higher Education in Developing Countries in response to the impressive amount of educational content being offered freely and openly for anyone to use through the Internet.

As Wiley and Hilton (2018) explain, OERs empower users to *retain, reuse, modify, remix, and redistribute* (the 5Rs) learning materials, creating a dynamic environment where content evolves through collaboration and creativity (see Figure 1). The William and Flora Hewlett Foundation (2013) highlights that this approach democratizes education by providing free, high-quality resources to learners worldwide, breaking down traditional barriers, and ensuring equitable access to knowledge (The William and Flora Hewlett Foundation, 2013).

Figure 1. Visual representation of the OER characteristics.



Source: Giulia Forsythe. https://brocku.ca/library/oer/

Imagine a classroom where every student benefits from adaptable materials that meet their unique learning needs—a vision that aligns with UNESCO's (2002, 2011) call for unrestricted, innovative educational practices. By training teachers to harness the power of OERs, we not only enhance pedagogical methods and foster learner-centered experiences (Brown & Adler, 2008; Constantino & Raffaghelli, 2021) but also build a vibrant, shared repository of collective knowledge that continuously enriches the educational landscape.

From then on, the use of OER has been considered a valid strategy to renew educational practices (Conole, 2013b) based on the discussion about learner-centered approaches supported by access to free knowledge beyond the curriculum (Brown & Adler, 2008; Constantino & Raffaghelli, 2021).

What do we mean by Open Education?

We live in an "open" reality ("The Open Definition," 2024), characterized by free access to and sharing of knowledge, a principle essential for scientific processes. OERs are one of the key components of the concept of "openness," especially in "Open Education," an umbrella term that

encompasses several meanings, from resources to practices, from institutionality to individuality of educational growth (EU Science HUB, https://joint-research-centre.ec.europa.eu/what-open-education_en).

Open Education has evolved from the initial embrace of Open Educational Resources (OER) as a strategy to democratise education—transforming what was once exclusive into a publicly accessible treasure trove of knowledge (Andrade et al., 2011; UNESCO, 2002, 2011)—to a broader philosophy that champions innovative teaching practices and institutional collaboration. As Inamorato et al. (2016, p. 10) note, "open education is a way of carrying out education, often using digital technologies" to remove barriers and make learning accessible and customisable for all.

Today's dynamic, digital, and AI-mediated reality, accelerated by the pandemic and emerging tools like ChatGPT (Tlili et al., 2023), challenges educators to rethink their roles and adopt Open Educational Practices (OEP) that extend beyond mere resource sharing (Ossiannilsson et al., 2020). It is not only about MOOCs and OERs but also about the democratic opening of education, and the modernization and innovation of our higher education systems in Europe through the use of digital technologies (Ossiannilsson et al., 2020).

Bolstered by initiatives such as the EU's Digital Education Action Plan (European Commission, 2023) and the evolving definition of openness (The Open Definition, 2024), Open Education now represents a transformative approach that not only provides access to quality materials but also fosters a culture of lifelong, inclusive, and resilient learning.

To learn more about OER and Open Education, see *Annex I* of The ENCORE Approach (Raffaghelli et al., 2023).

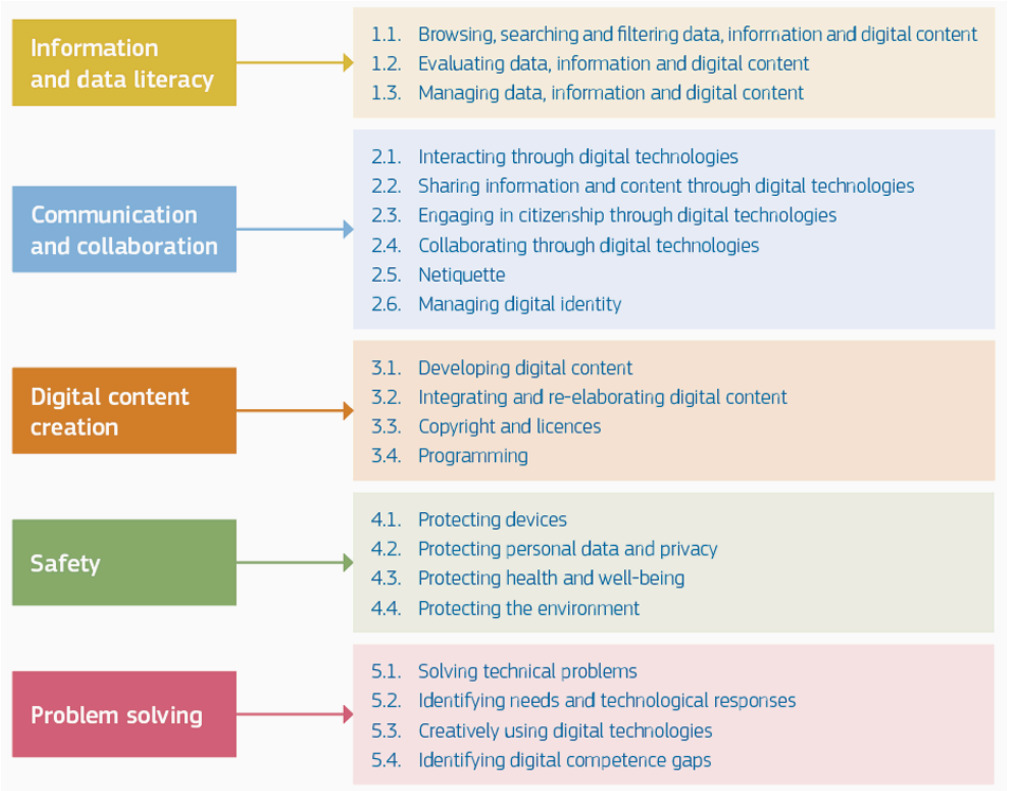
To deepen the strategies to engage teachers/trainers/educators and learners in the usage of OERs, see *Annex II* of The ENCORE Approach (op. cit.).

