DECriS

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Digital Education for Crisis Situations: Times when there is no alternative (DECriS

A list of critical success factors and their typological classification for the evaluation of the OER‘s

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DECriS project (Digital Education for Crisis Situations: Times When There is no Alternative) which was accepted within the Erasmus+ Call launched in September 2020 supporting digital education readiness and creative skills.

Erasmus+ Project DECriS (http://decris.ffos.hr/, Project Number: 2020-1-HR01-KA226-HE-094685) started on 1st of March 2021 and will run for a duration of two years.

Digital Education (DE) has the potential to provide better teaching and learning opportunities, especially in regard to the unpredictable circumstances such as COVID-19, which revealed that many higher education institutions (HEIs) faced problems of technical, socio-psychological and didactic nature. The DECriS project aims to produce 6 Intellectual Outputs (IOs), organize 4 Multiplier Events (MEs), 2 Summer Schools in the form of blended learning as an 'hybrid' arena for exchange of experience and knowledge transfer, and to design and produce 2 tutorials which will equip teachers with new skills required in the production, reutilization, and use of DE. The project' target groups are students/teachers at partner HEIs and European HEIs that offer programs in Library and Information Science (L)IS, which will be approached widely in regard to the use of Open Educational Resources (OER's) and ways for promoting, enriching and improving of DE for crisis situations, and beyond.

Consortium: University of Osijek, Croatia (Coordinator); University of Barcelona, Spain; University of Hildesheim, Germany; University of Library Studies and Information Technologies, Bulgaria, and University of Zagreb Computer Centre, Croatia and four associate partners.

1. Executive Summary

This research forms part of the Erasmus+ project *Digital Education for Crisis Situations: Times when there is no alternative (DECriS,* (http://decris.ffos.hr/*)*. The project is focused on innovative digital practices implemented in Higher Education Institutions (HEI) in the field of Library and Information Science (LIS), and their relationship with digital education (DE), in general, and the adoption of Open Education Resources (OER) in any learning situation, but with a special emphasis on crisis situations such as the COVID-19.

DECriS IO3 Report. The present report, titled '**A list of critical success factors and their typological classification for the evaluation of the OER's'**, belongs to the Project's Intellectual Output 3. There are two main goals of IO3 – the 1st goal is to **prepare a list of critical success factors which can be used to assess the quality of existing OER's** and the 2nd goal is to present a typological classification for the evaluation of the quality of the OER's. After the critical success factors have been separated and organized, this deliverable will be prepared in form of a **methodological framework** which will be available to all HEIs wishing to use them in evaluation processes of OER's.

Research Methodology: systematic review method of existing research literature. Studies were considered relevant if they written in English and described themselves as examining OER's issues or as focused on evaluation of OER's, or reported empirical data on experiences with OER's. Relevant studies were searched for systematically at: two scholarly databases Web of Science (WoS) Core collections and SCOPUS, Google Scholar and websites of organizations (such as UNESCO, IFLA, EBLIDA and others), and relevant project websites. Keywords/phrases for search: Open Educational Resources, Open Educational Resources*, OER, Open Educational Resources AND Evaluation; Open Educational Resources AND Factors. Scope of research: for Web of Science (WoS) Core collections, SCOPUS and Google Scholar: 01.01.2020-01.02.2022, the period of pandemic COVID-19 and the use of Open Educational Resources (OER's) enriching and improving of distance education in crisis situations. For other sources: documents from websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites – on researcher's decision.
The review was enriched with findings from IO1 Report *'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic'* (Mičunović, Rako & Feldvari, 2021) and from IO2 Report *'Digital education appraisal and quality perception by students, teachers and trainers at the partner HEIs during the COVID-19 crisis'* (Boté-Vericad, Argudo & Urbano, 2022) of the DECriS Erasmus+ Project.

Results. As a result of research activities, the **Literature Review** covered 74 relevant publications and other 128 documents (including publications, reports, presentations and websites).

The systematic literature review synthesizes the various aspects (theoretical, methodological, didactical, technical etc.) regards to the evaluation of OER's in the empirical literature following the guidelines of the established research questions: *What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across studies?; What were the findings of criteria for evaluation of Open Educational Resources extracted from theoretical works (such as UNESCO guidelines and recommendations and similar documents)? What were the findings of criteria for evaluation of Open Educational Resources extracted from experience-based works of educators and project managers? What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across geographical location/country/institution specifics of experiences?*

Analyses and findings, based on the research work on these questions, were resulted in preparation of a **List of critical success factors and their typological classification for the evaluation of the OER's** (in alphabetical order) and their interpretations:

Critical success factors	Sub-factors
Learning Content and Learning Experience Design	Accuracy and Content Quality
	Alignment
	Authority
	Breadth of Perspectives
	Convenient and ease of use
	Interactivity (optional)
	Standardized metadata and Citation
Technological Issues	Technical Requirements
	Quality of the Final product
Learning Process and Pedagogy	Accessibility. Inclusiveness and Equality. Cultural relevance
	Open Licensing
	Pedagogical goals and pedagogical approaches. Open Pedagogy
	Student engagement and assessment methods
Value-added Services	Linguistic accessibility. Understandability
	Monitoring and evaluation
	National and International Collaboration

Methodological Framework, titled **"4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's"** were designed. The offered Methodological Framework, titled "**4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's**" contains 4 main steps which corresponds to the layers of the typological classification of the critical success factors for the evaluation of the OER's as follow: **D**omain, **D**esign, **D**evelopment, **D**elivery ensure 5Rs - Retain, Reuse, Revise, Remix and Redistribute of the OER's. The goal of this framework is to be used in HEIs for evaluation processes of OER's.

4Ds for 5Rs of OER's DECriS Methodological Framework for evaluation of OER's

<table>
<tr><td colspan="3">OER's Title:</td></tr>
<tr><td colspan="3">Address/ URL:</td></tr>
<tr><td colspan="3">Domain:</td></tr>
<tr><td colspan="3">Author:</td></tr>
<tr><td colspan="3">Organization:</td></tr>
<tr><td colspan="3">Definition of OER: Open Educational Resources (OER) are learning, teaching and research materials <u>in any format and medium</u> that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others (UNESCO, 2019).</td></tr>
<tr><td rowspan="2">Type:
Describe (presentation, video, text, quiz, assessment …)</td><td>Type of OER</td><td>Type of learning activity</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Scale (level of coverage of the OER's critical success factors and sub-factors)
Between 80-60 points - high
Between 59-40 points - satisfac-tory
Less 40 points - non-satisfactory</td><td>General score: 80 points</td><td>Score of the evaluated OER:</td></tr>
<tr><td colspan="3">General description:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

Language of OER:		
Factors and sub-factors (in alphabetical order)	Points from 1 to 5 (5 is highest level)	Comments
Learning Content and Learning Experience Design		
Accuracy and Content Quality (The OER accuracy is a measure of precision, absence of errors, of a particular process or object, and reflects accurate and recent scholarship in terms of the subject matter. Content quality is appropriate to the knowledge, abilities, skills and attitudes that students must acquire during the teaching-learning process)		
Alignment (The OER aligns to the catalog's course description and student learning outcomes. Similar terms include appropriateness, efficacy (or fitness for purpose), educational value, potential of ease-of-reuse and impact; relevance; learning effectiveness)		
Authority (The OER provides data about the author/s or educational agency (name and if applicable: h-index, ORCID), affiliation/institutional membership)		
Breadth of perspectives (The OER reflects multiple perspectives and points of view on course topics. The OER provides theoretical perspectives for the topic, addressing major theories appropriately, includes multiple modalities (e.g. graphics, tables, and information other than text) and continually improved resources to support student learning.)		
Convenient and easy for use (The effective OER will make the process of searching, (re-using, or adapting OER as simple and convenient as possible providing effective learning experiences with cost-saving manner.)		
Interactivity (optional) (Interactivity is the functionality of OER, which allows an interaction, as a dialogue, between the device and the user (Checklist, 2020).		
Standardized metadata and Citation (The cover of the OER (a page or visible screen of the resource) includes comprehensive OER description with standardized metadata and information on how to cite the OER.)		

Technological Issues		
Technical Requirements (Technical factors that provide the openness of OER and ensure that the learning content will work within the existing system, on all platforms and devices that learners may use. The resource is designed taking into account formal guidelines that improve the comprehension capacity of users.)		
Quality of the Final product The OER content is clear and understandable; the interface and design are easy to navigate; the video and audio (if included) quality are high; the OER contains no spelling errors or typos. An effective OER should allow the educator to complete the 'quality circle': from discovery, to use, to professional evaluative feedback, and the process can then be repeated as many times as necessary (Connell, M. & Connell, J., 2020: 10).		
Learning Process and Pedagogy		
Accessibility. Inclusiveness and Equality. Cultural relevance. (The OER is designed from an open and inclusive perspective; it is accessible to learners with disabilities (usability guidelines are followed). The OER could be used or adapted for multi-aged/experienced users and multimodal, multilingual and multi-cultured categories of professional and technical communication users.)		
Open Licensing (Availability of an Open License for the use of educational content and terms of use are clearly specified. OER respects current legislation, and it is in conformity with EU-GDPR (if applicable).)		
Pedagogical Goals and Pedagogical Approaches. Open Pedagogy (The OER promotes active learning, class participation, and/or collaboration and includes a mix of instructional approaches. The OER allows learner-centered and personalized pedagogical approach and supports the OER-enabled pedagogy and open educational practices.)		
Student engagement and assessment methods (The OER includes set of actions, effective and engaging tasks, and assessments that users could perform throughout the resource to achieve the learning outcomes and educational goals.)		
Value-Added Services		
Linguistic accessibility. Understandability (The OER is characterizes with the reduced linguistic complexity, consistency of language and key terms. The OER provides		

multilingual support – e.g., the interface is designed in a multi-lingual way to widen the scope of users by allowing them to perform a search of content in different languages OR the OER is available in multiple languages.)		
Monitoring and evaluation (The OER provides quality control mechanisms; user evaluation tools or feed-back system. The educators carry out monitoring and evaluation procedures. Peer-review is ensured as a policy to revise and analyze the quality of OER.)		
National and International Collaboration (The OER provides permission for collaborative adaptations to specific contexts and for re-mixed by a global community, re-sulting in new OER that are more culturally relevant and inclu-sive for different communities of learners.)		

The **List of critical success factors and their typological classification** and **4Ds for 5Rs of OER's: DECriS Methodological Framework for the evaluation of OER's** serve a goal to achieve a good practice in OER design to be enabled to promote openness, sharing, reuse of resources and collaboration amongst academic communities, and more concrete in (Library and) Information Science.

2. Output title and Purpose of Research

Output Title

A list of critical success factors and their typological classification for the evaluation of the OER's

Purpose of Research

There are two main goals of this Intellectual Output.

The first goal is to prepare a list of critical success factors which can be used to assess the quality of existing OER's.

Essential evaluation elements of this part of IO3 will be, for instance, scope, target group, quality of the content, currency, authority, didactic approach, use of different e-learning components (instructions, tests, discussion forums, etc.), use of media (test, audio, video), ease of use; security issues; availability, etc.

These evaluation elements will be partly derived from IO 1 and IO 2 (e.g. reasons for use/non-use of OER's, important criteria when using OER's, experiences made, satisfaction/dissatisfaction, etc.).

The second goal is to present a typological classification for the evaluation of the quality of the OER's.

After the critical success factors have been separated and organized, this deliverable will be prepared in form of a methodological framework which will be available to all HEIs wishing to use them in evaluation processes of OER's. With such a methodological and evaluation framework the DECriS project brings in the new elements in the evaluation of existing OER's and their use in time of crisis and beyond.

3. Methodology of Literature Review

Existing research literature will be critically analysed to identify **evaluation criteria** used in other projects, and situations in time of crisis.

ULSIT, Sofia will analyse relevant literature with regards to the evaluation of OER's (i.e. literature analysis) and enlarge the preliminary criteria catalogue which will again be discussed by the project partners.

In this IO, a special focus is directed towards a deeper data collection and analysis which will be done by using mixed methodology, quantitative (collecting and analysing numerical data) and qualitative (text analysis, interviews with persons involved in evaluation processes, etc.) and will include the feedback from each partner.

1st step, we explore, and review works about literature review with comprehensive and systematic literature search, such as:

Donner, Eva Katharina (2022). Research data management systems and the organization of universities and research institutes: A systematic literature review. Journal of Librarianship and Information Science, 1–21. https://journals.sagepub.com/doi/pdf/10.1177/09610006211070282

Ayeni, P. O., Agbaje, B. O., & Tippler, M. (2021). A Systematic Review of Library Services Provision in Response to COVID-19 Pandemic. *Evidence Based Library and Information Practice*, *16*(3), 67–104. https://doi.org/10.18438/eblip29902

Clinton-Lisell, V. (2021). Open pedagogy: A systematic review of empirical findings. Journal of Learning for Development, 8(2), 255-268. ISSN: 2311-1550.

Grant, Maria J.; Booth, Andrew (2009): A typology of reviews: an analysis of 14 review types and associated methodologies. In: Health Information and Libraries Journal 26, S. 91–108. DOI: 10.1111/j.1471-1842.2009.00848.x.https://www.researchgate.net/publication/353351341_Open_Pedagogy_A_Systematic_Review_of_Empirical_Findings\

We chose the systematic review method of literature review because it has a potential to produce a reliable knowledge base through the accumulation of findings from a range of studies in a systematic and reproducible way (Briner & Denyer, 2012).

According to Moher et al. (2009, p. 1), a systematic review is a "review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyze data from the studies that are included in the review".

According to Grant, Maria J.; Booth, Andrew (2009) Systematic review is the best-known type of review. A systematic review seeks to systematically search for, appraise and synthesis research evidence. It is transparent in the reporting of its methods to facilitate others to replicate the process. Systematic reviews seek to draw together all known knowledge on a topic area.

Context

In 2022 we celebrated **20-ty years of the concept of Open Educational Resources (OER)**.

Open Educational Resources concept was first coined at a meeting of the United Nations Educational, Scientific and Cultural Organization (UNESCO) forum on 'the impact of open courseware for higher education in developing countries' in July 2002 (Nwankwo, 2017).

In that research we use the definition from UNESCO Recommendation on Open Educational Resources (OER), 25 Nov. 2019: Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others.
OER's form part of 'Open Solutions', alongside Free and Open Source software (FOSS), Open Access (OA), Open Data (OD) and crowdsourcing platforms (UNESCO, 2019).

Further to the adoption of the UNESCO OER Recommendation (2019), UNESCO launched the OER Dynamic Coalition to reinforce international and regional cooperation among all stakeholders in the first four areas of the UNESCO OER Recommendation (OER Dynamic, 2020). Follow-up important document is OER Advocacy Committee's survey report on the Implementation of the UNESCO Recommendation on OER from November 2020. It gathered feedback from ICDE stakeholders, members and partners about the status of the UNESCO OER Recommendation's implementation within the first seven months of adoption, and during the educational crisis caused by COVID-19 (Ossiannilsson, Aydin & Wetzler, 2020).

In November 2021 were published report about Open Education in European Libraries of Higher Education. It summarizes the results of a survey of European libraries on Open Education (OE) and Open Education Resources (OER) prepared by SPARC Europe. It was done in consultation with the European Network of Open Education Librarians (ENOEL) (Santos-Hermosa et al, 2021).

Report, titled 'Formative Evaluation of Open Education Networks', issued in July 2021 on behalf of the William and Flora Hewlett Foundation, explains different benefits in Open Education Networks and provides seventeen recommendations (Formative, 2021).

OER in General

Summary of that part of the Report based on: **Santos-Hermosa**, Gema. Video creation as Open Educational Resources (OER). // *The first Tutorial* of the Project Digital Education for Crisis Situations: Times in which there is no alternative (DECriS), 4th Nov. 2021, Univ. of Barcelona.

Main characteristics

Educational: teaching aim/us

Open (access): available with no cost/ free

Open (permission): open license or public domain

Reuse: adaptable (for different contexts, Open formats, etc)

Granularity: big and small OER

Other: innovation, inclusivity, accessibility, sustainability, interoperativity, etc..

Typologies - Small OER

- Courses, curricular programs, didactic modules;
- Student guides, teaching plans;
- Assessment tools, exercises, exams;
- Textbooks, research articles;
- Videos, podcasts, images, maps;
- Multimedia, interactive materials, simulations, games;
- Software, computer applications, mobile apps ...

…. and any other educational materials designed for use in teaching / learning (OECD, 2007).

Typologies - Big OER

OpenCourseWare (OCW)

- Set of educational materials organized into open courses

Origins: MIT (2001) _ Free and Open Access to the materials of its official courses' Consortia OCW (2005)

Massive Open Online Courses (MOOCS)

- Without formal requirements (no enrolment) neither limit of participants (open and free access): Udacity Coursera, EdX, MiriadaX, etc.

Origins: George Siemens & Stephen Downes -1st MOOC (2008) "Connectivism and Connective Knowledge (CCK08)".

Open Textbooks

- Collections of OER organized in a "traditional" book format (kind of textbooks with open license)

Open Licenses: Creative Commons

4 licenses allowing modification & adaptation (Reuse & Remix) (**Error! Reference source not found.**).

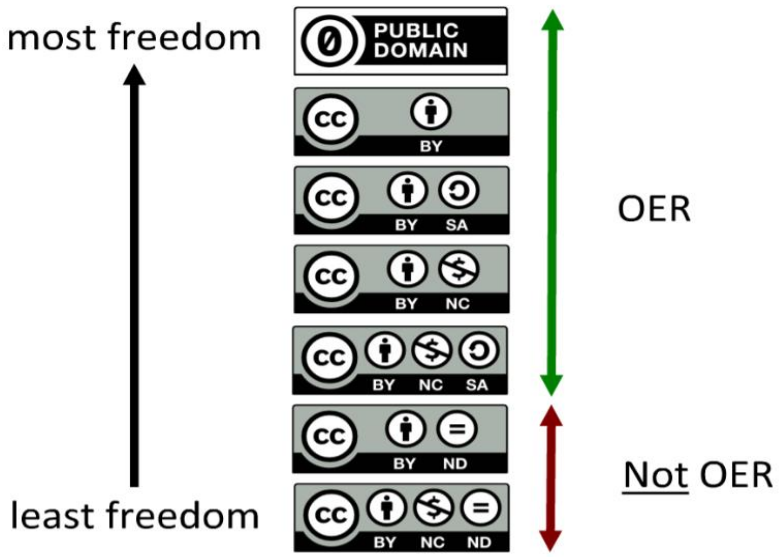


Figure 1. *Openness scale. (Cited by Bethel, E. (2020) from "Open Education: The Moral, Business and Policy Case for OER," by C. Green, 2014 (https://www.slideshare.net/cgreen/updated-keynote-slides-october-2014). CC BY.*

5Rs permissions of OER

According to D. Wiley (2014), https://opencontent.org/blog/archives/3221:

1. **Retain**: the right to make and possess **copies of content -** E.g. backup, download, duplicate, store, etc.
2. **Reuse**: the right to **reuse** the content in its **original and unaltered form**. E.g: use a material for a class, study group, on a website, etc.
3. **Revise**: the right to **adapt, adjust, modify** or alter the original content. E.g: translate a material into another language
4. **Remix**: the right to **combine** original content with another to create something new. E.g: create your own version adding visual / multimedia elements.
5. **Redistribute:** the right to **share copies** of the original content, its revisions or its remixes with others. E.g: send a copy of a material or share the link to its content.