Why focus on Digital, Green, Entrepreneurial Competencies?

The ENCORE Approach aligns with three essential competence frameworks crucial for lifelong learning and societal development in line with EU policy. These frameworks - Digital, Entrepreneurial, and Green Competence - are central to fostering digital transformation, the green transition, and an inclusive, innovative society.

The Digital Competence is underpinned by the DigComp 2.2 framework (see Figure 2), which outlines 21 competencies across five key areas, supporting the improvement of citizens' digital skills (Vuorikari et al., 2022).

Figure 2. The DigComp 2.2 conceptual reference model.



Source: Vuorikari et al., 2022, p. 4.

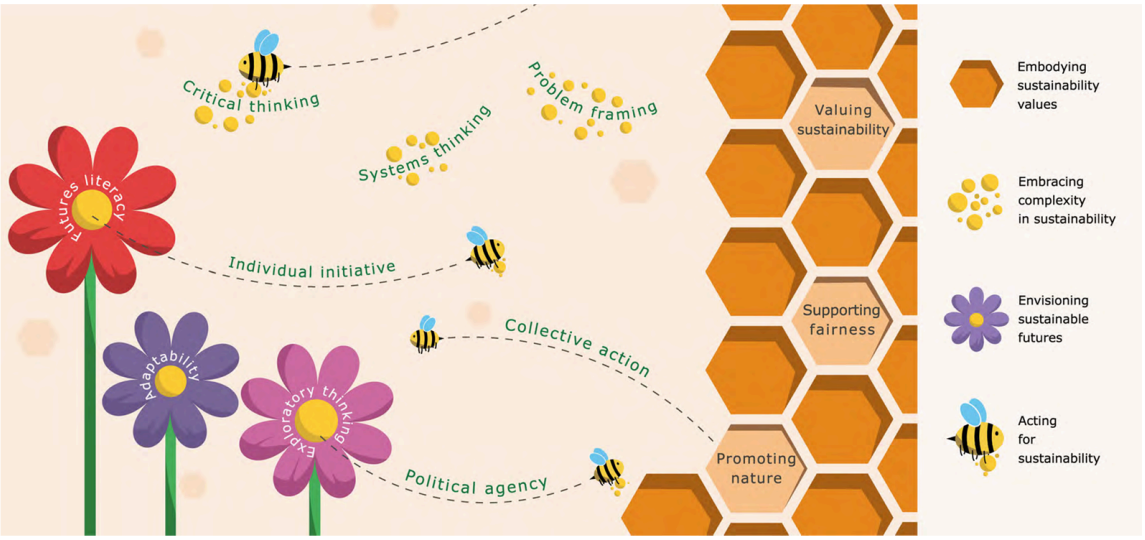
The Entrepreneurial Competence, guided by the EntreComp framework, identifies 15 competences fundamental to cultivating entrepreneurial skills, recognising and certifying skills, and value creation (Bacigalupo et al., 2016).

Figure 3. The EntreComp reference model.

Source: EU Science Hub - Competence areas and learning progress.

The Green Competence, supported by the GreenComp framework (Bianchi et al., 2022), focuses on sustainability, promoting empathy, responsibility, and environmental awareness in learners.

Figure 4. The GreenComp reference model.



Source: Bianchi et al., 2022, p. 16.

Concluding thoughts. A relevant reflection after this discussion is that every educator should consider how to introduce through her/his educational interventions at least one of the above-mentioned competences to align with the EU contextual development. The ENCORE Approach can become relevant support in this endeavour.

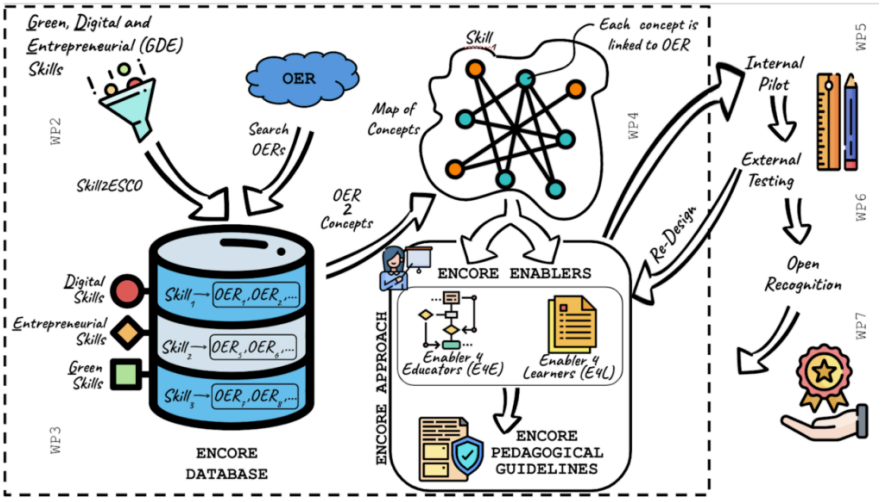
The ENCORE Approach and what it involves.

In the context of this Pedagogical Guidelines, we introduce now the ENCORE Approach, which is the set of instruments combined with potential activities to endow users to engage with OER and the DGE development. Therefore, the ENCORE approach is a tool based on smart technologies to facilitate access to quality OER and subsequently support educators in their exploration of their adoption in pedagogical practices.

Through ENCORE, open education can be part of the AI-driven digital transformation. How is the ENCORE approach composed?

The ENCORE Approach is based on the following relevant components (Figure 5).

Figure 5. Components of the ENCORE Approach.



1. Data-driven Tools for Searching Quality OERs: This component focuses on using data-driven tools to search for high-quality OERs classified according to a skills taxonomy provided by ESCO (the European Framework of Skills, Competences, Qualifications, and Occupations) (https://esco.ec.europa.eu/en/classification/skill_main). ESCO offers standardized definitions, metadata, and relationships for skills across 28 languages, which aids in clear educational planning. The University of Pisa report (UNIPI, 2022) describes how Natural Language Processing (NLP) techniques were used to label the most relevant skills from ESCO and link them to the OERs in the ENCORE database, with quality verified through automated metadata analysis (UNIPI & Beam Me Up, 2022).

2. Integrated Database Organized by DGE Skills (meta-Repository of OERs): i.e. the creation of a searchable open database of quality OERs organized by DGE skills, functioning as a meta-ROER—a portal that retrieves resources from multiple repositories. According to the University of Salamanca and Beam Me Up (2023), the database was conceptualized, developed, and populated following the Dublin Core Meta-data Element Set (DCMES) schema using PostgreSQL. The process involved web scraping, data cleaning, and an indirect quantitative method to assess quality through connected metadata (UNIPI & Beam Me Up, 2022), resulting in a repository of 118,808 high-quality, accessible, English-language OERs linked to specific DGE skills.

3. Enabler for Educators – Facilitated Interface: an advanced interface designed to support educators in developing customized learning pathways based on DGE skills. As highlighted by the Bruno Kesler Foundation (FBK, 2023), this tool interfaces seamlessly with the ENCORE database, allowing educators to discover, collect, plan, and execute personalized teaching paths. It features visual tools such as Venn diagrams, concept maps, and keyword explorations, and also enables the creation of resource collections (exportable to Moodle) that connect learning goals—based on Bloom's Revised Taxonomy—with specific activities and retrieved resources.

4. Professional Development Support and Pedagogical Guidelines: provides comprehensive professional development and pedagogical guidelines, combining documentation, video resources, training materials, and activities. These resources, detailed in documents such as those by Raffaghelli et al. (2023), support the integration of the ENCORE system into daily institutional practices across universities and the VET sector. They include strategies for aligning learning objectives, activities, and assessments with ENCORE's pedagogical enablers, as well as self-assessment and evaluation techniques based on models like the Unified Theory of Acceptance User Technology.

5. Open Recognition and Digital Badge Ecosystem: The Open Recognition component introduces a system for certifying the skills acquired through the ENCORE approach, fostering a culture of professional recognition and continuous learning. This system, aligned with the Entrepreneurship Competence Framework, enables both individual users and informal communities to gain credit for their contributions, thereby encouraging entrepreneurial attitudes and facilitating knowledge co-creation across higher education, vocational training, research, and industry. Further details will be provided in the forthcoming report by *Reconnaître - Open Recognition Alliance* (OREC) (see https://project-encore.eu/results/) and are discussed in the chapter on *Discussing Certification and Recognition* of The ENCORE Approach (Raffaghelli et al., 2023).

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

Designing with the ENCORE Approach

A key pillar of the ENCORE Approach lies in its design and implementation strategies, which are firmly rooted in objective-based design principles and Bloom's Revised Taxonomy (Anderson et al., 2001). By adopting an objective-centered model, educators are guided to start with clear learning outcomes—articulated as specific verbs and objects following Krathwohl's guidelines (Krathwohl, 2002)—and to design instructional activities and assessments that align with these goals. The dynamic, non-linear flowchart inspired by Tyler (1949) underlines this continuous process of assessment and re-design, ensuring that the learning journey is both adaptive and responsive.

Bloom's Revised Taxonomy (Figure 6), with its six ascending levels—remember, understand, apply, analyze, evaluate, and create—provides a structured yet flexible framework for mapping out cognitive processes and corresponding learning activities. Although the taxonomy offers a useful scaffold for planning and assessing educational outcomes, it is applied critically within the ENCORE Approach, recognizing that learning processes are often overlapping and non-linear (Anderson et al., 2001; Conklin, 2005; Munzenmaier & Rubin, 2013).

Figure 6. Bloom's Revised Taxonomy.

Level	Level Description	Cognitive Processes	Example Verbs
REMEMBER	Recall facts and basic concepts	Recognising and Recalling	EV: List, Memorise, Identify
UNDERSTAND	Explain ideas or concepts	Interpreting and Classifying	EV: Describe, Predict, Report
APPLY	Use the information in a new situation	Executing	EV: Implement, Respond, Use
ANALYSE	Draw connections among ideas	Organising	EV: Compare, Distinguish, Question
EVALUATE	Justify a stand or decision	Checking and Critiquing	EV: Determine, Reflect, Judge
CREATE	Produce new or original work	Generating and Producing	EV: Assemble, Design, Create

Note. The definitions of levels and cognitive processes are those of Krathwohl (2002). EV means example verbs.