4. Objectives and research questions

Given the complexities involved in defining and practicing with Open Educational Resources as well as the growing empirical examination of OER's, especially of their use during the COVID-19 crisis and special periods without face-to-face teaching, a review is necessary. The main goal of the review is **to produce and justify critical factors for evaluation of existing OER's.** After the critical success factors have been separated and organized as a typological classification for the evaluation of the quality of the OER's, this deliverable will be prepared in form of a **methodological framework** which will be available to all higher education institutions (HEIs) wishing to use them in evaluation processes of OER's. With such a methodological and evaluation framework the DECriS project brings in the new elements in the evaluation of existing OER's and their use in time of crisis and beyond.

Such a review can synthesize the various aspects (theoretical, methodological, didactical, technical etc.) regards to the evaluation of OER's in the empirical literature to develop a lens for examining the various research findings. In other words, a thorough review would allow for examination of not only how the evaluation process of OER's is defined, but how the findings relate to the approaches for evaluation of OER's. In addition, the status of the findings on *theoretical, practical, geographical location/country/institutional specifics of experiences and project experiences with OER's*, especially in the COVID-19 crisis, can be synthesized through a review. In this way, a review would provide a better understanding of the existing literature as well as identifying gaps in which more research is needed.

There are four research questions that guide this review:

1. What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across studies?
2. What were the findings of criteria for evaluation of Open Educational Resources extracted from theoretical works (such as UNESCO guidelines and recommendations and similar documents)?
3. What were the findings of criteria for evaluation of Open Educational Resources extracted from experience based works of educators and project managers? Including the findings from IO1 and IO2 of DECriS project.
4. What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across geographical location/country/institution specifics of experiences?

5. Method. Inclusion criteria

Studies were considered relevant if they:

1. described themselves as examining Open Educational Resources issues
2. described themselves as focused on evaluation of Open Educational Resources
3. reported empirical data on experiences with Open Educational Resources (both qualitative and quantitative studies are eligible)

Relevant studies were searched for systematically.

Studies had to be **in English**.

Scope of sources

First, two scholarly databases for searching: Web of Science (WoS) Core collections and SCOPUS

Second, Google Scholar

Third, websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites

Keywords/phrases for search: Open Educational Resources, Open Educational Resources*, OER, Open Educational Resources AND Evaluation; Open Educational Resources AND Factors

Scope of research:

For Web of Science (WoS) Core collections, SCOPUS and Google Scholar: **01.01.2020-01.02.2022**, the period of pandemic COVID-19 and the use of Open Educational Resources (OER's) enriching and improving of distance education in crisis situations

For other sources: documents from websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites – on researcher's decision

6. Stages of the application

1st Stage, Search results Full record of Abstracts (Web of Science (WoS) Core collections, SCOPUS, Google Scholar) were exported as **Printable HTML File** (Full record) and **Excel File** (Full record).

Search results on the level of Full record of Abstracts (Web of Science (WoS) Core collections, SCOPUS, Google Scholar) for record screening were registered on the Table 1-3.

Descriptions of studies relevant to:

Theoretical aspects were presented in Table 1 – given as example

Practical aspects and country/institutional specifics of experiences were presented in Table 2 – given as example

Project experiences were presented in Table 3 – given as example

See **Table 1-3 with examples**.

Table 1 Theoretical aspects

Source	**Author(s), Year, Title**	**Key words**	**Study purpose/questions**	**Findings (Evaluation of OER's)**	**Record screening result Decision for** Yes/No **eligibility for full-text article analyses, for qualitative analyses**
Article	Kokot-Kanikula, K., A. Walek 2021 Open Educational Resources - a review of the initiatives in Poland and around the world	Open Educational Resources; open education; open science; distance learning; university libraries	The aim of the article is to familiarize the readers with the idea of open educational resources, the legal and organizational foundations crucial for their creation and development, as well as the latest initiatives undertaken in the field of OER dissemination. In the first part of the article, the authors explain the concept and role of open educational resources in the teaching process. Then, they present selected initiatives implemented by members of European Network of Open Education Librarians (ENOEL) and the results of a survey conducted among European academic libraries by SPARC Europe.	The analysis of publications, the content of legal documents, reports, and recommendations made it possible to precisely define the meaning of open educational resources for their users. The multifaceted nature and scale of the activities confirm that modern teaching can develop faster based on open educational materials.	Yes
Article	Rodes, V (Rodes, Virginia); Gewerc, A (Gewerc, Adriana) 2021 A Latin American Critical Conceptual Model on the Adoption of Open Educational Resources	Open Educational Resources; Decolonisation; Critical Perspectives; Strategies for the Adoption; Latin America	A conceptual model on OER adoption is presented, as the substantive theoretical synthesis of a Grounded Theory study, whose purpose was to identify which factors influence the adoption of OER among teachers in Latin American universities.	The resultant conceptual model includes four categories influencing the adoption of OER among professors in Latin American universities: 1) Construction of Teacher Professional Identity; 2) Practices and Transformations in the Curriculum; 3) Creation, Use and Opening of Digital Educational Resources; and 4) Social Representations about Repositories of OER. The critical conceptual model may be adopted by researchers from	Yes

				all regions who seek to unveil and decolonise the hidden curriculum of OER.	

Table 2 Practical aspects and country/institutional specifics of experiences

Source	**Author(s), Year, Title**	**Key words**	**Study purpose/questions**	**Findings (Evaluation of OER's)**	**Record screening result Decision for** Yes/No **eligibility for full-text article analyses, for qualitative analyses**
Article	Cozart, DL (Cozart, Deanna L.); Horan, EM (Horan, Erin M.); Frome, G (Frome, Gavin) 2021 Rethinking the Traditional Textbook: A Case for Open Educational Resources (OER) and No-Cost Learning Materials	textbook; open educational resources (OER); higher education; student opinions	In this study, we compared pre-service teacher-student outcomes and perceptions of a traditional textbook versus no-cost, online materials such as open educational resources (OER) in an undergraduate Foundations of Education course. Outcomes were measured by comparison of final course grades. Perceptions were determined through quantitative and qualitative survey questions added to existing end-of-course evaluations.	Results revealed students found OER and no-cost online materials more useful to their success in the course and more engaging than a traditional textbook. Qualitative analysis further revealed that while students appreciated there was no cost for the online materials, they preferred them to a traditional textbook because of the customized content. Results suggest students find instructor-curated, no-cost online readings more useful and preferable to a traditional textbook without compromising student academic performance.	Yes

Table 3 Project experiences

Source	**Author(s), Year, Title**	**Key words**	**Study purpose/questions**	**Findings (Evaluation of OER's)**	**Record screening result Decision for** Yes/No **eligibility for full-text article analyses, for qualitative analyses**
Article	Bethencourt-Aguilar, A (Bethencourt-Aguilar, Anabel); Fernandez-Esteban, MI (Inmaculada Fernandez-Esteban, Maria); Ruiz, CJG (Gonzalez Ruiz, Carlos Jose); Martin-Gomez, S (Martin-Gomez, Sebastian) 2021 Open Educational Resources (OER) in Early Childhood Education: technological, didactic and socio-communicative characteristics	multimedia materials; teaching materials; early childhood education; information technology	This article presents an analysis of digital teaching materials inserted in the platform of the National Institute of Educational Technologies and Teacher Training (INTEF) aimed especially at the infant stage. This qualitative typology study is part of the research project called "Digital teaching materials in Early Childhood Education. Analysis and proposals for its use at school and at home "(RTI2018-093397-B-100) funded by the State Research Agency of the Ministry of Science, Innovation and Universities. The selected sample will comprise the Open Source Educational Resources (OER) available on this platform, choosing a representative sample based on the areas of knowledge in Early Childhood Education.	These digital didactic materials are analyzed based on a categorical analysis of their underlying methodological trend, the typology and technical and design characteristics of the materials, as well as the socio-community characteristics inherent in the designed learning resources, among other dimensions and categories. Among the results, the diversity of digital didactic materials according to the area of knowledge stands out, and the lack of depth in the evaluative development of the proposed didactic proposal or in the own evaluation of these materials.	1st researcher: No Reason: no relevance to Evaluation of OER's

Results from search activities were evaluated and duplicated works were deleted (See Figure 3).

Coding

In preparation for analyses, each record were coded for basic bibliographical and methodological information, authors key words, geographical location, study purpose/questions, findings (with special focus on Evaluation of OER's). Record screening result for each work were marked with *Yes/No* decision for eligibility for full-text article analyses for the purpose of qualitative analysis.

The records were screened by two independent researchers (double-checking) for ensuring the quality of work.

Duplicate records were checked on the **base of Titles (using Excel Table Full Records)** and the duplicate records were removed.

2nd Stage. As a result, from the screening and assessment of **abstracts** (Web of Science (WoS) Core collections, SCOPUS, Google Scholar) and **documents** (from websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites) - were identified **core articles and documents** with relevance based on the inclusion criteria, for further **full texts qualitative analyses and synthesis**.

3rd Stage. Evaluation elements derived from IO 1 Report *'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic'* and from IO2 Report *'Digital education appraisal and quality perception by students, teachers and trainers at the partner HEIs during the COVID-19 crisis'* (e.g. reasons for use/non-use of OER's, important criteria when using OER's, experiences made, satisfaction/dis-satisfaction, etc.).

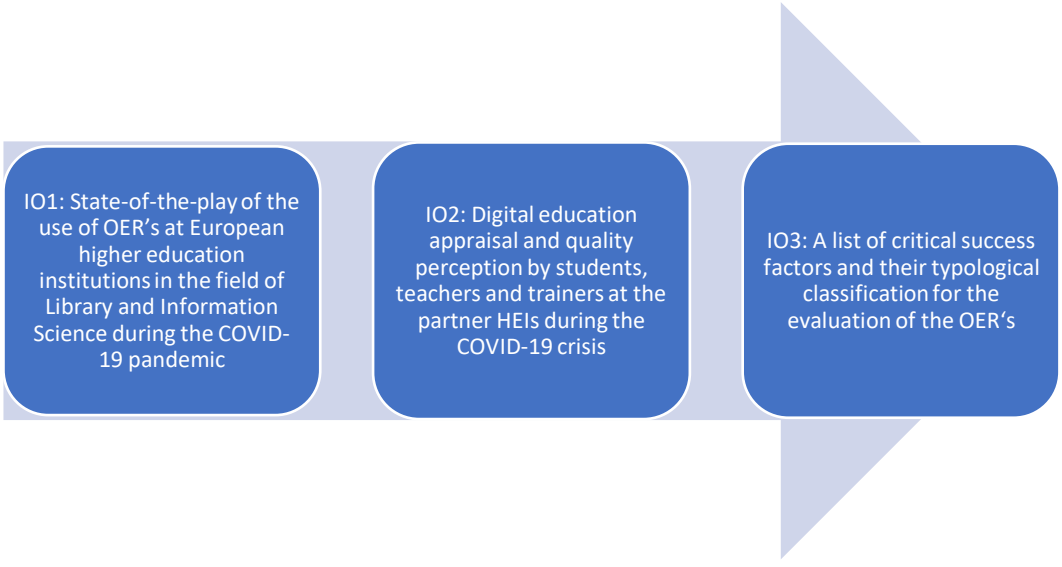


Figure 2. Correlation between IO1, IO2, IO3 of DECriS Project

7. Methodological organization

Each institution has a responsible researchers for the application of that task.

Sofia: Tania Todorova, Daniela Pavlova, Eugenia Kovatcheva, Hristina Bogova

Barcelona: Silvia Argudo, Juan José Boté, Gema Santos

Hildesheim: Lea Wöbbekind, Thomas Mandl, Sebastian Diem

Osijek: Anita Papić, Kristina Feldvari

Zagreb: Sandra Kučina Softić, Anja Đurđević

Division of work:
ULSIT team – for 1st stage of the task implementation:

Source	Name of researcher	Partner organization
Web of Science (WoS) Core collections	Tania Todorova	ULSIT
SCOPUS	Daniela Pavlova	ULSIT
Google Scholar	Hristina Bogova	ULSIT
Websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant Project websites	Eugenia Kovatcheva, Daniela Pavlova, Tania Todorova	ULSIT

Partners team for **2nd stage of the task implementation** (double cheking). The records were screened by two independent researchers (double-checking) for ensuring the quality of work.

First, two scholarly databases for searching: Web of Science (WoS) Core collections (Hildesheim team) and SCOPUS (Zagreb)

Second, Google Scholar (Osijek)

Third, websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites (Barcelona)

Source	Name of researcher/s	Partner organization
Web of Science (WoS) Core collections	Lea Wöbbekind, Thomas Mandl, Sebastian Diem	Hildesheim
SCOPUS	Sandra Kučina Softić, Anja Đurđević	Zagreb
Google Scholar	Anita Papić and Kristina Feldvari	Osijek
Documents available from Websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant Project websites	Silvia Argudo, Juan José Boté Gema Santos	Barcelona

3rd Stage. Evaluation elements derived from IO 1 and IO 2 (e.g., reasons for use/non-use of OER's, important criteria when using OER's, experiences made, satisfaction/dissatisfaction, etc.). – all researchers involved.

8. Implementation of the research method (stages 1-2)

Figure 3 summarizes the implementation of the research method in the phases 1-2. As a result from the screening and assessment of **abstracts** (Web of Science (WoS) Core collections, SCOPUS, Google Scholar) and **documents** (from websites of organizations (such as UNESCO, IFLA, EBLIDA and others) and relevant project websites) - were identified **core articles and documents** with relevance based on the inclusion criteria, for further **full texts qualitative analyses and synthesis**.
Total records selected for text analysis/qualitative analysis: **74**
Full-papers - 56; Other documents and websites – 18

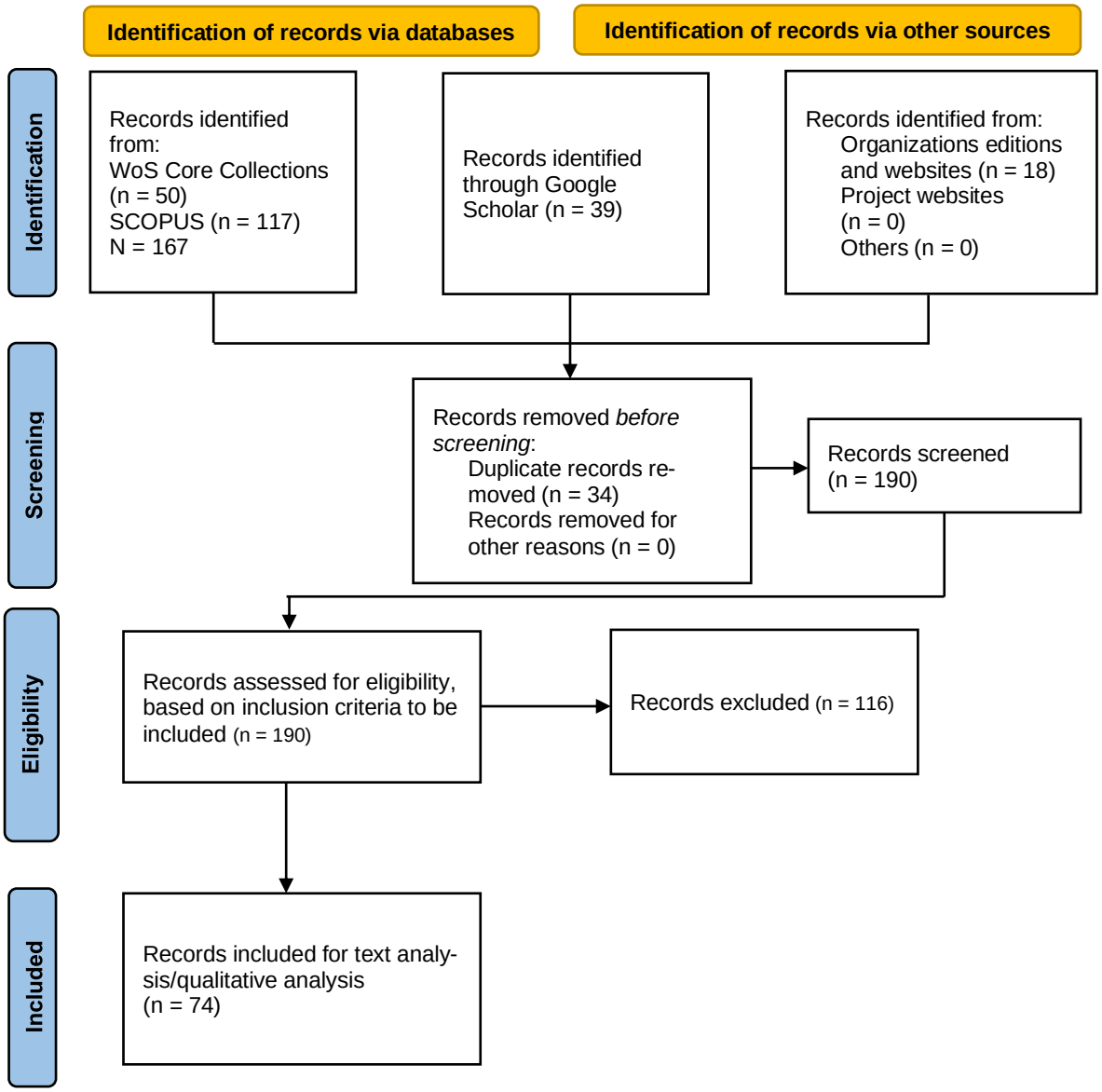


Figure 3. Research method at stages 1-2.
Based on PRISMA flow diagram http://prisma-statement.org/prismastatement/flowdiagram.aspx

9. LITERATURE REVIEW

INTRODUCTION

The World OER Declaration 2012 recommends that States join efforts to facilitate finding, retrieving and sharing OER. The OER movement has thus far spurred the creation of numerous repository initiatives worldwide with the aim of aiding the development of Open Educational Practice (Atenas, J. & Havemann, Leo (2013). The Open Education movement has gained substantial traction since the term Open Educational Resources (OER) was coined in 2000. However, there remains much scope for further advocacy and promotion of Open Education generally and of the principles and values that the concept embodies (Connell, M. & Connell, J., 2020).
Sharov and colleagues (2021: 204) stated that it should be stressed that in the environment characterized by an active combination of ICT capabilities and traditional forms of learning, as well as the rapid development of the Internet and the globalization of educational processes, open educational resources (OER) have become widespread. Their creation and use is, in fact, a new step towards the formation of a single educational environment that provides free access to educational information and interactive communication between the participants in the learning process. As a result, the modern educational process contains OER as a structural element of distance learning, which is used by students, teachers, and the authorities of educational institutions. At the same time, the popularity of distance learning in higher education is explained by the following objective reasons and advantages:

- The need for a flexible response of higher education to the needs of the information society
- Providing continuous learning and updating of educational information
- Modular principle in the development of training courses
- The ability to work with learning materials in asynchronous mode
- Free choice of online courses and time for their study
- Interactivity of educational activities and feedback support
- Various forms of user knowledge control
- Economic advantages over full-time study at a higher education institution (Sharov, 2021:204).