In uniting these elements, the ENCORE Approach offers a comprehensive, transformative pathway for educators. It integrates state-of-the-art technology for OER retrieval and quality assurance with pedagogically sound design strategies, ultimately guiding educators to design courses with learning outcomes that equip learners with the competencies necessary to navigate the challenges of digitalization, climate change, and post-COVID economic recovery. This integrative framework not only democratizes access to quality education but also fosters a vibrant, collaborative learning environment that continuously evolves through feedback, innovation, and open recognition.

Embracing the ENCORE Approach means stepping into a future where educational design is both data-informed and learner-centered—a future where every educator is empowered to create transformative learning experiences that resonate with the demands of our ever-changing world.

To know more about the ENCORE components, take a look at the ENCORE Enabler for Educators Platform and the project results HERE.

Facilitating the ENCORE Approach Integration: Recommendations for educators' professional learning

The evolving landscape of lifelong learning demands that educators address green, digital, and entrepreneurial competences—especially in higher education and adult learning contexts (Raffaghelli, 2014; Vladimirschi, 2018). Effective professional development goes beyond mere training; it requires a blend of experiential learning, peer mentoring, and problem-based approaches to build on prior knowledge (Steinert, 2020; Meyer & Murrell, 2014). Educators are encouraged to explore practical cases and resources to tackle complex issues like ethical AI and the green transition, rather than simply adopting digital technologies as a universal solution (Ranieri et al., 2018, 2019; Kuhn & Raffaghelli, 2023; Sancho-Gil et al., 2020; Selwyn, 2023). Consequently, the ENCORE system must be embedded within institutional practices as a tool for experimentation, reflection, and design thinking—promoting a critical, user-driven adoption of technology that prioritises human agency (Conole, 2013a; Raffaghelli, 2014; Design Council, 2019).

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

The following will show some modes of intervention tested during the years of ENCORE to screen effective possibilities for integrations of the Approach. The different declinations adopted present references to activities, timelines, and materials that are useful for thinking about the possible use of ENCORE in one's institutions and professionalism, according to one's own educational and professional needs.

Intensive Course for Undergraduates

The first type of intervention could be called “Intensive Training”. Upon the basis of ENCORE testing, the intensive course has been seen as useful, especially in the undergraduate setting. Some of the experiments conducted allow for interesting and inspiring reflections on implementation with one's students. In two different modes, this type of intervention was tested: 1) with a focus on OERs and DGEs to support increased knowledge about them and 2) with a specific focus on OERs and their creation from scratch, to support not only knowledge and awareness but also active participation in the Open approach.

Starting from the first setting, several moments of testing were initiated. In the University of Padua alone, 4 moments of intensive intervention were carried out, which served to fine-tune the most functional version. Based on experiments, we recommend organizing an activity in which students can reflect on their openness to the world of open educational resources (OERs) through initial and final self-assessment, using tools such as the *How Open I Am/How Open Can I Be*. This approach makes it possible to monitor the evolution of awareness and readiness toward OER throughout the activity. In between the two moments of self-assessment, it is useful to include a short presentation on OER and relevant EU policy to provide a clear and up-to-date overview of a highly relevant topic. At the end of the browsing experience, it is appropriate to offer time for guided reflection on the use of the platform and the overall activity, using feedback-gathering tools such as the *Your Opinion on the Session* test. This step fosters the processing of the experience and allows you to gather valuable insights to improve future training activities.

This compact version of experimentation may prove useful to investigate from the beginning and then the accrued level of knowledge about the Open world and its relevance. This approach helps

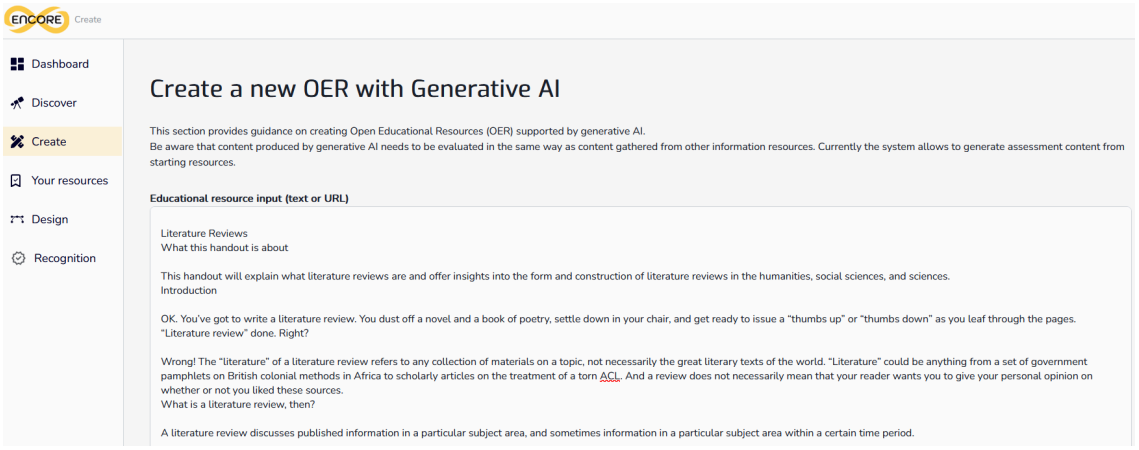
analyze how information materials and the experience of navigating the ENCORE platform contribute to increased awareness and competencies related to OER.