DEFINITION OF TERMS

Open

According to Connell, M. & Connell, J. (2020) Open Education is a broad canvas that is able to accommodate a range of understandings of the term. It is also a term that gathers an array of different elements beneath its umbrella, of which OER is one, although one that is much discussed. OER's are generally stored in a Learning Object Repository (LOR). In terms of the understanding of 'open' in OER, these authors take as a starting point the statement from David Wiley (https://opencontent.org/blog/archives/1123) that "*Open* is a continuous, not binary, construct." In other words, there can be no fixed definition of 'open' in the context of OER (Connell, M. & Connell, J., 2020).

DECriS ERASMUS+ Project research team accepted that view and, in that report, the 'Open' will be used in relation to the extent to which users are granted rights to use a repository or a resource in relation to the 5Rs of open educational resources, namely:

Retain - the right to make, own, and control copies of the content (e.g.,download, duplicate, store, and manage)
Reuse - the right to use the content in a wide range of ways (e.g., in a class, ina study group, on a website, in a video)
Revise - the right to adapt, adjust, modify, or alter the content itself (e.g.,translate the content into another language)
Remix - the right to combine the original or revised content with other material to create something new (e.g., incorporate the content into a
mashup)
Redistribute - the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend) (http://opencontent.org/definition/)

The more that the rights attached to a resource, or a repository meet the 5Rs, the more it can be judged to be 'open'. The 5Rs also offer a reasonable foundation for an exploration of quality in relation to OER and open repositories generally (Connell, M. & Connell, J., 2020).

Open educational resources (OER's)

UNESCO Recommendation on Open Educational Resources (OER), 25 Nov. 2019, states: Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others. OER's form part of 'Open Solutions', alongside Free and Open Source software (FOSS), Open Access (OA), Open Data (OD) and crowdsourcing platforms (UNESCO, 2019).

One of the oft-accepted definition of OER is that developed by the *William and Flora Hewlett Foundation*, derived from a number of preceding definitions: "Open Educational Resources are teaching, learning and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions" (https://hewlett.org/strategy/open-educational-resources/ *The William and Flora Hewlett Foundation*).

A shorter, sharper definition comes from OECD, but one that focuses on digital resources in particular: "Digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research." (http://www.oecd.org/education/ceri/38654317.pdf Ischinger, B OECD *Giving Knowledge for Free,* p.10).

In a Briefing document about Open Educational Resources and Libraries, IFLA experts formulate three key points. 1st, presents the definition of OER's: Open educational resources (OER's) are teaching, learning and research materials made available for free, and with no or only limited restrictions, to support access to knowledge; 2nd, OER's are becoming increasingly important in the education sector. They have proven their benefits by providing democratic and equitable access to knowledge, supporting life-long and informal learning, and offering diversified sources of knowledge, and 3rd, Librarians are helping to make OER's a reality: they make them available and accessible, and encourage their production, use and dissemination (IFLA, 2019).

What are Open Educational Resources and Why? Traditionally, learning materials are published under copyright and their use requires either payment or permission of the copyright-holder. OER are learning materials that are openly licensed, which means the copyright-holder has published the material on the internet under a Creative Commons (CC) license that allows others to retain, reuse, revise, remix or redistribute (the 5Rs) these materials (Wiley and Hilton, 2018; Van Allen, J., & Katz, S. (2020: 210). OER also includes material in the public domain, which are materials that are no longer under copyright or where the creator dedicates the materials to the public domain and relinquishes copyright (William and Flora Hewlett Foundation, 2013). All the CC licenses require those who use the resources to credit the original work by providing attribution (Wiley and Hilton, 2018) and the licenses delineate how that work can be used. According to the William and Flora Hewlett Foundation (2013, p. 4): [. . .] the idea behind OER is simple but powerful [. . .] these digital materials have the potential to give people everywhere equal access to our collective knowledge and provide many more people around the world with access to quality education.

CLASSIFICATION AND MAIN ADVANTAGES/DISADVANTAGES OF OER's

According to Sharov and colleagues (2021:204), if we take **the functionality of OER as a criterion for their classification**, we can identify the following types: **training OER** (textbooks, electronic textbooks, software and pedagogical tools); **educational technique OER** (educational programs, profiles of educational programs, curricula, syllabuses of disciplines); **methodological OER** (thematic plans of lectures, methodological recommendations for laboratory works, self-study work, writing term papers); **control OER** (software for control and self-control of knowledge in the form of modules or separate computer programs); auxiliary OER (reference books, dictionaries, scientific journals, conference proceedings).

The **main advantages of OER** include: increase of opportunities for interaction between participants in the learning process; creation of new teaching methodologies based on the use of ICT; emergence of a productive and personalized form of learning; the ability to use OER on various electronic devices; availability of an open license for the use of educational content; ensuring the principle of openness and accessibility of education; dissemination of academic culture and status of the educational institution; improving the quality of educational content; significant reduction of time for the creation of educational and methodological support in comparison with traditional educational and methodological resources; free use of educational resources, reducing the cost of their creation and content (Sharov, 2021:204).

Authors of the Manual for using and developing OER for ESD in VET (GreenSkills4VET, Erasmus+ Project) conclude that as with any educational resource, there are both advantages and disadvantages associated with using OER's in the classroom.

Advantages of using OER's include:

- **expanded access to learning**. Students anywhere in the world can access OER's at any time, and they can access the material repeatedly.
- **scalability**. OER's are easy to distribute widely with little or no cost.
- **augmentation of class materials**. OER's can supplement textbooks and lectures where deficiencies in information are evident.
- **enhancement of regular course content**. For example, multimedia material such as videos can accompany text. Presenting information in multiple formats may help students to learn the contents more easily being taught.
- **quick circulation**. Information may be disseminated rapidly (especially when compared to information published in textbooks or journals, which may take months or even years to become available). Quick availability of material may increase the timeliness and/or relevance of the material being presented.

- **less expense for learners**. The use of OER's instead of traditional textbooks or course packs, etc. can substantially reduce the cost of course materials for learners.
- **showcasing of innovation and talent**. A wide audience may learn of faculty research interests and expertise. Potential students and donors may be impressed, and student and faculty recruitment efforts may be enhanced.
- **ties for alumni**. OER's provide an excellent way for alumni to stay connected to the institution and continue with a program of lifelong learning.
- **continually improved resources**. Unlike textbooks and other static sources of information, OER's can be improved quickly through direct editing by users or through solicitation and incorporation of user feedback. Instructors can take an existing OER, adapt it for a class, and make the modified OER available for others to use.

Disadvantages of OER include:

- **quality issues**. Since many OER repositories allow any user to create an account and post material, some resources may not be relevant and/or accurate.
- **lack of human interaction between teachers and learners**. OER material is created to stand alone, and since self-learning users may access the material outside of a classroom environment, they will miss out on the discussion and instructor feedback that are characteristic for credit classes and that make such classes useful and valuable.
- **language and/or cultural barriers**. Although efforts are being made to make OER's available in multiple languages, many are only available in English, limiting their usefulness to non-English speakers. Additionally, not all resources are culturally appropriate for all audiences.
- **technological issues**. Some students may have trouble using some OER's if they have a slow or erratic internet connection. Other OER's may require software that students don't have and that they may not be able to afford.
- **intellectual property/copyright concerns.** Since OER's are meant to be shared openly, the "fair use" exemption from the U.S. Copyright Act ceases to apply; all content put online must be checked to ensure that it doesn't violate copyright law. (Manual, 2017: 19-20).

'QUALITY' AND OER's

The issue of **quality assurance** is fundamental in supporting the uptake of OER. Research has shown that it remains a concern despite availability of many guides and frameworks. This is why strategies are needed to further monitor the quality of OER and, most importantly, spread trust in OER amongst stakeholders. Results from the ENCORE+ OER Stakeholder Survey 2021 have shown that professional educators as well as leaders and managers in higher education and business rely on trustworthy source such as repositories to access high quality OER. Stakeholders from business and higher education were asked whether they prefer to use OER from official trustworthy sources (e.g., repositories), from personal recommendations (e.g., colleagues, friends), with official quality certifications, seals or stamps, or whether they assess OER based on their own evaluation and quality judgement (n=208). 75,6% of the professional educators and 59,6% of the leaders and managers agreed or strongly agreed that they preferred to use OER from official trustworthy sources such as repositories (Open, 2021).

Connell, M. & Connell, J. (2020) state that 'Quality' is by no means a simple concept to define in the context of OER repositories and their study about 'Critical Evaluation of Quality Criteria and Quality Instruments in OER Repositories for the Encouragement of Effective Teacher Engagement' seeks to lay out a number of different ways in which the concept can be analysed and made useful. They underlined that any attempt to define quality in relation to educational resources, whether open or not, is fraught with difficulty. Quality is both subjective and heavily context specific and attempting to set out the parameters of quality in relation to OER often leads to subjective layer built upon subjective layer, with each level of definition proving difficult or impossible to measure in any simple way. There is also the simple assertion that there can, ultimately, be no inherent or intrinsic sense of 'quality' within a resource other than in a particular context where it must serve specific needs for educators, students or self-learners. It must impact on the learning in a positive way. A 'good' resource in one context might be a 'poor' resource in another – it depends upon the use to which it is put and for whose benefit (Connell, M. & Connell, J., 2020: 9).

The authors suggested the **'The Quality Circle' in Relation to OER**, which includes Starting Point – Upload & Moderate Resource – Generate Robust Metadata – Teacher Searches for & Find Resources – Teacher Uses in Teaching & Assesses Impact – Teacher Gives Feedback & Rates Resources (Connell, M. & Connell, J., 2020: 10).

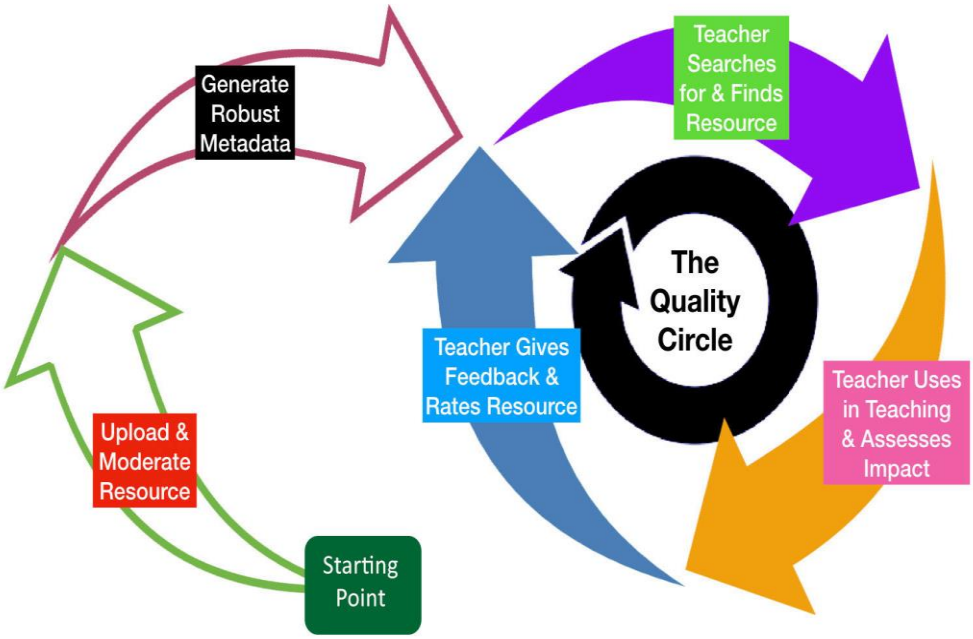


Figure 4. A Simple Outline of the Notion of the 'Quality Circle' in Relation to OER (Connell, M. & Connell, J., 2020: 10)

An effective repository should allow the educator to complete this 'quality circle', from discovery, to use, to professional evaluative feedback, and the process can then be repeated as many times as necessary. However, the authors underlined that the concept of a Quality Circle might be consciously implemented in repositories to develop a model of collective intelligence relevant and appropriate, but there is no one-size-fits all (Connell, M. & Connell, J., 2020:46).

Camilleri, Ehlers and Pawlowski in their "State of the Art Review of Quality Issues Related to OER" (Camilleri et al., 2014) set out the following features, some of which are universal or general while others are more specific to a particular instance of use by which it might be possible to come to an understanding of the quality of a learning resource:

Efficacy – by this is meant the fitness for purpose of the object / concept being assessed. Within the context of OER, this might include concepts such as ease-of-reuse or educational value.
Impact – impact is a measure of the extent to which an object or concept proves effective. Impact is dependent on the nature of the object / concept itself, the context in which it is applied and the use to which it is put by the user.
Availability – the concept of availability is a pre-condition for efficacy and impact to be achieved, and thus also forms part of the element of quality. In this sense, availability includes concepts such as transparency and ease-of-access.

Accuracy – accuracy is a measure of (a) precision and (b) absence of errors, of a particular processes or object.
Excellence – excellence compares the quality of an object or concept to (a) its quality-potential, i.e., the maximum theoretical quality potential it can reach (Camilleri et al., 2014).

Taking the approach of Camilleri et al (2014) at develop it further, Connell, M. & Connell, J. (2020: 10) state that all five factors (efficacy, impact, availability, accuracy, excellence) taken together embrace both the question of impact on learning and the need for a 'pre-definition' of quality that works for the teacher hoping to create interesting learning experiences for students. In taking forward these characterizations of quality, they propose **a conceptual framework** built around three sets of quality approaches:

Quality Assurance of Resources – … a lifecycle model to understand the quality factors affecting individual resources, including their creation, use and evaluation

Quality Assurance of Strategies / Policies – using a maturity model… the institutional development of policies which govern and promote the creation of OER

Quality Assurance of Learning – … course-specific quality assurance, including processes of teaching, assessment and recognition (Connell, M. & Connell, J., 2020: 10).

By taking this approach, they go beyond defining quality in terms simply of some intrinsic characteristics of the resources. For example, they outline the value reinforced in the resources by the features built into the process of creating the resources in the first place. Even here, though, the ultimate quality of the resource, no matter the calibre of its provenance, can only be measured against its effectiveness in facilitating learning. They note too, in passing, that applying the process of resource-creation to OER is necessarily more complex than the same process applied to traditionally produced resources, given the potential multiplicity of facets of authorship, sharing, modification, use and re-use in OER. (Connell, M. & Connell, J., 2020: 10-11). They propose **quality assurance** components to develop effective and fully functioning OER repositories such as:

- Featured resources;
- User evaluation tools;
- Peer review;
- Authorship;
- Keywords;
- Metadata;
- Multilingual support;

- Social Media support;
- Creative Commons Licenses
- Source Code of Original Files (Connell, M. & Connell, J., 2020: 12-13).

Here, we will mention the proposed criteria in four other sources.

Affordable Learning Georgia set out the following guidelines for teachers for evaluation of OER: Clarity, Comprehensibility, and Readability; Content Accuracy and Technical Accuracy; Adaptability and Modularity; Appropriateness; Accessibility; Supplementary Resources (Affordable, 2022).

Checklist for evaluating the quality of an OER from CEDEC including 13th indicators, such as:

- Cover of the resource (First page or first visible screen of the resource);
- Didactic Methodology (Methodological principles that inspire the general design of the different elements of the resource);
- Contents (The knowledge, abilities, skills and attitudes that students must acquire during the teaching-learning process);
- Homework (Set of actions that users must perform throughout the resource to achieve the objectives and educational goal); Didactic Guide (It offers specifications and guidelines on the purpose, parts and use of the resource);
- Capacity to Generate Learning (The resource is ideal for learning);
- Adaptability (The resource can be easily adjusted to specific contexts); Interactivity (The resource allows an interaction, as a dialogue, between the device and the user);
- Technical Requirements (Needs of the technology with which the resource is made);
- Format and Style (The resource is designed taking into account formal guidelines that improve the comprehension capacity of all people);
- Accessibility (The resource is designed from an open and inclusive perspective, making it as easy as possible to understand it and interact with the material in case assistive technology is needed);
- Licenses and Copyright (The resource respects current legislation and is carried out under the premise of an ethical commitment to knowledge and authorship);
- Inclusive communication (The oral and iconic communicative guidelines are oriented towards the inclusion of men and women as well as all kinds of people from an egalitarian perspective) (Checklist, 2020).

Gordillo and colleagues (2020) user study involved 53 participants and 400 OER whose quality was evaluated by reviewers using the **Learning Object Review Instrument** (LORI). The main finding of this study is that pedagogical quality scores can enhance traditional content based OER recommender systems by allowing them to recommend OER with more quality without detriment to relevance. Factors from the LORI model were revised and updated: Search services & tools usability; quality control policy/ rating policy/ ranking metric *(new critical factors)* OER recommended systems & techniques - approaches *(new critical factor);* pedagogical quality - quality scores (*new critical factors);* user evaluation tools; learning goal alignment, feedback and adaptation, motivation, presentation design, interaction, usability, accessibility, reusability, and standards compliance (Gordillo, A. et al., 2020).

Bulathwela, Yilmaz & Shawe-Taylor (2019) explore the methodology about automatic, scalable quality assurance in Open Education and suggest Five Quality Verticals: Understandability (Yellow), Topic Coverage (Green), Freshness of Information (Cyan), Presentation (Blue), and Authority (Orange).

Figure 5. Five Quality Verticals quality assurance in Open Education by (Bulathwela, Yilmaz & Shawe-Taylor, 2019)

The importance of ensuring quality in digital learning resources (indeed any learning resources, no matter their format) cannot be underestimated. Camilleri et al. (2014) note that, although open learning resources are generally available, they are 'not frequently used'. In the reasons for why this might be so, they list the following: "…[lack of] organisational support, a lack of sharing culture within organisations, lack of skills, quality, trust or time and skills for adaption. Only one element is related to the availability of technical tools for sharing and adapting resources. Not a single barrier relates to the question of accessibility and availability." So, lack of quality or even a simple lack of information about quality, is a determining factor in the relative lack of actual use of digital learning resources. However, given that the perception of quality is just one of several barriers to uptake and usage of OER, any **strategies undertaken to improve quality must be seen as just one facet of policies designed to increase the use of OER in any educational sector**. Questions of trust (itself one element of quality, of course), time, skills and culture must be dealt with alongside questions of quality (Connell, M. & Connell, J., 2020: 14).

Findings from IO1 Survey of DECriS Erasmus+ Project, titled '**State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project** show that **all surveyed LIS schools/departments used digital learning materials while about 50% of them use digital OER's**. In general, a small number of LIS schools/departments used OER's during the pandemic. Existing teaching materials were often used as OER's, especially those that were already a part of Moodle courses, but LIS schools/departments also used OER's developed and created by others at national and international level, and OER's that were personally designed, developed and created by their staff. The reason for poor use of OER's is the lack of awareness about the OER's concept itself and the relevance and impact OER's have on higher education, but also the lack of time, which is understandable in terms of organizational challenges posed by the pandemic, and the lack of institutional initiatives that refer to capacity building OER's solutions. Proposed analyses comment the **different ways to motivate LIS school/department and their teachers/trainers, to adopt, design and author OER's.** Both, institutional and personal motives refer to similar motivational factors. Despite some of the participants stating that they don't know what could motivate and incentivize both their institutions, and teachers and trainers to start using OER's, the rest of the participants stated that the use of OER's could be motivated/incentivized by creating awareness of OER's, open education and open science, providing teaching staff with more time, resources and flexibility, recognizing and rewarding teachers' work on the development and implementation of OER's, providing necessary funding and bonuses for teachers who create and implement OER's, creating policies and providing infrastructure, or event making it an obligation, i.e. having institutional order. There is no "one size fits all" approach that could motivate all institutions equally and meet their needs. Therefore adoption and creation of OER's needs informed planning and strategic development (Mičunović, Rako & Feldvari, 2021).