A second complementary approach could focus on active exploration of OER, encouraging participants to search for resources, create their own, and share them openly. This model is particularly effective when implemented in intensive workshops as demonstrated by the experimentation conducted in a 4-day workshop, each dedicated to a key aspect of integrating open educational resources (OER) into instructional design. This format provides an opportunity to work closely with individual students, guiding them through hands-on design activities and deepening their understanding of design processes in a collaborative setting.
As a result, to implement a course for undergraduates in education, but also aimed at students who might be engaged in areas of open education and science, we suggest the following structure based on 4 meetings:

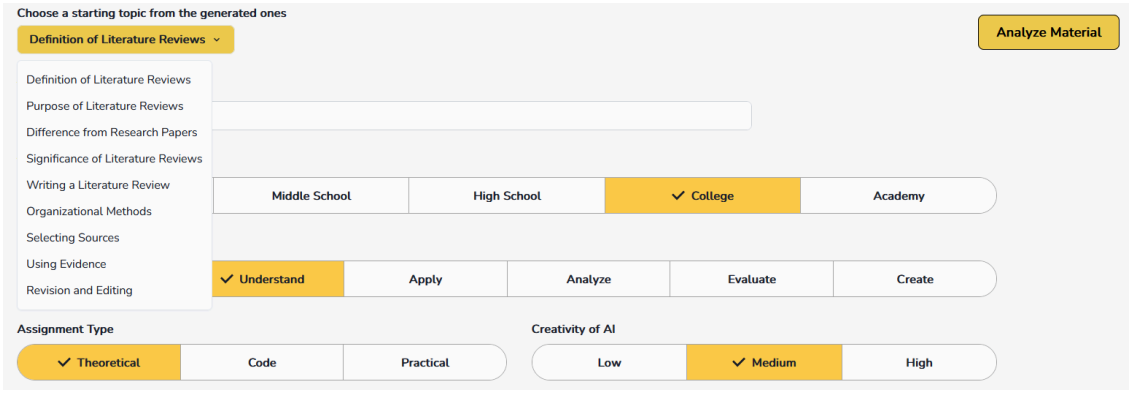
- L1-SEARCH: Begin with the “How Open Am I?” to prompt self-reflection on openness toward OERs. Then, explore the role of the educational process and assessment, with references to Bloom's Taxonomy and the Open Approach. Students, working in groups, analyze various platforms for finding and creating OERs, selecting a topic of interest to guide their exploration.
- L2-FIND AND INTEGRATE: Students design and plan an interdisciplinary instructional learning unit (UDA) focused on developing and enhancing specific skills. In alignment with the principles of openness, the UDA should be structured as an OER. To facilitate this process, you can refer to the guided mode offered by ENCORE to use your material to create a new OER (Figure 7). ENCORE acts in an interoperable and circular mode, promoting the use of OER and AI to support the creation of its open contribution that, if reloaded, will again enrich ENCORE's already rich database of usable resources.
  If you want there are also other platforms available to upload your resources like OER: for example, OER Commons (https://oercommons.org/), which has a dedicated upload page that can be used easily to format the final product and makes it easier to upload and share. Even if you upload here, the resource will then be reusable on ENCORE.
- L3-RECYCLE AND REUSE: Emphasis is placed on refining and adapting the UDA into a polished format ready for Open Access publication. Students are encouraged to consider how their resources might be reused and remixed by others.
- L4-SHARE: Conclude with a reflective session on the overall experience. Groups share their materials and complete the final "How Open Can I Be?" questionnaire to assess their growth in openness. The completed UDAs are uploaded to ENCORE, contributing to the wider educational community and reinforcing the emergence of a shared practice network.

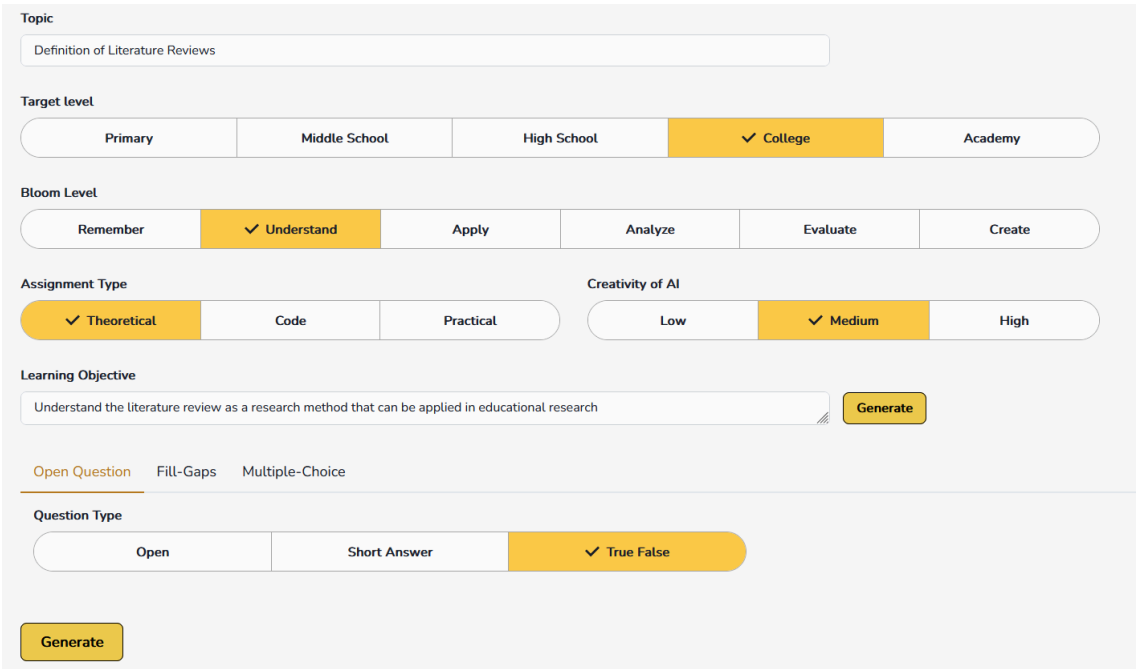
This sequence not only guides participants through the process of creating and sharing an OER but also fosters an early awareness of community-based knowledge-building and collaborative practices.