DEVELOPMENT PHASES OF THE CONCEPT OF OER AND OER QUALITY

In 2011, the OPAL project (Open Educational Quality Initiative, http://web.achive.org/web/20140327055249/http://www.oer-quality.org/) developed the basic cornerstones for quality of open educational resources (OER). The approach argued that resources in themselves do not immediately lead to education quality but that rather the education process has to be taken into account while recognizing that the use of open educational resources changes an important component of the education setting. **Quality can be understood as fostering and encouraging open educational practices though the presentation of OER**. The initiative therefore developed the approach of **open educational practices** (OEP) which today is an accepted and well introduced concept expressing the use of open educational resources in educational settings characterized by the attempt to open the learning design. OPAL published important guidelines for learners, for education professionals, like teachers, trainers, curriculum designers or quality management professionals, for policy makers and for institutional leaders. For each of these stakeholder groups, a guideline was developed which provides a maturity matrix against which stakeholders can assess themselves and their ability for OEP capacity, meaning their ability to support quality in the open education process (Camilleri et al., 2014).

In 2014, with the support of the Joint Research Center of the European Commission, the European Foundation for Quality in e-Learning compiled and released the so far most comprehensive report on quality for open education resources in Europe (Camilleri et al., *State of the art review of quality issues related to open educational resources (OER)* 2014). The report lists several quality approaches dedicatedly developed for OER, explains the importance and value of open educational practices, and concludes that more efforts need to be made on a European scale to develop the concept of quality in an open education space.

Position Paper No. 1., titled 'Open Educational Resources and Repositories: The Role of Quality: Towards a community-oriented Quality Review Framework for OER ENCORE+ OER Quality Circle' underlined that quality for OER, respectively quality for open education is viewed as the single most important factor determining the uptake of OER in institutions and training contexts**.** According to ENCORE+ research, **the concept of OER and OER quality** has gone through **several development phases** with different focus points in research, policy and practice since its introduction in 2001 (Open, 2021: 8).

1st phase: During the 2000s up to 2010, a strong focus was put on **developing** open educational resources from a **resource centric** point of view, meaning a focus on data, metadata, interoperability, media types, definitions, and repositories. The process of searching for OER was at the center of attention, more than the OER themselves and their quality.

2nd phase: An analysis of the research, projects', and initiative environment shows that from **2010 to 2020,** more importance has been put on strategies of institutions, policies, competencies and development of the capacity of **usage, and quality (for learning)**.

3rd phase: 2020 – up to now. Today, **big data and artificial intelligence-based recommendation of learning materials** is within reach.

Within institutions and in the national environment of European member states, this is coming to the forefront and is becoming reality. Now, the question of quality for open education, taking into account the concept of **OER and OEP**, is therefore gaining new momentum. Where its uptake through maturing national environments and institutional policy work is gaining traction, quality comes to the forefront again as a necessary condition for its success. The ENCORE+ initiative takes the issue of quality as a focal point to develop cornerstone aspects of a **European Ecosystem of OER Quality** within the next three years (2021-2024) and beyond.

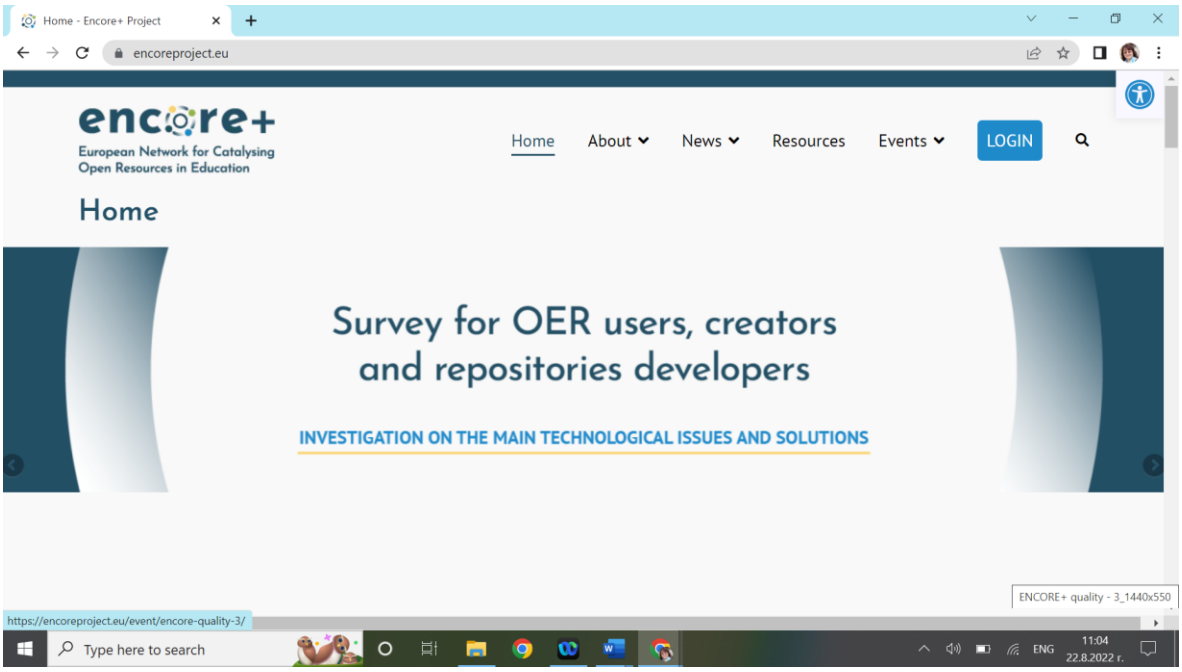


Figure 6. Website of ENCORE+: European Network for Catalysing Open Resources in Education

ENCORE+ Project (https://encoreproject.eu/) has identified that **there is a distinct lack of an integrated European OER quality assurance mechanism (including credentialing)** both in business and academia. The ENCORE+ initiative will consolidate existing sectoral quality frameworks to build a European overarching consensus on quality for learning through OER and frameworks for professional development in this area. Development of the **European open & community-led quality review framework for OER and open education** is already underway. The ENCORE+ initiative is therefore focusing on developing, testing, and mainstreaming **"community-oriented quality approaches"** where each repository is a focal point for a user community and serves its user community as a stream of providing OER (Open, 2021: 9).

The ENCORE+ team believe that territories, and spaces of communities using OER exist within higher education institutions and businesses. Those are developing their own specific environments, using their own tools, deciding on their own regulations, and building and agreeing on their community specific values. They think that it is important to add to the current focus of quality development in OER a new dimension of **community-oriented value-based quality considerations** (Open, 2021: 6). In the discourse on quality assurance, they observe a move away from a focus on quality characteristics towards a new "**quality community view**".

In the ENCORE+ OER Quality Circle the researchers explore what it takes to set up a **European collaboration for an open OER review community**. To engage institutions, businesses, educational professionals and learners into open review communities, **open quality frameworks are needed** as well as **emerging technologies to support them**, such as **Artificial Intelligence**.

The quality framework will be a tool which can be used by repository owners, by professionals (content creators, designers, etc.) and leaders in higher education and businesses and will comprise a quality charter for users. The tool will be presented as an open and adaptable framework which serves to identify quality improvement potential. The ENCORE+ initiative invite participants to mutually enter community-based quality review processes (Open, 2021: 9).

9.1. A list of critical success factors and their typological classification for the evaluation of the OER‘s

The concept and goals of the Erasmus+ Project ‘Digital Education for Crisis Situations: Times when there is no alternative’ (Project: 2020-1-HR01-KA226-HE-094685) **fit into these ongoing discussions and initiatives.**

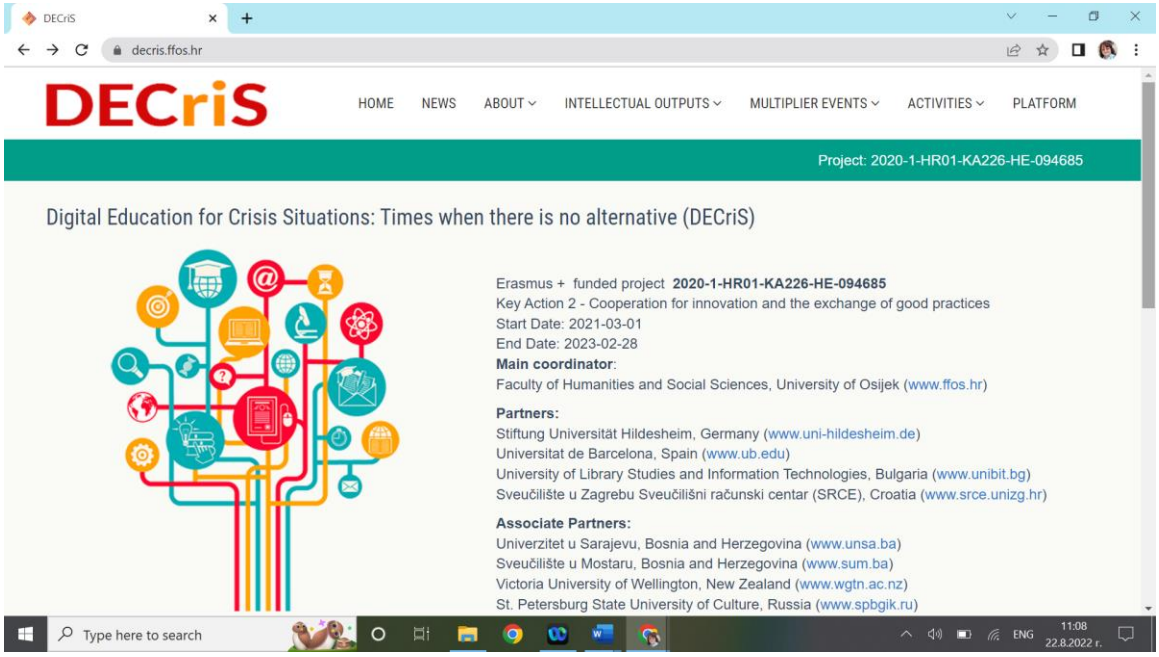


Figure 7. Website of DECriS Erasmus+ Project: https://decris.ffos.hr/

As a result of research activities in the frame of **Intellectual Output 3 (IO3)**, based on Literature **Review (incl. current publications 2020-2022) -** is presented a **List of critical success factors and their typological classification for the evaluation of the OER‘s** (in alphabetical order) (See Figure 9).

After the critical success factors have been separated and organized, this deliverable is prepared in form of a **Methodological Framework** which will be available to all HEIs wishing to use them in evaluation processes of OER’s.

The significance of the various critical success factors must be considered in relation to questions of **overlap, practicality, and sustainability** of the OER’s. More so, **The list of critical success factors and their typological classification for the evaluation of the OER‘s** and the **Methodological Framework** are designed to be in line to the implementation of the further DECriS Erasmus+ project intellectual outputs **IO4** (Case study on how the critical success factors work in practice) and **IO5** (Optimisation of OER’s) (See Figure 8).

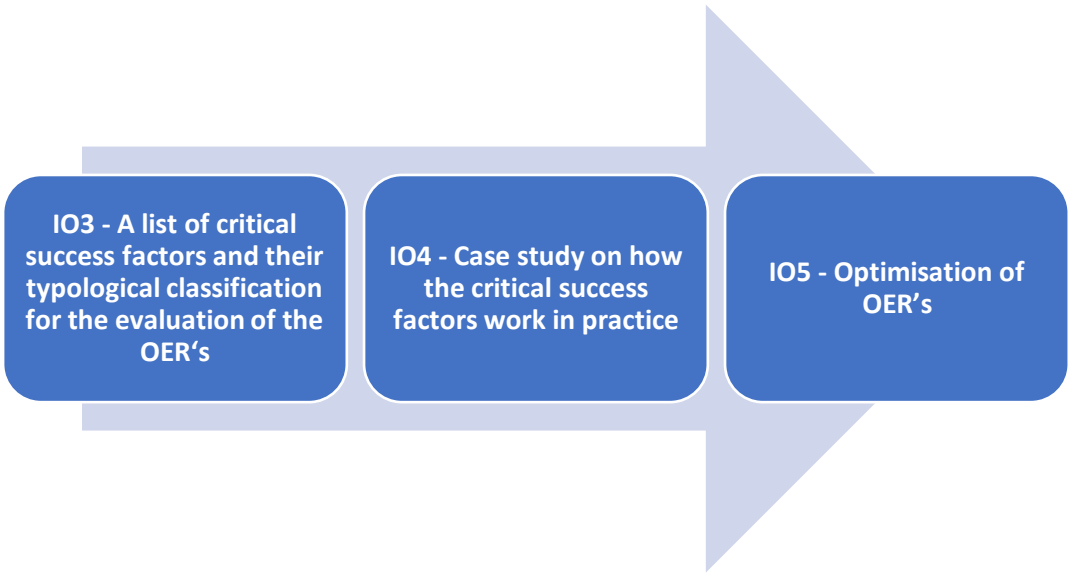
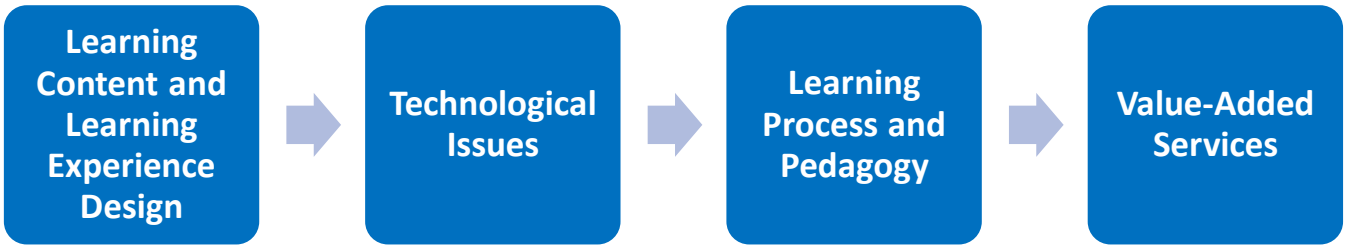


Figure 8. Correlation between IO3, IO4, IO5 of DECriS Project

Typological classification of critical success factors for the evaluation of OER's

with 4 main vertical layers and sublayers (in alphabetical order) is presented at Figure 9.

4 main verticals layers include:



Learning Content and Learning Experience Design	**Accuracy and Content Quality**
	Alignment
	Authority
	Breadth of perspectives
	Convenient and easy of use
	Content quality
	Interactivity (optional)
	Standardized metadata and Citation
Technological Issues	**Technical Requirements**
	Quality of the Final product

Learning Process and Pedagogy	Accessibility. Inclusiveness and Equality. Cultural relevance
	Open Licensing
	Pedagogical Goals and Pedagogical Approaches. Open Pedagogy
	Student engagement and assessment methods
Value-Added Services	Linguistic accessibility. Understandability
	Monitoring and evaluation
	National and International Collaboration

Figure 9. Typological classification of critical success factors for the evaluation of OER's

Learning Content and Learning Experience Design

Accuracy and Content Quality

Morganti & Towery (2020) in the Checklist for Evaluating OER explain the **accuracy** criteria as follows: the information in the OER is accurate; The OER provides appropriate coverage of material in a clear, logical manner; The OER reflects accurate and recent scholarship in terms of the subject matter; The OER provides a thorough and evenhanded exploration of course content; Freshness of information (currency and publish date presence). According to (Camilleri et al., 2014) **accuracy is a measure of (a) precision and (b) absence of errors**, of a particular processes or object.

Currency (Tang, Lin & Qian, 2020; Hettige, S. et al., 2022) **or freshness of information** (Bulathwela, Yilmaz & Shawe-Taylor, 2019); Morganti & Towery (2020), **content accuracy** and **technical accuracy** (Affordable, 2022; Connell, M. & Connell, J., 2020:15), **usability** (Covey, H., 2021) – is a key success factor for quality assurance of fully-functioning OER repositories. Tang, Lin & Qian (2020:9) share findings from their survey: participants revealed some OER were not readily maintained or updated as they found many outdated, broken, or missing links…. Participants complained that some OER contained inaccurate information or broken links the difficulty of finding appropriate resources was the primary barrier to using OER; Participants attributed this barrier to the duplicated resources, inefficient navigation of OER repositories. Covey, H. (2021) position usability as an important factor and share problems that faced users of OER: broken links, look out-of-date, text heavy OER's, lack of fresh design elements, difficult navigation.

In Affordable Learning Georgia Guideline two questions addressed the content accuracy and technical accuracy: Is the content accurate based on both your expert knowledge and through external sources?; Are there any factual, grammatical, or typographical errors?; Is the interface easy to navigate? Are there broken links or obsolete formats?

Other efforts must be put to achieve in OER the **quick circulation** (Manual, 2017: 19-20). Information may be disseminated rapidly (especially when compared to information published in textbooks or journals, which may take months or even years to become available). Quick availability of material may increase the timeliness and/or relevance of the material being presented.

An effective open educational repository should allow the educator to complete this **'quality circle'**, from discovery, to use, to professional evaluative feedback, and the process can then be repeated as many times as necessary (A Simple Outline of the Notion of the 'Quality Circle' in

Relation to OER (Connell, M. & Connell, J., 2020: 10). Taking account of the broader responsibilities required in teaching and learning, it is important to keep in mind that teachers, before teaching or learning even takes place, have to find learning resources that are appropriate to their teaching requirements, that are readily searchable and available, and that, where possible, already have some perceived level of trustworthiness because the resource has previously been curated or has proved useful to other educators. Teachers need some assurance about the **perceived quality of a resource** to help them select the best content possible for their teaching. So in looking at quality with respect to OER, we should think of **'quality-before-the-fact'** as well as **'quality-after-the-fact'**. (Connell, M. & Connell, J., 2020: 9). By this means, and others, the repository will then be able to offer teachers some information by which they are able to pre-determine to some extent the quality of the resources they select (Connell, M. & Connell, J., 2020: 4) and something more – to include featured resources (Ability of featuring resources that are potentially of high interest for teachers because of their design or content).

Manual for using and developing OER for ESD in VET, prepared by IO3 GreenSkills4VET, Erasmus+ Project, recommended the implementation of **competence-oriented assessment** and **quality assessment**. Also, it is underlined the possibility of **augmentation of class materials** - OER's can supplement textbooks and lectures where deficiencies in information are evident (Manual, 2017: 19-21).

Morganti & Towery (2020) interested in **content quality**: images, tables, weblinks, multimedia, headings and subheadings, formulas, font size, and **content structure**: contents is organized under headings and subheadings; headings and subheadings are used sequentially.

Checklist for evaluating the quality of an OER from CEDEC highlights the importance of the **cover of the resource** (first page or first visible screen of the resource): "The title of the resource is motivating and suggestive. The title not only offers a general idea of the content of the resource but is also written taking into account the educational stage, age and level of the students it is aimed at, or of the teachers and/or educational agents for whom the resource is built. Therefore, the title promotes interaction with the resource, arouses interest and stimulates reading/viewing it" (Checklist, 2020).

We identified some articles, which presented findings from lecturers and students experiences with OER's. Farrow, R. et al. (2020) review of open textbooks by educators and experts lists the following criteria: comprehensiveness, content accuracy, relevance longevity, clarity, consistency, modularity, organization structure flow, interface, grammatical errors and cultural relevance/appropriacy. In the survey of Angelopoulou and colleagues (2022:10) participants were asked to rate the quality of text in the surveyed course compared to texts used in other courses. Most students

(77%) perceived the quality of the OER material about the same as the quality of texts in other courses. Although no student responded that the textbook quality was worse than the traditional textbook pre-pandemic, they provided comments about features of the book being worse, such as lack of depth and limited practice examples that made it harder to understand some concepts. Students who rated the textbook quality as worse than traditional textbooks during the pandemic commented on the lack of breakdown of each individual section and the difficulty of understanding it the way it was worded. Students also provided comments about features of the book being better, such as the price (free), accessibility (online access), and interactivity (examples with step-by-step visualizations of concepts). Sharov, S. et al. (2021:204) state that one of the main advantages of OER is improving the quality of educational content; significant reduction of time for the creation of educational and methodological support in comparison with traditional educational and methodological resources. Teachers also report adding OER into the mandated curriculum to contextualize the content for students within current world events, issues, and interests, making the curriculum "more accessible, transparent, and flexible" (Blomgren, 2018: 61). Atenas, J. & Havemann, Leo (2013:32) state: "If repositories provide support for the realms of activity, which could summarised as four themes: **Search, Share, Reuse and Collaborate** - they will therefore work actively to promote **quality in the resources** themselves".

Short description of a sub-factor: **Accuracy and Content Quality**

The OER accuracy is a measure of precision, absence of errors, of a particular process or object, and reflects accurate and recent scholarship in terms of the subject matter. Content quality is appropriate to the knowledge, abilities, skills and attitudes that students must acquire during the teaching-learning process.

Alignment

Findings from the selected articles show that many authors focused on the **alignment** as a quality factor of OER. In addition to the term **alignment** (Morganti & Towery, 2020), researchers use other terms with similar interpretation, such as: **appropriateness** (Affordable, 2022; Connell, M. & Connell, J., 2020:15); **efficacy** (or fitness for purpose) together with **educational value,** potential of ease-of-reuse and **impact** (Camilleri et al., 2014); **relevance** (Bethel, E., 2020); **learning effectiveness (**Wiley, D., 2015).

Morganti & Towery (2020) describe the factor **alignment**: The OER aligns to the catalog's course description and student learning outcomes – it is clear to students what materials they should interact with in order to demonstrate mastery of specific outcomes; The OER aligns with the Core Curriculum Objectives – it is clear to students what materials they should interact with in order to demonstrate mastery of specific core objectives; The OER aligns with course student learning outcomes and objectives. Also, this includes **topic coverage** (Wikification features; Title Word

Count; Document Entropy; Length of Content), supported by (Bulathwela, Yilmaz & Shawe-Taylor, 2019; Molavi, M. et al., 2020). In that connection, they include **valuation** process: Controversies within the discipline/program are discussed with sufficient scope for the course learning outcomes and objectives.

Kılıçkaya, F. & Kic-Drgas, J. (2021) considers the contextual factors and design of OER. They suggested that OER could be useful sources for classes and also a valid replacement for commercial textbooks but must be considered the context where OER will be used and how OER are designed and used in this context since these two determine whether OER will work and suffice.
Tang, Lin & Qian (2020:9) emphasize that non-alignment between OER and course standards, leads to teachers' struggles to narrowing the search for OER. The survey of Tang and colleagues (2021) reported for the lecturer's concern whether OER fit their teaching decreased because some OER were unaligned with curriculum standards or inappropriate for students' grade or age. This caused teachers to spend significant time adapting OER, "nullifying the time-saving benefit of using an OER" (Tang, Lin & Qian, 2021).

According to Camilleri et al. (2014, cited by Connell, M. & Connell, J., 2020: 10) e**fficacy** meant the fitness for purpose of the object/concept being assessed. Within the context of OER, this might include concepts such as ease-of-reuse or educational value. The first of these factors – efficacy, or fitness for purpose – might be viewed as the single factor most relevant to teachers seeking effective resources for their teaching. **Impact** is a measure of the extent to which an object or concept proves effective. Impact is dependent on the nature of the object / concept itself, the context in which it is applied and the use to which it is put by the user. In quality assurance to develop effective and fully functioning OER repositories the interpretation of Connell, M. & Connell, J. (2020: 12) include **keywords** that methodically describe the resources to facilitate the retrieval of the materials within certain specific subject areas.

One of the key challenges in the uptake of OER, besides the questions of attitude and motivation, the ability and confidence to assess the quality of OER presents. Allen and Seaman have found that "two key qualities faculty consider when selecting learning materials for their students are **proven efficacy** and **trusted quality**" (Open, 2021: 6). It is therefore crucial to enable users to confidently select high-quality OER and thereby instill trust in these resources. This is in support with Wiley (2015) who posit that when people say "high quality" they mean all these things (author credentials, review by faculty, copyediting, etc.) except effectiveness. In the world of textbooks and other educational materials, "high quality" describes the authoring and editorial process and is literally unrelated to whether or not the educational resource supports learning. Wiley (2015) said: "We don't want "high quality" educational materials – we want **"effective" educational materials**. If we can change this one element of the education conversation, we'll have done something powerful." Connell, M. & Connell, J. (2020: 9) comment: "However, Wiley's contention, though a fundamental truth, is not enough. It is too simplistic, and it takes little account

of the realities of a teacher's needs". In that direction are questions suggested about **appropriateness** in the Affordable Learning Georgia Guideline: Is the content presented at a reading level appropriate for higher education students?; How is the content useful for instructors or students?; Is the content itself appropriate for higher education? According to Albright (2005) and Bethel (2020) important dimension in evaluation of OER is a **relevance**.

Findings from IO2 Survey of DECriS Erasmus+ Project, titled '*Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID- 19 crisis*' emphasized between the reasons for not using OER - **the low coverage for a specific course** (Boté-Vericad, Argudo & Urbano, 2022).

Short description of a sub-factor: **Alignment**

The OER aligns to the catalog's course description and student learning outcomes. Similar terms include appropriateness, efficacy (or fitness for purpose), educational value, potential of ease-of-reuse and impact; relevance; learning effectiveness.

Authority

In order to improve on current practices without placing additional resourcing burdens on operators of repositories, Atenas, J. & Havemann, Leo (2013:32) propose that there should be more breadth and consistency in the data captured on upload. First, it is crucial that authors should identify themselves, as well as potentially state their institutional membership (which would facilitate search and analysis by author, region, or institution). Indeed, to help ensure the quality of the content it is important to provide a sort of 'gate keeping' mechanism such as requiring registration for those who want to share a resource, requesting them to provide at least a minimum of personal and institutional data (which then allows for automatic population of these fields on resource upload). For users simply wishing to access resources, no registration need be required. Similarly, Morganti & Towery (2020) asked the following data to be presented about authority: Author (h-index; citations; wiki reputation); Content (link statistics and page rank); Organization (university rank and Reputation). Bulathwela, Yilmaz & Shawe-Taylor (2019) explore the methodology about automatic, scalable quality assurance in Open Education and suggest Five Quality Verticals: Understandability (Yellow), Topic Coverage (Green), Freshness of Information (Cyan), Presentation (Blue), and authority (Orange). In quality assurance to develop effective and fully functioning OER repositories the interpretation of Connell, M. & Connell, J. (2020: 12) include: Authorship - analyse if the repositories include the name of the author(s) of the resources.

Short description of a sub-factor: **Authority**

The OER provides data about the author/s or educational agency (name and if applicable: h-index, ORCID), affiliation/institutional membership.

Breadth of perspectives

Morganti & Towery (2020) describe the factor **breadth of perspectives**: The OER reflects multiple perspectives and points of view on course topics; The OER provides theoretical perspectives for the topic, addressing major theories appropriately; The OER includes multiple modalities (e.g. graphics, tables, and information other than text) to support student learning; The OER includes additional faculty resources and free available external relevant resources; The OER is designed to promote learning. In addition, at Manual (2017: 19-20) there are listed other excellent perspectives that OER's bring to the educational institutions, such as: **continually improved resources** (unlike textbooks and other static sources of information, OER's can be improved quickly through direct editing by users or through solicitation and incorporation of user feedback. Instructors can take an existing OER, adapt it for a class, and make the modified OER available for others to use); **enhancement of regular course content** (for example, multimedia material such as videos can accompany text. Presenting information in multiple formats may help students to learn the contents more easily being taught); **showcasing of innovation and talent** (A wide audience may learn of faculty research interests and expertise. Potential students and donors may be impressed, and student and faculty recruitment efforts may be enhanced); **ties for alumni** (OER's provide an excellent way for alumni to stay connected to the institution and continue with a program of lifelong learning). Van Allen, J., & Katz, S., 2020 provide an overview of OER with considerations for educators during the COVID-19 pandemic but also makes the case that OER should be integrated into classrooms beyond the pandemic. To support educators in finding and using OER, their work highlights repositories that include a breadth of various learning materials across subject areas and educational contexts. The authors provide specific suggestions for finding, personalizing, and contextualizing OER and propose **strategy for educators how to get started with OER during the collective crisis and beyond**.

In the Report, titled 'Formative Evaluation of Open Education Networks', 11th recommendation is to **develop more student-facing communications materials**. The benefits of open education for students should continue to be emphasized and highlighted. The evaluation found that many network leaders believe that communication for open education should be more student-centric and that too many students are unaware of the availability and benefits of open education at their colleges. It is recommended that networks work with an external communications firms ..., to develop student facing materials and messages that can be incorporated into materials that could be used by higher education institutions' student services, advising, financial aid, and enrollment services staff who are in frequent and close contact with students. (Formative, 2021).

Kokot-Kanikuła, K. & Wałek, A. (2021) article, titled "Open Educational Resources - a review of the initiatives in Poland and around the world" has the aim to familiarize the readers with the idea of open educational resources, the legal and organizational foundations crucial for their creation and development, as well as the latest initiatives undertaken in the field of OER dissemination. In the first part of the article, the authors explain the concept and role of open educational resources in the teaching process. Then, they present selected initiatives implemented by members of European Network of Open Education Librarians (ENOEL) and the results of a survey conducted among European academic libraries by SPARC Europe. The analysis of publications, the content of legal documents, reports, and recommendations made it possible to precisely define the meaning of open educational resources for their users. The multifaceted nature and scale of the activities confirm that **modern teaching can develop faster based on open educational materials**.

Short description of a sub-factor: **Breadth of Perspectives**

The OER reflects multiple perspectives and points of view on course topics. The OER provides theoretical perspectives for the topic, addressing major theories appropriately, includes multiple modalities (e.g. graphics, tables, and information other than text) and continually improved resources to support student learning.

Convenient and easy-to-use

Educators searching for OER by and large make use of repositories to search for, locate, download, use, re-use and adapt the learning resources they need for their teaching. It would seem to make sense that effective repositories will make this process as simple and as easy-to-use as possible. They should also seek to give teachers mechanisms that will allow them to provide professional feedback on the value and usefulness of the resources once they have deployed them in their teaching. By this means, and others, the repository will then be able to offer teachers some information by which they are able to pre-determine to some extent the quality of the resources they select (Connell, M. & Connell, J., 2020: 4). The use of OER's instead of traditional textbooks or course packs, etc. can substantially reduce the cost of course materials for learners is an advantage of OER's mentioned of many authors: **less expense for learners** (Manual, 2017: 19-20) connected with **scalability** (OER's are easy to distribute widely with little or no cost); **cost saving** (Oelfke, A. L. et al., 2021; Angelopoulou et.al., 2022:5; Gordillo, A. et al., 2020; Sharov, S. et al., 2021:204; Shenoda, M., 2020; Bethel, E. (2020); Cozart et al, 2021; Kılıçkaya, F. & Kic-Drgas, J., 2021). Wiley (2015) states: *"And don't forget – when materials are so expensive that students can't afford them, they are perfectly ineffective"*.

Several studies reported convenience and easy-to-use as a success factor for the effective OER. Oelfke, A. L. and colleagues (2021) conduct a survey to gather students' feedback on the use of

OER across different disciplines and findings emphasized the importance of OER quality, cost savings and ease of use. Sharov, S. et al. (2021:204) underline the ability to use OER on various electronic devices.

Gordillo, A. et al. (2020) state: Open educational resources (OER) can contribute to democratize education by providing effective learning experiences with lower costs. Cozart and colleagues' study (2021) compared pre-service teacher-student outcomes and perceptions of a traditional textbook versus no-cost, online materials such as open educational resources (OER) in an undergraduate Foundations of Education course. Outcomes were measured by comparison of final course grades. Perceptions were determined through quantitative and qualitative survey questions added to existing end-of-course evaluations. Results revealed students found OER and no-cost online materials more useful to their success in the course and more engaging than a traditional textbook. Qualitative analysis further revealed that while students appreciated there was no cost for the online materials, they preferred them to a traditional textbook because of the customized content. Results suggest students find instructor-curated, no-cost online readings more useful and preferable to a traditional textbook without compromising student academic performance.

Based on 16 studies evaluation, Kılıçkaya, F. & Kic-Drgas, J. in 2021 reported for two major findings: (1) when students use OER, they obtain the same learning outcomes as with traditional textbooks while saving money; and (2) both students and teachers find OER comparable to traditional learning resources in terms of quality. This is in line with a recent study by Nagashima, T., & Hrach, S. (2021) which point out advantages such as: the cost benefit, no significant difference between the learning outcomes of students who used open textbooks and those with traditional textbooks, unrestricted access to materials, comprehensive content, cost to the student, easy to find, perceived content quality, ease of use, repurposing, accessibility, increased student engagement. Several common motivating factors that affect OER adoption positively, are: cost savings, instructional benefits (e.g., flexibility, quality of content) and unrestricted access to materials. It is also important to consider contextual factors such as institutional policies and institutional support.

As we mentioned before, Wiley, D. (2021: 411) appeal toward **stronger theorization of OER research**. Over the short-term, including during the rapid shift to digital learning catalyzed by the COVID-19 pandemic, OER adoption can be expected to save college students money and close the achievement gap between Pell-eligible students and their wealthier peers. Over the longer term, this benefit will likely disappear, and **faculty will need to explore the affordances of the 5Rs more fully** in order to create dramatic improvements in success for all students. More specifically, Shenoda (2020) suggested achievement of two main goals of the implementation of OER - **improvement of access to course materials through cost reduction** and **maintenance of course quality, based on the evaluation**.

Much research is centred around **availability** (Camilleri et al., 2014; Morganti & Towery (2020); Bethel, E., 2020) and similar terms as findability and visibility (Open, 2022: 8), discoverability (Open, 2019; Manual, 2017: 19-20; IFLA, 2019) of OER's. According to Camilleri et al. (2014) the concept of **availability is a pre-condition for efficacy and impact to be achieved, and thus also forms part of the element of quality**. In this sense, **availability includes concepts such as transparency and ease-of-access**. Users need to be empowered to find the right OER for their needs without a long and tedious search. Platforms and curation can play a major role in this regard, as well as offering a potential means of addressing concerns around quality, given that they make it easier to assess and identify materials (Open, 2019). An interoperable European metadata and search engine strategy enabling a connected European repository alliance is still to be achieved (Open, 2022: 8). Morganti & Towery (2020) discuss the following issues: the OER support materials are available for use on the first day of class; the OER are accessible in multiple modes, according the 5Rs permissions of OER – for retain, reuse, revise, remix, redistribute (e.g., for download, printing, reading online and mobile technology). For expanded access to learning students anywhere in the world they can access OER's at any time, and they can access the material repeatedly (Manual, 2017: 19-20). This is in line with recent studies (The Rich, 2019; (Ossiannilsson, Aydin & Wetzler, 2020); Sharov, S. et al., 2021:204; de los Arcos et al., 2016; Nagashima, T., & Hrach, S., 2021) which echoed the potential of OER to transform education by providing greater access, flexibility, and affordability.

Short description of a sub-factor: **Convenient and easy for use**

The effective OER will make the process of searching, (re-)using, or adapting OER as simple and convenient as possible providing effective learning experiences with cost-saving manner.

DISCUSSION

Findings from the selected articles allow to summarize the following **challenges and obstacles, which students associated with the use of OER**, such as: differences between students and tutors' experiences (Covey, H., 2021); unclear instruction and guidance, insufficient self-regulation skills; need for internet access, slow internet connections. Hettige, S. et al (2022) reported students are not able to differentiate between good and bad quality of OER and reading on digital screens is considered to disturb emotional feelings of users/students. The Oelfke and colleagues (2021) conduct a survey to gather students' feedback on the use of OER across different disciplines. Exploring the issue of consideration of student population and accessibility of OER their findings confirm that older, returning, and part-time students prefer printed copies of learning materials.

Several studies reported about **benefits** and **challenges that faced lecturers of using OER**.

Nagashima, T., & Hrach, S. (2021) through analyzing survey responses for the open-ended question regarding the perceived **benefits of using OER**, it was identified four mid-level themes that the faculty commonly reported: pedagogical improvements, collaboration, discoverability of materials, and students' access to learning materials. Despite the mentioned benefits, surveyed faculty also reported a variety of challenges associated with the adoption of OER. It was found **four main categories of challenges** that the faculty experienced: low levels of discoverability and content quality, lack of time, collaboration, and unfamiliarity with technology and copyright.

In IO2 Survey of DECriS Erasmus+ Project, titled 'Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID-19 crisis' were positioned as important issues **the teachers' information seeking behaviour and OER discoverability**. In general, it has been observed that **there is a low promotion of OER sources** (specific repositories and search engines) at HEI and also **a lack of capacity building** to know where to find OER. Researchers revealed for the need of capacity building about the OER into the continuing education of teachers, since **one of the main barriers for not to use the OER found was the lack of training in this area** (Boté-Vericad, Argudo & Urbano, 2022).

Interesting observations in that direction is given by Santiago, A., & Ray, L. (2020) in their survey. When faculty cannot find suitable OER in their discipline, they may consider the possibility of creating their own materials without understanding how they can use and adapt existing OER in doing so, indicating that **additional education is needed in this area**. Because there is no time to releasing a highly polished product, OER are often continual works-in-progress, as faculty complete their work enough for student use, but "completeness" is a moving target due to constant updates. Some faculty create resources that cannot be technically considered OER because they are not openly licensed; instead, they are delivered through the LMS with the intent of replacing the textbook. This presents an opportunity to transition existing course materials into OER (Santiago, Ray, 2020:402).