Figure 7. ENCORE creation and reuse of OER Template.

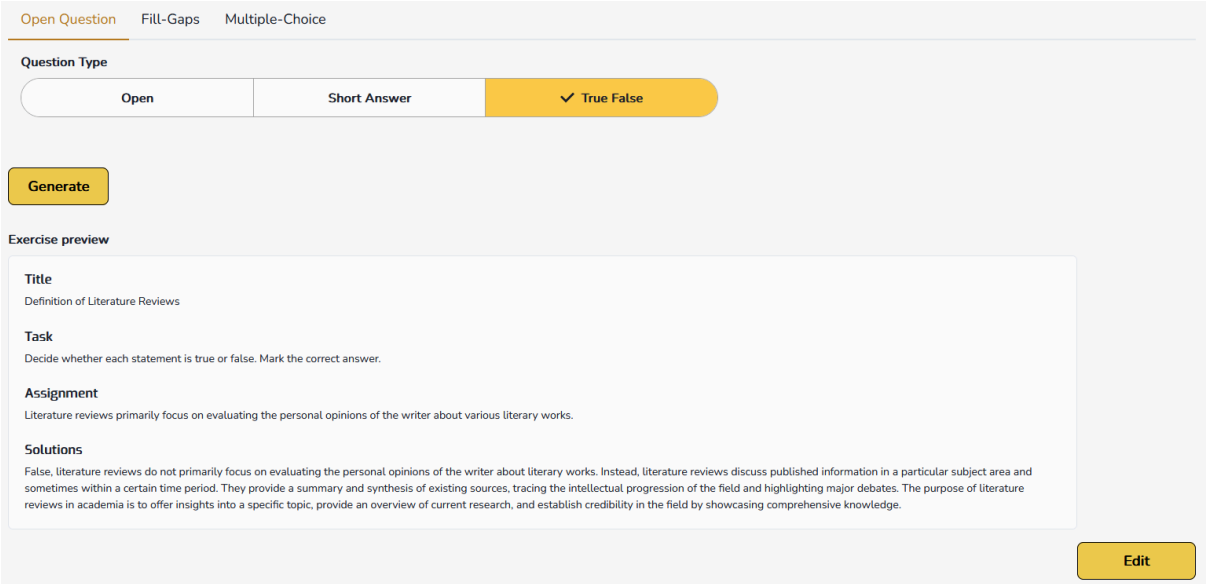


1) After the brainstorming session, the material devised can be entered into the "Create" section.





2) After uploading the material, follow the directions to structure your product. Remember to set all the parameters to generate the resource.



3) Eventually, with the support of Generative AI, one can also be supported in devising and rethinking exercises that are useful for one's goals.

Crash Course for Teachers, Educators and Trainers

A second type of intervention can be structured as a "Crash Course", particularly beneficial for teachers, academics, and trainers seeking to explore ENCORE. Unlike student-focused activities, this format is designed to accommodate the scheduling constraints of educators, allowing for both synchronous sessions and asynchronous, self-paced learning.

The course can include self-assessment tools to gauge participants' initial knowledge and openness, such as the "*How Open I Am/How Open Can I Be*" test for OER awareness, alongside a more specialized self-test focused on key transversal competencies: "*My Digital, Green, Entrepreneurial Approach to Teaching/Training*". These assessments can be tailored to the audience and any planned training objectives, with the overarching goal of exploring participants' baseline understanding of OERs and the significance of digital, green, and entrepreneurial skills in contemporary education and professional development.

To sustain engagement and enhance learning outcomes, the information materials could be designed in two complementary formats, balancing the depth of content with strategies to maintain participants' attention throughout the course.

- Start with a short presentation (*Getting Started!*), customized for the target audience — one version for educators and another for VET professionals and trainers. Each presentation begins with a theoretical overview, followed by sample case studies and practical activities. These activities can use a dedicated template to help participants design and reflect on their educational scenarios, bridging theory with practice.
- Use interactive H5P (https://h5p.org/) presentations to deepen understanding and engage participants actively: 1) the module *The ENCORE system in brief* introduces the ENCORE platform through video examples produced by European project partners (University of Pisa, University of Salamanca, and Fondazione Bruno Kessler-FBK's teams). It includes embedded activities to explore the system's features and potential applications more concretely. 2) The second module *Use Cases* proposes a collection of real-world learning scenarios, complete with critical reflection activities. Participants analyze completed cases, dissecting their

components to prepare for the hands-on phase where they develop and refine their educational scenarios.