Tang and colleagues (2021: 3221) state that teachers found that it is **time-consuming** to find and adapt OER tailored to their needs and it is time-consuming to determine whether a resource was OER due to **insufficient knowledge about open licensing**. Contrary, the lecturers from Ukraine notice that the use of OER has led to significant reduction of time for the creation of educational and methodological support in comparison with traditional educational and methodological resources and to improving the quality of educational content (Sharov, S. et al., 2021:204).

A survey of teacher education faculty at the authors' institution (City University of New York (CUNY), USA) revealed that only 1% of faculty used OER to share information and deliver content to students, with only two respondents indicating they had their teacher candidates create and share OER with others (Van Allen, J., & Katz, S., 2020: 212).

Petrich (2020) case study presents a library-led Open Educational Resource (OER) training program for faculty and an assessment of barriers to OER adoption on campus. It examines program assessment data (including faculty-reported needs to increase the likelihood of OER adoption) and analyzes a community-focused outreach strategy for a new OER program. It offers a model for other libraries to follow in creating sustainable practices. Limited awareness and understanding of OER's are barriers to adoption. Although challenges to OER adoption exist, those barriers can become starting points in developing services that make OER more approachable to users. To address the challenges of low awareness and adoption of OER's, the library developed a stipend program to launch OER services on campus (Petrich, M., 2020).

Canchola, A. et al (2021) paper presents the validation of ASOEP, a tool for evaluating attitudinal aspects that teachers in higher education have regarding the creation, management, reuse and use of OER in Latin America.

Interactivity (optional)

Interactivity is the functionality of OER, which allows an interaction, as a dialogue, between the device and the user (Checklist, 2020). In case of lack of human interaction between teachers and learners, OER material is created to stand alone, and since self-learning users may access the material outside of a classroom environment, they will miss out on the discussion and instructor feedback that are characteristic for credit classes and that make such classes useful and valuable (Manual, 2017: 20).

Short description of a sub-factor: **Interactivity (optional)**
Interactivity is the functionality of OER, which allows an interaction, as a dialogue, between the device and the user.

Standardized metadata and Citation

In the creation of digital learning resources, the European Consortium for Accreditation (The European, 2022) suggests as an important quality criterion that **learning objectives should be described in a comprehensible way**. They should be defined in clear and concrete terms (short and simple sentences) and focus on what students are expected to be able to demonstrate and describe observable abilities which can be assessed. This is in line with the questions proposed in Affordable Learning Georgia Guideline: Is the content, including any instructions, exercises, or supplemental material, clear and comprehensible to students? Is the content well-categorized in terms of logic, sequencing, and flow? (Affordable, 2022). Atenas, J. & Havemann, Leo (2013:32)

state: authors should give some basic information about the resource, possibly by adding an abstract that includes the pedagogical scope and a set of keywords. This data should be added on forms provided by the repository in a structured but simplified way… Also, authors should be asked to explain any technical requirements if specialist software is required to play or display the resource. Where possible (for example, where the resource contains machine readable text), repositories could also automatically perform content indexing on upload, which the author could then have the option to review and edit or leave as is. Connell, M. & Connell, J. (2020: 10-13) note too, that applying the process of resource-creation to OER is necessarily more complex than the same process applied to traditionally produced resources, given the potential multiplicity of facets of authorship, sharing, modification, use and re-use in OER. As factors of quality assurance of effective and fully-functioning OER repositories they include **metadata** (Introduce standardized formats of metadata (Dublin Core - IEEE LOM – OAI-PMH) for interoperability and **Source Code or Original Files -** allow downloading the original files or source code of resources so they can be adapted.

The importance of **Comprehensive OER Description with Standardized Metadata** underlined by (OER Dynamic, 2020: Quality Assurance in 1. Capacity Building (Aggregation of repository systems with common quality standards and evidence based adoption strategies); Ingavelez-Guerra et.al., 2022:9704-9705: quality of metadata for description); (Tavakoli, M., Elias, M., Kismihok, G., & Auer, S., 2020:2, critical factors for OER: metadata quality, quality control); (Molavi, M. et al., 2020, the authors present an OER topic extraction approach with text mining techniques to generate high quality metadata of OER); (Tang, Lin & Qian, 2020, 2020:9: for accuracy criteria – the lack of quality assurance is a challenge). For the description of the accessibility characteristics of the contents published in learning objects, it is necessary to use information description mechanisms based on metadata, which would facilitate the information of a digital resource and its possible requirement based on preferences and needs of the student“ (Ingavelez-Guerra et.al., 2022:9704-9705). Coetzee, S. et al (2020) work emphasize the importance of the **usability and understandability of metadata attributes**, focused on in a specific area of geospatial educational resources. This also supports from the survey analyzed the impact of metadata on the quality of OER by de Oliveira, Paschoal & Barbosa (2021) and Barbosa (2022). Conclusions are the following: OER metadata must be directly related to OER content; OER quality is directly related to their metadata; Lack of relevant metadata can “hide” qualified resources in OER collections. Those authors put attention to the **standards compliance**: the use of standards is important to enabling service interoperability and content exchange and to **understandability**: the OER and their metadata must be easy to understand. Failure of any of these items will impact the quality of the OER, because:

- ✓ Lack of relevant terms in the metadata, which increases the difficulty of identifying relevant resources
- ✓ Lack of documentation to support users in understanding the meaning of each metadata
- ✓ Lack of standardization to describe the same information (date, resource type, etc.)
- ✓ Poor metadata description
- ✓ Internal asymmetry: resources from the same OER repository have different metadata

External asymmetry: OER collections have adopted different set of metadata, making integrated searches impractical (Barbosa, 2022; de Oliveira, Paschoal & Barbosa, 2021).

Barbosa (2022) and de Oliveira, Paschoal & Barbosa (2021) generalized: an OER is characterized by its metadata…. The OER's are stored in repositories. The purpose of OER repositories is to support educators in searching for content in a structured way, sharing their own resources, re-using existing materials and creating new resources through adapting or translating, and in collaborating with other members of the user community by commenting upon, reviewing, promoting, and developing resources.

Short description of a sub-factor: **Standardized metadata and Citation**

The cover of the OER (a page or visible screen of the resource) includes comprehensive OER description with standardized metadata and information on how to cite the OER.

Technological Issues

Technical Requirements

The study sample considered technological issues, incl. Learning Management Systems (LMS) as important pillar for the quality of OER. Santos-Hermosa, G. et al. (2020) analyze OER at Spanish universities with paying special attention to platforms used and policies. They conclude that **technical factors might affect the openess of OER and found the need for greater institutional promotion**. It is crucial **to ensure that the learning content will work within the existing system**. Using digital OER's, it's important to make sure they will work on all platforms and devices students might be using, in and out of educational institution. To make the most use of OER, also need ways of storing and organizing content so it can be accessed, modified, and shared by teachers. Some students may have trouble using some OER's if they have a slow or erratic internet connection. Other OER's may require software that students don't have and that they may not be able to afford. A good wireless network, high broadband connectivity, and a solution that provides students with regular and equitable access to a device is key. This can be one-to-one, bring your own device, a computer lab, or some other solution (Manual, 2017: 19-20). The parts about

Technical Requirements and Format and Style at the 'Checklist for evaluating the quality of an OER' from CEDEC consider the needs of the technology with which the resource is made and give the recommendation that the resource must be designed considering formal guidelines that improve the comprehension capacity of all people (Checklist, 2020).

Findings from IO2 Survey of DECriS Erasmus+ Project, titled '*Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID- 19 crisis*' revealed that HEI were not ready for the challenge that an intense demand put on the technological infrastructures, despite at the end they managed to overcome the difficulties quite efficiently, either with more in-house resources or by outsourcing, like in the case of SaaS licenses for videoconferencing platforms to deliver online classes. Also, some gaps in the digital competence of both teachers and students were also identified. Results show the necessity for professors to be trained to shift face-to-face teaching to online teaching. On the other hand, students also need to be trained to be able to learn online, such as how to behave in class in relation to engagement, interaction, collaboration, and time of self-management (Boté-Vericad, Argudo & Urbano, 2022).

Short description of a sub-factor: **Technical Requirements**

Technical factors that provide the openness of OER and ensure that the learning content will work within the existing system, on all platforms and devices that learners may use. The resource is designed taking into account formal guidelines that improve the comprehension capacity of users.

Quality of the Final product

According to Morganti & Towery (2020) the Quality of the Final product/Service include: The content in the OER is clear and understandable; The interface and design are easy to navigate; The sound quality is high for audio resources; The video and audio (if included) quality are high. The OER contains no spelling errors or typos.

The purpose of OER repositories is to support educators in searching for content in a structured way, sharing their own resources, reusing existing materials and creating new resources through adapting or translating (Atenas, J. & Havemann, Leo, 2013). On p. 21 of that Report was given the proposed by Connell, M. & Connell, J. (2020: 12-13) **quality assurance** components to develop effective and fully functioning OER repositories such as: Featured resources; User evaluation tools, Peer review, Authorship, Keywords, Metadata, Multilingual support, Social Media support, Creative Commons Licenses, Source Code of Original Files.

Previously was mentioned, the ENCORE+ initiative is focusing on developing, testing, and mainstreaming "**community-oriented quality approaches**". It is important to add to the current focus of quality development in OER a new dimension of community-oriented value-based quality considerations. (Open, 2021: 14). The research team formulated the Need 4, titled **'Integrated European OER quality paradigm and assurance mechanisms'** with the following tasks:

- identifying the key quality concerns for future OER repositories, communities and users;
- piloting a new quality framework focused on harnessing and enabling OER innovation;
- establishment of **European open & community-led Quality Review Framework for OER** (Open, 2021: 9).

At ENCORE+ Workshop at March 2022 the Thematic Peer Group discussed the current state of quality development for OER repositories in Europe to dimension the problem of quality for OER repositories. One of defined problems is about **understanding of quality**: It is often unclear how quality regarding repositories is defined. It is often not defined what the term quality refers to; whether it refers to the content, i.e. OER itself, to the organization of the repository, to the user-friendliness, etc. Quality standards are existing but have yet to be put to practice. (Open, 2022: 8). The next issue is **community and communication**: There is a great variety of OER repositories across Europe, but there is not yet a stable overarching community that has agreed on a quality framework, uses it jointly and develops it further. The other important issue is **quality assurance processes**: Regarding the quality of OER itself, there is a lack of possibilities to get OER reviewed. Calls were made for reliable peer review procedures. Also, **user participation** is addressed: OER repositories need to react more to users' needs, hence those needs must be identified. This could be established by engaging users more in repository communities. User trust in OER needs to be strengthened (Open, 2022: 7-9).

Connell, M. & Connell, J. (2020), citing Chounta (2019), express the similar opinion that the quality of a learning resource depends on the demands and requirements both of the educator and of the learner rather than on some pre-determined characteristic of the resource: "In this sense, quality assurance and validation cannot come from a topdown approach that will perform a centralized quality control. On the contrary, such quality control should consider the end-users, engage them proactively in providing feedback and suggestions for enhancements, support them in adapting the content themselves and sharing it with the community."

In the discourse on quality assurance, the ENCORE+ experts observe a move away from a focus on quality characteristics towards a **new "quality community view"**. In the ENCORE+ OER Quality Circle the researchers explore what it takes to set up a European collaboration for an open OER review community. To engage institutions, businesses, educational professionals and learners

into **open review communities, open quality frameworks are needed** as well as **emerging technologies to support them**, such as **Artificial Intelligence** (Open, 2021: 6).

Short description of a sub-factor: **Quality of the Final product**

The OER content is clear and understandable; the interface and design are easy to navigate; the video and audio (if included) quality are high; the OER contains no spelling errors or typos. The OER allows the educator to complete the 'quality circle': from discovery, to use, to professional evaluative feedback, and the process can then be repeated as many times as necessary (Connell, M. & Connell, J., 2020: 10).

DISCUSSION

Several studies reported that one of the reasons of not frequently used of OER's is the lack of **institutional policies regarding OER's** and the lack **of institutional support and motivational factors** for teaching staff to create and share OER (Camilleri et al, 2014; Canchola, A. et al., 2021; Connell, M. & Connell, J., 2020: 10; McGrath, C., 2020; Nagashima, T., & Hrach, S., 2021; OER Dynamic, 2020; Open, 2021: 7; The Rich, 2019; Santos-Hermosa, G. et al., 2020; Tang, Lin & Qian, 2021:3220-3221).

Findings from IO1 Survey of DECriS Erasmus+ Project, titled 'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project show that only 7 institutions (out of 26 that are using OER's during the pandemic) have institutional policy regarding OER's. Among those institutions that have an institutional policy about OER's, top reason for such document is "OER's supports adaptive and flexible teaching and learning". At 52% of surveyed institutions the production and usage of OER's is the result of the work of an engaged individual. There is a visible necessity for the creation of institutional initiatives which govern and promote the creation of OER (Mičunović, Rako & Feldvari, 2021).

In IO2 Survey of DECriS Erasmus+ Project, titled 'Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID- 19 crisis' researchers systematized **the reasons for not using OER**: the lack of information, their dispersion in very different platforms and repositories, their irregular quality, their inexistence in teachers' own language and the low coverage for a specific course. Therefore, the OER does not seem to be the out-of-the-box solution, unless there is some awareness among teachers and students. Some teachers recognized that it's very time-consuming to look for them

and later adapt them for their teaching purpose. As a result, OER should be unlikely to be considered during crisis situations if the cultural shift has not still become (Boté-Vericad, Argudo & Urbano, 2022).

Government support and institutional leadership have been crucial for OER (The Rich, 2019).

The experts from OER Dynamic Coalition (2020) in Quality Assurance at 2nd point included "2, Policies (To encourage the development and/or implementation of policies that recognize OER users and creators, as well as policies that stimulate the creation, access, re-use, repurpose, adaption and redistribution quality OER by educator and learners)".

In the Report, titled 'Formative Evaluation of Open Education Networks' the 10th Recommendation calling to continue **to develop a communications strategy to spread awareness of Open Educational Resources and Practices**. In every aspect of the evaluation and across network leaders, improved communication, and greater awareness of OER among stakeholders and decision-makers are cited as areas of improvement. Insufficient communication about what open education is-and isn't- how it works, the licensing process, its benefits and value propositions, and its potential for students and educators is considered by leaders as a major barrier in both higher education and K-12 sectors. Better communication of the benefits and value of OER is needed across stakeholders, and decision-makers (Formative, 2021).

Learning Process and Pedagogy

Accessibility. Inclusiveness and Equality. Cultural relevance

A deep understanding of the requirement of inclusive, equitable and accessible quality of OER's is in a focus of UNESCO and OER Dynamic Coalition documents and advocates for the implementation of an inclusive communication (UNESCO, 2019; OER Dynamic, 2020). The oral and iconic communicative guidelines must be oriented towards the inclusion of men and women as well as all kinds of people from an egalitarian perspective (Checklist, 2020). Morganti & Towery (2020) state that the OER enhances meaning through collaborative experiences, develops an attitude of acceptance and respect for others' opinions and resources must establish the inclusion through classroom activities. Connell, M. & Connell maintain that questions of trust (itself one element of quality, of course), time, skills and culture must be dealt with alongside questions of quality. Covey, H. (2021) describes a user research study to gather usability and Ux apects when using OER's for professional and technical communication courses. Findings show that differences can be identified between multi-aged/experienced users and multimodal, multilingual, and multi-cultured categories of professional and technical communication users. Teachers also report adding

OER into the mandated curriculum to promoting culturally sustaining pedagogy (Paris, 2012). Tang and Bao (2020:10) insist on further promotion of the social justice in education, to encourage teachers to recognize the cultural differences and adapt OER with reference to local culture and norms.

Findings from the selected articles (Azadbakht, E. et al., 2021; Morganti & Towery (2020); Checklist, 2020; Zhang, X. et. al., 2020; Neto, L. et al., 2020; Affordable, 2022; Connell, M. & Connell, J., 2020:15) show that for open educational resources (OER's) to be truly open to all, they must be accessible to learners with disabilities, including those with visual, auditory, physical and cognitive disabilities. Although not all people with disabilities face barriers when using a typical OER, accessibility is important for those who rely on a screen reader or other assistive technology and inclusive design to interact with websites and other digital files and programs. The OER must be designed from an open and inclusive perspective, making it as easy as possible to understand it and interact with the material in case assistive technology is needed (Checklist, 2020).

Zhang, X. et. al. (2020) and Azadbakht, E. et al. (2021) highlighted that researchers should focus more on considering the **four accessibility principles** when providing OER's:

- Perceivable (Text Alternatives, Time-based Media, Adaptable, Distinguishable);
- Operable (Keyboard Accessible, Enough Time, Seizures, Navigable);
- Understandable (Readable, Predictable, Input Assistance);
- Robust (Compatible).

Zhang, X. et. al. (2020) conclude that accessibility is still in its infancy within OER and there is a need of further work. OER can serve the needs of those with diverse abilities for a number of complementary reasons: permissions granted by an open license remove legal barriers to adapting and customising OER, making it possible to create learning environments that are more flexible and robust for all students; OER offer the opportunity for instructors to curate materials authored by a diverse set of individuals, including those who identify as disabled, normalizing and reducing stigma while sharing viewpoints that have historically been marginalized; unlike commercially published materials, OER that are adapted to meet accessibility requirements can be retained and freely shared with communities, reducing duplicative work at and across institutions; OER adoption can reduce costs, which benefits all students but can be especially beneficial for students with disabilities who may face additional financial pressures (Zhang, X. et. al., 2020).

In Affordable Learning Georgia guideline four questions assist the accessibility decisions: Is the content accessible to students with dis-abilities through the compatibility of third-party reading applications? If you are using Web resources, does each image have alternate text that can be

read? Do videos have accurate closed captioning? Are students able to access the materials in a quick, non-restrictive manner? (Affordable, 2022). Atenas, J. & Havemann, Leo (2013:32) underlined: authors should clarify if they followed any usability guidelines to create the resources and if students with learning disabilities will need extra support or specific software to read, listen to, or view the resource.

Equity in education is an important issue during times of normal operation. During the COVID-19 pandemic, educational institutions worldwide have made massive shifts to remote learning. With this change, educational news sources are reporting grave disparities in student access to learning, particularly for students with disabilities, those who are homeless and English language learners, along with calls for elected officials, parent leaders and community leaders to come together to rapidly address these issues (Viega, 2020; Van Allen, J., & Katz, S., 2020: 209).

Short description of a sub-factor: **Accessibility. Inclusiveness and Equality. Cultural relevance**
The OER is designed from an open and inclusive perspective; it is accessible to learners with disabilities (usability guidelines are followed). The OER could be used or adapted for multi-aged/experienced users and multimodal, multilingual and multi-cultured categories of professional and technical communication users.