For a hands-on exploration of Open Educational Practices (OEP), consider structuring the main practical activity with the support of the **OpenMed platform** - *Opening up Education in South-Mediterranean countries* (https://openmedproject.eu/home/) - part of an Erasmus+ co-funded project aimed at promoting the adoption of Open Educational Resources (OER) and OEP in South-Mediterranean countries (Egypt, Jordan, Morocco, and Palestine), with a focus on higher education. The platform offers the online course "Open Education: Fundamentals and Approaches," designed to build capacity for Open Education and Open Educational Resources (OER) among university teaching staff. The activity can be organized as follows:

1. **Course Exploration and Template-Based Design:**
   Begin with a section of the OpenMed course to introduce participants to foundational concepts. Then, provide a template inspired by *Project Work Step 1*, guiding them to start transforming their course, teaching practice, or training activity into an open format.
2. **Resource Search via ENCORE:**
   After the initial design phase, encourage participants to browse the ENCORE platform to discover relevant resources that can enrich their project work, promoting active exploration and critical evaluation of available OERs.
3. **Reflection and Feedback:**
   Conclude the activity with a reflective moment focused on participants' interaction with the ENCORE platform. This reflection should explore not only their perception of the resource collection but also their experience in designing a learning path. To avoid cognitive overload, consider using a shortened version of the *Your Opinion on the Session* test for a lighter, yet valuable, feedback process.

This structure helps participants progressively move from theory to practice, fostering both individual reflection and collaborative learning through the integration of Open Education tools and platforms.

Self-paced Course

Another possible intervention can be inspired by the self-paced learning environment produced to support educators' engagement with ENCORE. The self-managed mode was designed to provide teachers in HE institutions, VET and Company trainers with an open and freely accessible e-learning set to learn how to adopt the ENCORE approach.

One can, therefore, consider the self-directed course design either as an additional activity offering a comprehensive synthesis of the learning mediated by the previous types of experiments or as a stand-alone usable activity to deepen understanding of the ENCORE approach.
For example, you might launch the course with an interactive forum (*General Forum*) where participants can share opinions and ideas, fostering a collaborative space for developing communities of practice. Begin with a short questionnaire to capture the participant's attention and ask about his or her background and area of interest/experience, then move on to more detailed self-tests on openness to OER (*How Open I Am*) and the development of Digital, Green, and Entrepreneurial competences (*My Digital, Green, Entrepreneurial Approach to Teaching/Training*). These assessments can help participants gauge their current stance and envision how course insights

might influence their professional practices.
Integrate H5P interactive sessions with practical reinforcement activities focused on key topics such as Open Education and relevant policy frameworks connected (*Open, Digital, Entrepreneurial and Green Policies*), Pedagogical Guidelines to the ENCORE Approach (*ENCORE Approach Guidelines*), and an introductory overview of the ENCORE platform (*Do you know ENCORE?*). These sessions are designed to bridge theory with actionable classroom and training strategies, giving new insights into educational environments.
Guide trainers through a tutorial on creating personalized learning scenarios using the ENCORE platform (*Using ENCORE*). Provide them with a simplified scenario design template tailored to their teaching contexts, and encourage them to use a self-checklist for evaluating their scenarios. Additionally, facilitate ongoing discussion and feedback through the course forum.
Offer a strategic guide (*ENCORE within your institution*) that outlines tailored strategies for embedding the ENCORE Approach within diverse organizational contexts. This could be useful to pick up interesting insights into expanding one's practices or those within which one works.
Conclude with an exploration of the open recognition process (*Promoting Open Recognition*), complete with a step-by-step walkthrough and shareable resources, to help participants understand how to upload, share, and receive recognition for their work. In the case of ENCORE, the project welcomed and integrated the work of ORCA Pods partners (https://openeducator.orcapods.org/). The example provided offers a useful way to rethink and adapt the approach to your context.
Finally, encourage users to reflect on the platform's impact on their professional development (*Your Feedback about ENCORE*) and consider surveying their maturation of openness to innovative practices (*How Open Can I Be?*). When implementing asynchronous self-paced courses, it is advisable to include a final usability survey of the course to provide valuable feedback for future iterations—referencing models like the *Self-Paced Course Usability* guide. These recommendations aim to not only guide trainers in effectively using the ENCORE platform but also to inspire continuous improvement in educational practices.

Assessing the ENCORE Approach's Impact

While the previous section outlined how to design and implement the ENCORE Approach, this section focuses on strategies for its assessment. Some of the tools mentioned earlier will be presented with some useful pointers and references to consult.

The comprehensive set of tools, complete with setup examples and usage guidelines, is available in the "Training Materials" methodology document. This resource includes a curated package of open-access materials that can be seamlessly integrated into your Moodle course or other learning management systems.

These materials provide valuable support for evaluating both the adoption of OER and the effectiveness of open learning pathways, helping trainers and educators track participants' progress and reflect on the impact of the ENCORE Approach in practice.

For more in-depth information on the tools, a description of them and guidance on their implementation, see the open-access material package on Zenodo [Community]: here you will be able to find the "ENCORE Training Materials Documentation" report that will guide you to navigating the record and the training materials themselves.

How Open I Am/How Open Can I Be

The “How Open I Am” (pre-course) and “How Open Can I Be” (post-course) self-tests can be used to assess the impact of exposure to the ENCORE Approach on professional learning and identity, specifically regarding knowledge of and engagement with OERs, the implementation of Open Educational Practices, and contributions to Open Science. Based on self-reflection statements from **DigCompEdu** (DigCompEdu, JRC, 2017) and further expanded by the **Open Digital Framework** (JRC, 2016, 2019), these self-tests offer insights into how participants’ openness evolves throughout their learning journey. There are two versions available:

- One designed for educators/teachers/trainers.
- One for students (prospective teachers, trainers, and educators).

These self-assessments can be utilized in both internal intensive and crash courses to evaluate shifts in participants' understanding and adoption of open practices in education.

My Digital, Green, Entrepreneurial Approach to Teaching/Training

The *My Digital, Green, Entrepreneurial Approach to Teaching/Training test* self-test serves as a self-reflection tool, designed to help educators and trainers deepen their understanding of Digital, Green, and Entrepreneurial (DGE) competencies. It encourages participants to assess their current level of awareness and openness towards these competencies and reflect on whether their development is supported (or not) in their teaching or training practices. This self-test can also be used to evaluate the long-term impact of exposure to the ENCORE Approach on professional learning and identity, particularly in terms of how these competencies evolve. The test draws from several EU frameworks: DigComp 2.2 (Vuorikari et al., 2022) for digital competencies, EntreComp (Bacigalupo et al., 2016), for entrepreneurial competencies, and GreenComp (Bianchi et al., 2022), for green competencies.
It has been applied in both internal intensive and crash courses to facilitate reflection and growth in these key areas.

Digital Competence
Digital Competence is one of the eight Key Competences for Lifelong Learning defined by the Council of the European Union (2018). It provides a common framework—exemplified by the DigComp 2.2 model—for identifying and developing essential digital skills across various groups. Educators are encouraged to reflect on how they foster digital skill development in their teaching through a series of structured questions with graduated response options.

Entrepreneurial Competence
Entrepreneurial Competence, also one of the eight Key Competences for Lifelong Learning defined by the Council of the European Union (2018), builds upon the definition by the Danish Foundation for Entrepreneurship & Young Enterprise. This competence focuses on transforming opportunities and ideas into financial, cultural, or social value (Bacigalupo et al., 2016). Educators are prompted to assess their practices in three areas—Ideas and Opportunities, Resources, and Into Action—with response options reflecting varying levels of support in their teaching.

Green Competence
Green Competence focuses on embedding sustainability into education to safeguard the environment and public health, a priority emphasized by the European Commission. It equips learners with the knowledge, skills, and attitudes needed for a sustainable and fair society. Educators

are invited to consider their engagement with the four areas of the GreenComp framework—Embodying Sustainability Values, Embracing Complexity in Sustainability, Envisioning Sustainable Futures, and Acting for Sustainability—through a series of questions designed to assess how they support these competences in their teaching.

Your Opinion On the Session

The *Your Opinion On the Session* survey is designed to assess the impact of exposure to the ENCORE Approach on professional learning, teaching, training, and learning outcomes. It also gauges the acceptance of the ENCORE system by educators and learners. For this reason, The survey is divided into two sections. The first part consists of open-ended questions and aims to gather qualitative feedback on the impact of the ENCORE Approach, encouraging participants to reflect on their experience and its effect on their practice. The second part consists of 20 questions inspired by the Unified Theory of Acceptance of User Technology (UTAUT; Venkatesh et al., 2003). This section seeks to measure the acceptance of the ENCORE system, investigating factors such as perceived ease of use, usefulness, and intention to use the system.
This two-part survey provides valuable insights into both the subjective experiences of participants and their acceptance of the ENCORE system as a tool for enhancing educational practices.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al., 2003) is widely applied to understand human-technology acceptance behaviour, particularly in the context of information systems. It explains both behavioral intention to use and actual use of technology.
The items in the survey are inspired by the UTAUT model and focus on analyzing the following factors (Venkatesh et al., 2003, p. 447-453):

a) Performance Expectancy: This refers to “the degree to which an individual believes that using the system will help him or her to attain gains in job performance”.
b) Effort Expectancy: This refers to “the degree of ease associated with the use of the system”.
c) Social Influence: This refers to “the degree to which an individual perceives that important others believe he or she should use the new system”.
d) Facilitating Conditions: This refers to “the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system”.
e) Behavioural intention.

In the UTAUT, performance expectancy, effort expectancy, and social influences are directly associated with behavioural intentions, while facilitating conditions are associated with actual use.

The survey items were developed based on the UTAUT studies related to OER (Abbad, 2021; Kurelovic, 2020) and took into account previous literature on UTAUT usage for AI-based instruments (Raffaghelli et al., 2022). Two versions of the test were provided:

- an extended version of the initial crash course and the intensive course;
- a shorter, more focused version for the crash course and self-paced course.

The data collected from the crash and intensive workshops (including the report) is available as Open Data on Zenodo: HERE.

The results indicate a strong positive response regarding the improvement of OER and DGE skills following the ENCORE workshops. Additionally, there was a significant positive reception to the acceptance of the ENCORE system.

Similarly, data from the reduced version used in the external testing cycle is also available as Open Data on Zenodo: HERE.

The findings suggest a highly positive perception of the platform's usefulness, particularly among Higher Education (HE) and Vocational Education and Training (VET) institutions. Intentions to use the platform were strong, with a notable shift from medium to very high levels of perception. This shift was influenced by critical reflections on future usage and perspectives for the platform.

Conclusions

The Open Education movement could be deemed as a “Trojan Horse” (Conole, 2012) to invite educators to reflect on and improve teaching and learning processes, ultimately enhancing the quality of lifelong learning. Evidence suggests that systems enabling active engagement with open content and rethinking learning design offer valuable opportunities for educators to transform their practices. Nonetheless, we claimed that despite the widespread discourse on the benefits of openness and the positive support of the policy context, these elements alone are insufficient. In this regard, we also considered several strategies to introduce ENCORE as a tool to mediate professional learning and to initiate a reflection on:

- Understanding how data-driven systems work, their potentials and limitations, and the best way we can interact with them.
- 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 the institutional level.
- Recognise and reward efforts for open education/teaching promoting open learning.
- Connect open education/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, evaluate them, and 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.

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