DISCUSSION

Veletsianos' (2021) paper, titled "*Open educational resources: Expanding equity or reflecting and furthering inequities?*" argues that open educational resources (OER), such as open textbooks, are an appropriate and worthwhile response to consider as colleges and universities shift to digital modes of teaching and learning. Paper questions the role of OER in creating equity opportunities and problematic areas where inequity is reinforced in terms of visibility and representation. Veletsianos (2021:408-409) discusses: „If we are not mindful, the creation and use of OER could not only reflect inequities but reinforce them as well. (…) A critical and equity-seeking adoption and examination of OER materials is necessary for practitioners and researchers to further dismantle some of the structural inequities that OER may reproduce. For instance: By asking Who creates OER? we may be able to examine the systemic structures that (dis)empower certain individuals from creating openly licensed materials. Will we discover, for example, that OER are predominantly authored by men reflecting the disparate publishing rates that we observe within educational technology journals? What steps should we take, if, for instance, we discover that a disproportionate amount of OER is produced by tenured white professors and we lack OER authored by scholars of colour? The author concludes that without scrutiny, such efforts may reflect or reinforce structural inequities. Thus, OER can be a mixed blessing, expanding inclusion and equity in some areas, but furthering inequities in others.

Rodés (2021) addressed the situation in Latin America universities and proposed A Latin American Critical Conceptual Model on the Adoption of Open Educational Resources, which includes four categories influencing the adoption of OER among professors in Latin American universities: 1) Construction of Teacher Professional Identity; 2) Practices and Transformations in the Curriculum; 3) Creation, Use and Opening of Digital Educational Resources; and 4) Social Representations about Repositories of OER. That critical conceptual model may be adopted by researchers from all regions who seek to unveil and decolonise the hidden curriculum of OER.

Open Licensing

OER does not come without specific challenges. Although the idea behind OER is that it should be shared broadly, this may not be so easy for a variety of legal reasons. Using OER will still require understanding of licensing terms, which may stand in the way of particular types of reuses. Producing OER, especially when this involves drawing on existing copyrighted works, such as newspaper articles or pictures also requires knowing what is possible, and then how to apply the right license and make this clear to developers and to users (Open, 2019).

According to UNESCO Recommendation on Open Educational Resources (OER) **open license** refers to a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the rights to access, re-use, re-purpose, adapt and redistribute educational materials (UNESCO, 2019).

One of the prominent advantages of OER discussed in the included articles is the principle of openness and accessibility of education, availability of an **open license for the use of educational content** (Manual, 2017: 20; Bethel, E., 2020; Checklist, 2020; Connell, M. & Connell, J. (2020: 12-13); Sharov, S. et al., 2021:204). Among some of authors points, we highlight the following recommendations: specify the type of Creative Commons License per resource or give information about the specific type of license for all the resources (Connell, M. & Connell, J. (2020: 12-13); authors should additionally be responsible to indicate what license applies to the use of the content they have provided (Atenas and Havemann, 2013: 32); all content put online must be checked to ensure that it doesn't violate copyright law (Manual, 2017: 20). The part about Licenses and Copyright at the Checklist for evaluating the quality of an OER from CEDEC states that the resources must respect current legislation and is carried out under the premise of an ethical commitment to knowledge and authorship. (Checklist, 2020).

K. G. Jeffery (2021) underlined that fair, open, and free does not mean no restrictions. Commonly, these terms are used incorrectly, causing much confusion and misunderstanding. Actually, no digital asset is completely FAIR, open, and free, and most would be classified somewhere on a spec-

trum of FAIRness, openness, and freedom from cost. The authors put attention that key restrictions hindering the ideal include privacy (personal data protection - General Data Protection Regulation (GDPR) in Europe), licensing, access/use authorization, security, and costs that may be absorbed by an organization (Jeffery, K.G., 2021).

Findings from IO1 Survey of DECriS Erasmus+ Project, titled 'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project show that out of 46% of institutions using OER's, 21% of institutions publish OER's under an open license, and just 7% as a part of public domain. It was noticed that some respondents don't recognize Creative Commons as an open license. Those responses show the importance of further discussions about open licenses among LIS schools/departments representatives (Mičunović, Rako & Feldvari, 2021).

Short description of a sub-factor: **Open Licensing**

Availability of an Open License for the use of educational content and terms of use are clearly specified. OER respects current legislation, and it is in conformity with EU-GDPR (if applicable).

Pedagogical Goals and Pedagogical Approaches. Open Pedagogy

Morganti & Towery (2020) positioned the importance of **pedagogical goals** and **didactic approach** - the OER must promotes active learning, class participation, and/or collaboration and to includes a mix of instructional approaches. Bethel, E. (2020) consider as a critical success factor for OER's - pedagogy and the appropriate teaching practices. Through analyzing survey responses for the open-ended question regarding the perceived benefits of using OER, Nagashima, T., & Hrach, S. (2021) identfied four mid-level themes that the faculty commonly reported: pedagogical improvements, collaboration, discoverability of materials, and students' access to learning materials.

Learner-centered pedagogical approach is a factor interpreted in several studies. An important milestone is an achievement of a productive and personalized form of learning (Golitsyna, I., 2017). According to Hernández-Castellano et al (2021: 204) one of the main advantages of OER include the increase of opportunities for interaction between participants in the learning process and creation of new teaching methodologies based on the use of ICT. OER provides the perfect **opportunity for personalization** given the permissions afforded by a CC license. For instance, educators often fear their students may not have sufficient background knowledge to fully understand content. When using an OER textbook or instructional resource, the specific background knowledge an educator anticipates their students lack may be added to the content through videos, images, hyperlinks, etc. By finding, adapting, and remixing OER, educators can create materials that are not only personalized to their students' learning needs but also foster greater equity

for accessing content for those with limited background knowledge. OER allows educators to adapt learning material by embedding reminders and quick checks for understanding for their students to interact with using instructional videos, call out text boxes, multiple choice quizzes, etc. OER affords teachers the creativity and opportunity to personalize content for their students (Van Allen, J., & Katz, S., 2020: 214). As an opportunity, the effective and fully functioning OER repositories could include social media support. Connell, M. & Connell, J. (2020: 12-13) suggest being introduce the social media tools to enable the users to share the resources within social media platforms.

Some of the authors in included studies discuss **success factors to promote open science and OER-enabled pedagogy** (Farrow, R. et al., 2020; Tillinghast, Fialkowski & Draper, 2020; Hernández-Castellano (2020), Canchola, A. et al., 2021; Hettige, S. et al., 2022). The study of Tillinghast (2020) explores the process of developing and implementing an OER's for an undergraduate course and experimenting with OER-enabled pedagogy. Conclusions indicate relatively few differences, although the overall response to OER was generally positive across sections, and the OER-enabled pedagogical approach was viewed as positive. Hernández-Castellano and colleagues (2020) paper presents OER project as a successful experience in open educational practices. They describe co-creation process that was carried out with students to develop OER's, as well as the didactic material and its interactive elements. Findings indicate that the process has led to the production of didactic materials in combination with active methodologies, noticeably improves students' learning experiences.

Canchola, A. et al (2021) reveal for a need to promote a culture that contributes to open educational practices.

We could repeat here the conclusion at the Position Paper No. 1., titled Open Educational Resources and Repositories: The Role of Quality: Towards a community-oriented Quality Review Framework for OER ENCORE+ OER Quality Circle: "Quality for OER, respectively quality for open education is viewed as the single most important factor determining the uptake of OER in institutions and training contexts" (Open, 2021: 8).

Short description of a sub-factor: **Pedagogical goals and pedagogical approaches. Open Pedagogy**

The OER promotes active learning, class participation, and/or collaboration and includes a mix of instructional approaches. The OER allows learner-centered and personalized pedagogical approach and supports the OER-enabled pedagogy and open educational practices.

Student engagement and assessment methods

Morganti & Towery (2020) summarized the following criteria in evaluation of quality of OER's about student engagement, assessment methods and self-assessment: the OER includes effective and engaging student assessments of the course learning outcomes and objectives; the resource provides opportunities for students to test their learning (e.g., a video or PowerPoint presentation with built-in checks for understanding); the OER provides for self-reflection and self-assessment. Having previously established a framework for evaluating the effectiveness of implementing OER in a Construction Management Technology course, Shenoda (2020) addressed the achievement of the several goals, such as: meeting required student learning outcomes, improving student attitudes regarding educational access, and fostering adaptation of the material to enhance student learning and provide current information.

Short description of a sub-factor: **Student engagement and assessment methods**

The OER includes set of actions, effective and engaging tasks, and assessments that users could perform throughout the resource to achieve the learning outcomes and educational goals.

Value-added services

Linguistic accessibility. Understandability

Several studies focus on linguistic accessibility of open educational resources in connection of the OER's inclusiveness and understandability. Connell, M. & Connell, J. (2020: 12-13) recommended the OER's multilingual support - design the interface of the repository in a multilingual way to widen the scope of users by allowing them to perform search of content in different languages. Rets et al (2020:3) appeal for the reduction of linguistic complexity of OER reading materials to improve their understandability. They underlined that making OER linguistically accessible also requires some additional effort from the OER publishers. Understanding which linguistic features differentiate between OER at different educational levels and subjects can help further improve automatic text simplification tools, that can potentially be applied to increase OER linguistic accessibility in the future. When interpreted the OER evaluation criteria, the authors of Affordable Learning Georgia Guideline (2022) put attention on the question: Is the content consistent with its language and key terms? (Affordable, 2022). In the (Manual, 2017: 20) there is a focus on the language and/or cultural barriers and conclusion is: although efforts are being made to make OER's available in multiple languages, many are only available in English, limiting their usefulness

to non-English speakers. Additionally, not all resources are culturally appropriate for all audiences. Another important document (Report, 2020) recommended the creation of OER's on natural language or translation of OER's on national language.

Short description of a sub-factor: **Linguistic accessibility. Understandability**

The OER is characterizes with the reduced linguistic complexity, consistency of language and key terms. The OER provides multilingual support – e.g., the interface is designed in a multilingual way to widen the scope of users by allowing them to perform a search of content in different languages OR the OER is available in multiple languages.

DISCUSSION

Connell, M. & Connell, J. (2020: 12-13) positioned a question of further research. In the European context in particular, the real challenge of multiple languages exists. The language of search and the language of the resources themselves is a critical qualitative factor to be taken into consideration by repositories. Users are often having to search for resources in a second or even third language but some repositories are making good progress towards dealing with this challenge. This is a challenge that is already being explored by Project 'eQNET', which is examining the criteria by which some resources 'travel well' across national and cultural boundaries while others do not.

Monitoring and evaluation

More concerns centred around the perceived quality of OER. Since many OER repositories allow any user to create an account and post material, some resources may not be relevant and/or accurate (Manual, 2017: 20). Some respondents from the survey of Tang and colleagues (2021) state that some OER were not validated because anyone could publish OER without any quality assurance (Tang, Lin & Qian, 2021, 2021:3221). In suggesting types of OER, according to the functionality of OER as a criterion for their classification, Sharov and colleagues (2021:204) discern **control OER** with software for control and self-control of knowledge in the form of modules or separate computer programs. In quality assurance to develop effective and fully functioning OER repositories the interpretation of Connell, M. & Connell, J. (2020: 12) include: **user evaluation tools** for the resources to be evaluated by users aiming to rate a resource. They underline the importance teachers to have mechanisms that will allow them to provide professional feedback on the value and usefulness of the resources once they have deployed them in their teaching. The key yardstick to measure quality of OER's is the effective structure of metadata and **feed-back systems** to help teachers trying to assess the 'fitness for purpose' of resources (Connell, M. & Connell, J., 2020:32). As we mentioned before, Shenoda (2020) shares that in setting up the

framework for OER implementation, based on the evaluation, were achieve two main goals: improvement of access to course materials through cost reduction and maintenance of course quality. Gordillo and colleagues (2020) examine the usefulness of using pedagogical quality scores for generating OER recommendations in OER repositories by means of a user study that compares the following four different recommendation approaches: a traditional content-based recommendation technique, a quality-based non-personalized recommendation technique, a hybrid approach that combines the two previous techniques, and random recommendations. Their user study involved 53 participants and 400 OER whose quality was evaluated by reviewers using the Learning Object Review Instrument (LORI). The main finding is that **pedagogical quality scores** can enhance **traditional content based OER recommender systems** by allowing them to recommend OER with more quality without detriment to relevance. The massive number of resources currently available in OER repositories makes it difficult for teachers and learners to find relevant and high-quality content, which is hindering OER use and adoption. Recommender systems that use data related to the pedagogical quality of the OER can help to overcome this problem (Gordillo, A. et al., 2020). In addition, **the concept of 'collective intelligence'** used by De Oliveira et al (2018) is one that has much to commend it (De Oliveira et al, 2018 as cited by Connell, M. & Connell, J., 2020:33-34). Also, systems such as Curriki and MERLOT offer an approach to quality assurance that is built around the collective views expressed by users using **rating systems** and, as a result, offered in the search filters that enable users to rank findings accordingly (Connell, M. & Connell, J., 2020:34).

Findings from IO1 Survey of DECriS Erasmus+ Project, titled 'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project establish that **most of LIS schools/departments carried out monitoring and evaluation procedures of DE.** Monitoring and evaluation of DE is important for defining indicators of success, for future planning and improving and/or adapting existing programmes and models (Mičunović, Rako & Feldvari, 2021).

This lends support to Camilleri and colleagues (2014) conclusion in the '*State of the art review of quality issues related to open educational resources (OER)*' that a lack of quality (including, we presume, perceived lack of quality as a consequence of a paucity of prior evaluations), or even a simple lack of information about quality, is a determining factor in the relative lack of actual use of digital learning resources.

Bethel, E., (2020), Albright (2005), D'Antoni & Savage (2009) discussed several factors that may inhibit OER adoption including the quality issue. Given that it does not always follow a traditional editorial process, some suggest that OER's meets a lower standard. However, **OER can be peer reviewed through open methods and there is a lot of high-quality material available**. Nonetheless, there is a need to combat the assumption that OER is of a lower quality than conventional

materials and sources (Open, 2019). Peer review as policy to revise and analyse OER's to ensure its quality is suggested by Connell, M. & Connell, J. (2020: 12-13).

Presently, ENCORE+ OER Quality Circle Position Paper No. 2, published in April 2022 – comments the situation about Quality assurance processes as following: Regarding the quality of OER itself, there is a lack of possibilities to get OER reviewed. Calls were made for reliable peer review procedures. OER repositories need to react more to users' needs, hence those needs must be identified. This could be established by engaging users more in repository communities. User trust in OER needs to be strengthened. (Open, 2022: 9). The ENCORE+ experts observe a move away from a focus on quality characteristics towards a **new "quality community view"** and they suggest being set up an **European collaboration for an open OER review communities**. In that direction the open quality frameworks are needed as well as emerging technologies to support them, such as Artificial Intelligence (Open, 2021: 6).

Findings from IO1 Survey of DECriS Erasmus+ Project, titled 'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project show that OER's are rarely peer-reviewed. Only a few institutions does the pre-publication or post-publication review exist. Teachers are mostly responsible for the curation, management, and monitoring of OER's that they created. Existing OER's are promoted and shared (23%), but rarely monitored and evaluated (7%) (Mičunović, Rako & Feldvari, 2021).

Short description of a sub-factor: **Monitoring and evaluation**

The OER provides quality control mechanisms, user evaluation tools or feed-back system. The educators carry out monitoring and evaluation procedures. Peer-review is ensured as a policy to revise and analyze the quality of OER.

DISCUSSION

Connell, M. & Connell, J. (2020:33-34) predicate that the complexity and levels of bureaucracy built into a repository will have a bearing on its effectiveness, because teachers are unlikely to use a complicated feedback system.

National and International Collaboration

Adopted unanimously by the UNESCO General Conference at its 40th session, UNESCO Recommendation on Open Educational Resources (OER) in 2019 supports the creation, use and adaptation of inclusive and quality OER, and facilitates international cooperation in this field (UNESCO, 2019).

The true power of OER lies in the permissions of the work to be collaboratively adapted and re-mixed by a global community, resulting in new OER that are more culturally relevant and inclusive for different communities of learners (Van Allen, J. & Katz, S., 2020). One of the main advantages of OER is a dissemination of academic culture and status of the educational institution (Johnstone, S., 2005). There are several challenges facing the efforts of national and international collaboration. According to McGrath (2020) the universities need know-how on how to run the OER's (courses) with the help of teachers, how to make the inter-institutional agreements, in some cases university need to employ staff to deliver OER to routinising work processes. For example, there must be organisational challenges for students from different universities attending the course at the same time and teachers could ensure the credit sharing, e.g., marking essays for students from other countries and universities. That author reflects on a project case study of the development and implementation of OER on bioethics including universities from Norway, Sweden, Denmark and Finland and revealed for the need of collaboration between HEIs for course design and course planning.

Sharov, S. et al. (2021) analyze the developers and thematic areas of online courses which are presented on the Ukrainian platforms of massive open online courses such as Prometheus, EdEra, and OUM and test the assumption that well-known international organizations, government agencies, and higher education institutions are involved in the development of online courses. Similarly, the European Consortium for Accreditation suggests internal and external stakeholders should be involved in the process of designing and revising learning objectives, for example by participating in meetings, pedagogical boards, satisfaction surveys, evaluation procedures, etc. (The European, 2022). Camilleri et al. (2014) made the important point that, although open learning resources are generally available, they are 'not frequently used' and between the reasons for why this might be so, they list the lack of organisational support and a lack of sharing culture within organisations. This is in support with Canchola, A. et al. (2021) conclusion that there is a need to design institutional policies regarding open educational practices, promote teacher training; evaluate teacher competencies to create and use OER and promote a culture that contributes to open educational practices.

The results of IO1 Survey of DECriS Erasmus+ Project, titled '**State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic' at DECriS Project** revolve around a general conclusion that COVID-19 pandemic didn't encourage HEIs to a large scale adoption of OER's, but it certainly instigated many studies on the issue, as well as the creation of OER's' initiatives that proclaim and anticipate a promising future for OER's, Open Access and Open education movement. Other identified issues include the need for: a) a more comprehensive and networked approach to creating OER's poli-

cies, b) open licensing of educational materials that come in other formats, c) designing institutional strategies whose purpose would be to focus on capacity-building and provision of adequate quality infrastructure and services that would support quality OER's practices, d) collaboration and cooperation, both within and between HEIs, e) conducting studies on OER's (cost-effectiveness and their impact on HE, f) (steady) funding of OER's initiatives, and g) motivating stakeholders and decision makers to embark on OER's strategies, either through securing additional funding or by providing socio-political, cultural and economic support for the development of quality OER's and OA policies and practices (Mičunović, Rako & Feldvari, 2021).

Short description of a sub-factor: **National and International Collaboration**

The OER provides permission for collaborative adaptations to specific contexts and for re-mixed by a global community, resulting in new OER that are more culturally relevant and inclusive for different communities of learners.

FUTURE PERSPECTIVES OF RESEARCH

Barbosa (2022) positioned a couple of problems**: a gap between" literature" and "practice"**; several approaches have been proposed in the literature, but they are far from the OER reality; evaluations are carried out only into controlled environments, with few resources and metadata. This lends support to Atenas, J. & Havemann, Leo (2013) conclusion that the **actual initiatives demonstrate quite heterogeneous approaches**, and **some indicators achieve very low incidence** considering the crucial role they play in supporting the aims of the OER movement.

In IO2 Survey of DECriS Erasmus+ Project, titled '*Digital Education appraisal and quality perception by students, teachers and trainers at the partner Higher Education Institutions (HEI) during the COVID- 19 crisis'* researchers presents **future proposals and lines of work for boosting the use of OER:**

- Collaboration and networking in the OER creation, sharing and use.
- Institutional policies, support, and human resources to foster OER creation and use.
- Knowledge about the availability of information sources to discover, assess and reutilize OER. The creation of new specific repositories is also proposed if there is a need in terms of discipline area, language, or other specific unavailable scope.
- Formulation of national, institutional or by discipline policies that lead to the design of overall planning about the creation, treatment, dissemination, and dissemination of OER for teaching
- Framing OER under the Open Science momentum: regarding the push for new models of academic performance evaluation and incentives, it would be very suitable and fair to reward teachers who create OER.

- Raise awareness among teachers of the possibilities of flipped classroom and the incorporation of online and blended elements in face-to-face teaching as a way for stimulating the production and use of OER.
- Capacity building: integrating the OER into the continuing education of teachers, since one of the main barriers found was the lack of training in this area (Boté-Vericad, Argudo & Urbano, 2022).

To confirm the results obtained in their study, Gordillo, A. et al (2020) plan to conduct a new online experiment where **OER recommendations generated according to the analyzed recommendation approaches will be presented to users of an OER repository under normal conditions over a long period of time**. Another interesting **line of future work** would be **to examine the usefulness of quality scores for enhancing other types of OER recommender systems** in addition to those using content-based techniques, such as collaborative filtering, knowledge-based, or demographic recommender systems. Finally, these researchers recommend **research on sustainable solutions for OER repositories** that have the capacity to provide effective quality assurance for many digital learning resources.

Krajcso (2016) shares the important point that ensuring quality in the process of creating learning resources does not necessarily equate to high impact on the eventual learning intended by its use: "…focus on the input quality criteria of OER…. has not been proven as causal for the learning effect yet. **More research is needed to confirm and extend the** following **quality criteria**" (Krajcso, 2016: 50).

According to Van Allen, J., & Katz, S. (2020: 215) the power, and paradox, of OER is that these learning materials are available for everyone globally but adaptable for anyone locally. Now is the opportune time to introduce educators to OER and advocate for its use over commercially published materials that are being made freely available during the crisis. The potential of OER to improve equity in learning beyond the pandemic is compelling. As the Creative Commons blog notes, "Open education is not a short-term fix to a passing problem—it is a long-term solution to ensuring equitable, inclusive access to effective educational resources and learning opportunities" (Green & Vézina, 2020).

Wiley, D. (2021: 414) suggests the **future research on the impact of OER** to be grounded in a **theoretical framework** that provides **a clear rationale for why a reasonable person would expect OER use to impact student learning**. As researchers move beyond license comparison studies and begin to propose and test concrete explanatory mechanisms for a hypothesized OER effect, our understanding will progress much more rapidly.

Connell, M. & Connell, J. (2020: 33-35) positioned a set of questions for further research. They can be summarized thus:

- **In the European context in particular, the real challenge of multiple languages exists**. The language of search and the language of the resources themselves is a critical qualitative factor to be taken into consideration by repositories. Users are often having to search for resources in a second or even third language but it is clear that some repositories are making good progress towards dealing with this challenge. This is a challenge that is already being explored in the EUN Project 'eQNET' (http://eqnet.eun.org), which is examining the criteria by which some resources 'travel well' across national and cultural boundaries while others do not;

- **While users may be downloading resources from OER repositories, they are not always commenting on issues of usefulness and quality within the repositories themselves.** In some cases, teachers often set up their own online groups and communities in which to share ideas, resources, lesson plans and so on. This creates a kind of hinterland beyond the open repositories and open communities in which educators are certainly making use of open resources but they are dealing with quality issues within closed or exclusive groups, often at a regional or national level. There is a need for further research to verify this assertion, which is based on experience and observation;

- Further investigation could be made of those repositories that most effectively build **practical and usable user-feedback systems into their platforms**. **The concept of 'collective intelligence'** used by De Oliveira et al (2018) is one that has much to commend it. Systems such as Curriki and MERLOT, do undoubtedly offer an approach to quality assurance that is built around **the collective views expressed by users** through the use of rating systems and, as a result, offered in the search filters that enable users to rank findings accordingly.

- **The potential contention between two understandings of quality in relation to learning resources has to be dealt with pragmatically by repositories**. For the benefit of educators seeking resources for their teaching practice, their prime consideration will always be finding 'useful' resources, resources that match their pedagogical requirements. In terms of learners, however, the true quality of a resource will always be its ultimate impact on the learning, a determination that can only be made after-the-fact, and often will be a determination that is applicable only in the limited situation defined by the actual learning activity in which the resource was used;

- Work could be done to determine **how many OER repositories are offering such functionality now and how successful they are in their implementations;**

- Some further work might be done on **adding breadth and depth to the concept of 'efficacy' as it relates to the quality of educational content.** The fitness-for-purpose of a resource is critical in helping teachers to find exactly what they need for a particular lesson or course. The perceived or stated efficacy of a resources might be the most appropriate factor to take into account in thinking about 'quality-before-the-fact' in relation to open education resources.

Finnaly, according to Connell, M. & Connell, J. (2020: 33-35) **future perspective of research** is the questions about **Artificial Intelligence and Machine Learning**. It is reasonable to suggest that this is an area that will prove to be increasingly important as we move forward to the next generation of OER repositories. Any research questions arising out of this area will have to include not only technical and pedagogical issues but also questions of ethics, fairness and responsibility to teachers, learners, and researchers themselves**.**

10. METHODOLOGICAL FRAMEWORK

The offered Methodological Framework, titled "**4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's**" contains 4 main steps which corresponds to the layers of the typological classification of the critical success factors for the evaluation of the OER's as follow: **D**omain, **D**esign, **D**evelopment, **D**elivery ensure 5Rs - Retain, Reuse, Revise, Remix and Redistribute of the OER's (Figure 10).

The **Domain** considers the features of Learning Content and Learning Activities. It is the basic step. The knowledge of the domain is significant for the reliable OER.

The **Design** or how to design the Learning Experience according to the Learner-Centred Pedagogical Approach and the first step of the Learning Process.

The **Development** or how to present the content and activities with technology.

The **Delivery** the final step of the Learning Process when the learners have access to the training or just to the learning content and activities. It brings the value-added services to OER developers and users and added value for the evaluation process of OER's.

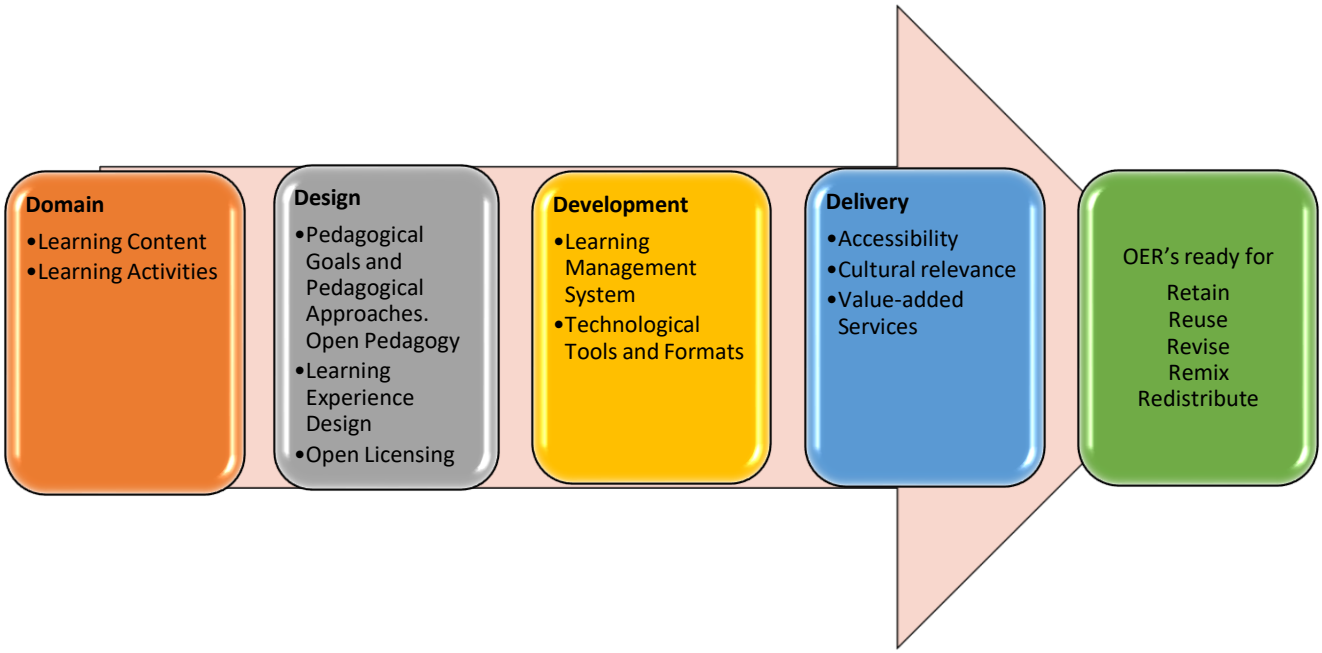


Figure 10. 4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's

The quality of a learning resource depends on the demands and requirements both educator and learner rather than on some pre-determined characteristics of the resource (Connell, M. & Connell, J., 2020).

The goal of this framework is to be used in HEIs for evaluation processes of OER's.

Definition: Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others. OER's form part of 'Open Solutions', alongside Free and Open Source software (FOSS), Open Access (OA), Open Data (OD) and crowdsourcing platforms (UNESCO, 2019).

There are 5 horizontal elements: Retain, Reuse, Revise, Remix, Redistribute which are in the core of OER's and their digital nature.

The developed OER's could be different types regarding the digital file formats: Text, Audio, Video, and Multimedia which correspond to the Open Textbook, Lecture notes & presentations, Assignments, Quizzes and so on.

Target groups

- Teachers
- Students
- Higher Education Institutions (HEIs)

4Ds for 5Rs of OER's

DECriS Methodological Framework for evaluation of OER's

OER's Title:
Address/ URL:
Domain:
Author:
Organization:
Definition of OER: *Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others* (UNESCO, 2019).

Type: Describe (presentation, video, text, quiz, assessment …)	Type of OER	Type of learning activity
Scale (level of coverage of the OER's critical success factors and sub-factors) Between 80-60 points - high Between 59-40 points - satisfac-tory Less 40 points - non-satisfactory	General score: 80 points	Score of the evaluated OER:
General description:		
Language of OER:		

Factors and sub-factors (in alphabetical order)	Points from 1 to 5 (5 is highest level)	Comments
Learning Content and Learning Experience Design		
Accuracy and Content Quality (The OER accuracy is a measure of precision, absence of errors, of a particular process or object, and reflects accurate and re-cent scholarship in terms of the subject matter. Content quality is appropriate to the knowledge, abilities, skills and attitudes that students must acquire during the teaching-learning pro-cess)		
Alignment (The OER aligns to the catalog's course description and student learning outcomes. Similar terms include appropriateness, ef-ficacy (or fitness for purpose), educational value, potential of ease-of-reuse and impact; relevance; learning effectiveness)		
Authority (The OER provides data about the author/s or educational agency (name and if applicable: h-index, ORCID), affiliation/in-stitutional membership)		

Breadth of perspectives (The OER reflects multiple perspectives and points of view on course topics. The OER provides theoretical perspectives for the topic, addressing major theories appropriately, includes multiple modalities (e.g. graphics, tables, and information other than text) and continually improved resources to support student learning.)		
Convenient and easy for use (The effective OER will make the process of searching, (re-)using, or adapting OER as simple and convenient as possible providing effective learning experiences with cost-saving manner.)		
Interactivity (optional) (Interactivity is the functionality of OER, which allows an interaction, as a dialogue, between the device and the user (Checklist, 2020).		
Standardized metadata and Citation (The cover of the OER (a page or visible screen of the resource) includes comprehensive OER description with standardized metadata and information on how to cite the OER.)		
Technological Issues		
Technical Requirements (Technical factors that provide the openness of OER and ensure that the learning content will work within the existing system, on all platforms and devices that learners may use. The resource is designed taking into account formal guidelines that improve the comprehension capacity of users.)		
Quality of the Final product The OER content is clear and understandable; the interface and design are easy to navigate; the video and audio (if included) quality are high; the OER contains no spelling errors or typos. An effective OER should allow the educator to complete the 'quality circle': from discovery, to use, to professional evaluative feedback, and the process can then be repeated as many times as necessary (Connell, M. & Connell, J., 2020: 10).		
Learning Process and Pedagogy		
Accessibility. Inclusiveness and Equality. Cultural relevance. (The OER is designed from an open and inclusive perspective; it is accessible to learners with disabilities (usability guidelines are followed). The OER could be used or adapted for multi-aged/experienced users and multimodal, multilingual and multi-cultured categories of professional and technical communication users.)		

Open Licensing (Availability of an Open License for the use of educational content and terms of use are clearly specified. OER respects current legislation, and it is in conformity with EU-GDPR (if applicable).)		
Pedagogical Goals and Pedagogical Approaches. Open Pedagogy (The OER promotes active learning, class participation, and/or collaboration and includes a mix of instructional approaches. The OER allows learner-centered and personalized pedagogical approach and supports the OER-enabled pedagogy and open educational practices.)		
Student engagement and assessment methods (The OER includes set of actions, effective and engaging tasks, and assessments that users could perform throughout the resource to achieve the learning outcomes and educational goals.)		
Value-Added Services		
Linguistic accessibility. Understandability (The OER is characterizes with the reduced linguistic complexity, consistency of language and key terms. The OER provides multilingual support – e.g., the interface is designed in a multilingual way to widen the scope of users by allowing them to perform a search of content in different languages OR the OER is available in multiple languages.)		
Monitoring and evaluation (The OER provides quality control mechanisms; user evaluation tools or feed-back system. The educators carry out monitoring and evaluation procedures. Peer-review is ensured as a policy to revise and analyze the quality of OER.)		
National and International Collaboration (The OER provides permission for collaborative adaptations to specific contexts and for re-mixed by a global community, resulting in new OER that are more culturally relevant and inclusive for different communities of learners.)		

11. CONCLUSION

As a result of research activities in the frame of Intellectual Output 3 (IO3) of DECriS Project, the presented **Literature Review** covered 74 relevant publications (See in REFERENCES: List of 74 selected documents for text analysis/qualitative analysis) and other 128 documents (including publications, reports, presentations and websites).

The review synthesizes the various aspects (theoretical, methodological, didactical, technical etc.) regards to the evaluation of OER's in the empirical literature following the guidelines of the established research questions: *What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across studies?; What were the findings of criteria for evaluation of Open Educational Resources extracted from theoretical works (such as UNESCO guidelines and recommendations and similar documents)? What were the findings of criteria for evaluation of Open Educational Resources extracted from experience-based works of educators and project managers?* Analyses and findings, based on the research work on these three research questions, were resulted in preparation of a **List of critical success factors and their typological classification for the evaluation of the OER's** (in alphabetical order) (See Figure 9) and of a Methodological Framework, titled **"4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's"** (See Figure 10 and Methodological Framework) with interpretations.

The analyses according the fourth research question: *What were commonalities and differences in the evaluation criteria of the quality of Open Education Resources across geographical location/country/institution specifics of experiences?* allow to define specifics of experiences with OER, especially in the COVID-19 crisis. This is an example for the geographical scope of evaluated works: Bahamas (Bethel, 2020:1), Georgia (Nagashima, T., & Hrach, S., 2021), Denmark, Finland, Norway and Sweden (OER on bioethics) (McGrath, C., 2020), Latin America (Canchola, A. et al., 2021) and (Rodes, V. & A. Gewerc, 2021), Poland (Kokot-Kanikula, K. & A. Walek, 2021), Spain (Santos-Hermosa, G. et al., 2020), Ukraine (Sharov, S. et al., 2021), United Kingdom (Farrow, R. et al., 2020), USA (Van Allen, J., & Katz, S., 2020), Sri Lanka (Hettige, S. et al., 2022), and many others.

The review was enriched with findings from IO1 Report *'State-of-the-play of the use of OER's at European higher education institutions in the field of Library and Information Science during the COVID-19 pandemic'* (Mičunović, Rako & Feldvari, 2021) and from IO2 Report *'Digital education appraisal and quality perception by students, teachers and trainers at the partner HEIs during the COVID-19 crisis'* (Boté-Vericad, Argudo & Urbano, 2022) of the DECriS Erasmus+ Project.

Quality is undoubtedly a difficult concept to define in relation to OER. It is nonetheless a difficulty that must be tackled if we all wish to see the Open Education movement go from strength to strength in the future (Connell, M. & Connell, J., 2020: 35).

The **List of critical success factors and their typological classification** and **4Ds for 5Rs of OER's: DECriS Methodological Framework for the evaluation of OER's** serve a goal to achieve a good practice in OER design to be enabled to promote openness, sharing, reuse of resources and collaboration amongst academic communities, and more concrete in (Library and) Information Science.

More so, A list of critical success factors and their typological classification and 4Ds for 5Rs of OER's: DECriS Methodological Framework for the evaluation of OER's are designed to be in line to the implementation of the further DECriS Erasmus+ project intellectual outputs:
IO4 - **Case study on how the critical success factors work in practice**. In IO 4, DECriS partners intend to map the success factors to the practices at partners' HEIs. The methodology used will be case studies in each of the partner's HEI which will allow a deeper data collection and analysis to obtain a better understanding of the relation between the success factors and the implementation and use of digital learning resources, OER's in particular, in separate settings.
and
IO5 - Optimisation of OER's. DECriS consortium will apply the success factors to the existing OER's from the EINFOSE project (http://einfose.ffos.hr) to improve them and test how the success factors can be applied in practice. There are four OER's in key areas of (Library and) Information Science. The critical analysis of these OER and their modification/improvement will be done.

Results from research activities will be visible at DECriS platform: https://decris.ffos.hr/platform/ and DECriS website: https://decris.ffos.hr/.
Outputs:

- A general report of IO-3, titled "A List of critical success factors and their typological classification for the evaluation of the OER's" for DECriS website
- List of critical success factors and their typological classification for the evaluation of the OER's (in alphabetical order)
- Methodological Framework, titled "4Ds for 5Rs of OER's: DECriS Methodological Framework for evaluation of OER's"
- 2 Presentations for Multiplier Event 2 „Critical success factors and their typological classification for the evaluation of the Open Educational Resources (OER)" in ULSIT, Sofia (3-4 May 2022): PPT1 *Introduction to DECriS Third Intellectual Output and Methodology of research* and PPT 2 *Critical factors for evaluation of existing OER's: Research in progress*
- Presentation for Multiplier Event 3 "Presentation and discussion about Methodological Framework for Evaluation Process of OER's" in SRCE, University of Zagreb (24-25 November 2022)
- Presentation at The International Conference on Digital Transformation and Inclusiveness of the Higher Education Institutions in the Time of Crisis Situations (22-23 May 2023, Osijek, Croatia), Multiplier Event-4, DECriS
- Paper for a scientific journal (in progress)

With such a methodological and evaluation framework the DECriS project brings in the new elements in the evaluation of existing OER's and their use in time of crisis and beyond.

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List of 74 selected documents for text analysis/qualitative analysis (IO3)

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