IO1 A1 – Development of methodological and operational framework for the creation of KMS on digital energy efficiency methodological framework

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"The IO1 is a curated collection of OERs dedicated to the theme of energy efficiency of digital services and, more generally, to the reduction of the environmental footprint of digital with a specific focus on their teaching in a professional context that will become increasingly characterised by the ubiquity of sensor systems of the so-called Internet of Things and related data analysis systems based on machine learning."

Digital technologies are becoming increasingly important for our lives, especially the energy sector benefits from the recent developments. With digitalization, renewable energy Technologies could be widely used because of optimizing demand responses of grid systems, the use of distributed energy sources such as PV panels could be facilitated, or smart charging technologies could increase the number of electrical vehicles. The concept of digitalization is generally defined positively, however, there are some concerns because of the carbon footprint caused by digitalization. For this reason, DEEDs Project aims to "reduction of the environmental footprint of digital with a specific focus on their teaching in a professional context that will become increasingly characterized by the ubiquity of sensor systems of the so-called Internet of Things and related data analysis systems based on machine learning."

In this project, we mainly focus on various concepts such as digitalization and sustainability on energy systems, digital footprint, and energy efficiency to provide information and educational material to teachers of vocational schools. The project aims at how vocational schools are turning to digital tools (KMS) to enhancing energy efficiency practices.

What is OER?

"OERs refer to digital materials provided freely and openly for educators, learners/self-learners to be (re)used with the purpose of teaching, learning and research." (OECD, 2007).

Open Educational Resources are all educational materials in the public domain or published under an open license. Fully copyrighted resources, subscription-based resources are not OER. Contents must be based on open licensing like Creative Common Licensing etc. It makes it possible for its users to use, copy, adapt and reshare it free of charge.

What is meant by educational materials is all kinds of materials that students, teachers, and interested learners can use. (Books, animations, videos, audios, reports, laws, online courses, lectures, assignments, photos, games, lecture notes, lesson plans, activities, journal articles, databases, etc.) Anything that exists can be used as educational material if it is valuable for the teacher and the subject.

The difference from ordinary materials is that OERs are open to using by adapting them to course content. Within the scope of OERs, five activities should be able to be performed;

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Why OER?

Everything is changing and developing at a rapid pace; knowledge transfer and education cannot stay the same. Formal education should evolve towards a sustainable form of education. Modern, high-quality education should be available for each motivated person to access for free. Equal access to knowledge means equal opportunity. Knowledge belongs to everyone. This is where OER Movement comes into play.

It will remove the roadblocks on education by significantly impacting students by closing the deficiencies of formal education. Being a subject-oriented, free, inclusive movement, OER takes the burden of high textbook costs on students and empowers teachers to make a change and create content.

Types of Open Licensing

Just being free is not enough; free content and OER are different things. Free doesn't allow retaining, revisiting, redistributing, etc. When you want to evaluate an OER, the first thing to do is make sure it has that CC license.

CC license of OERs may also have specific usage conditions. CC license types differ as follows;

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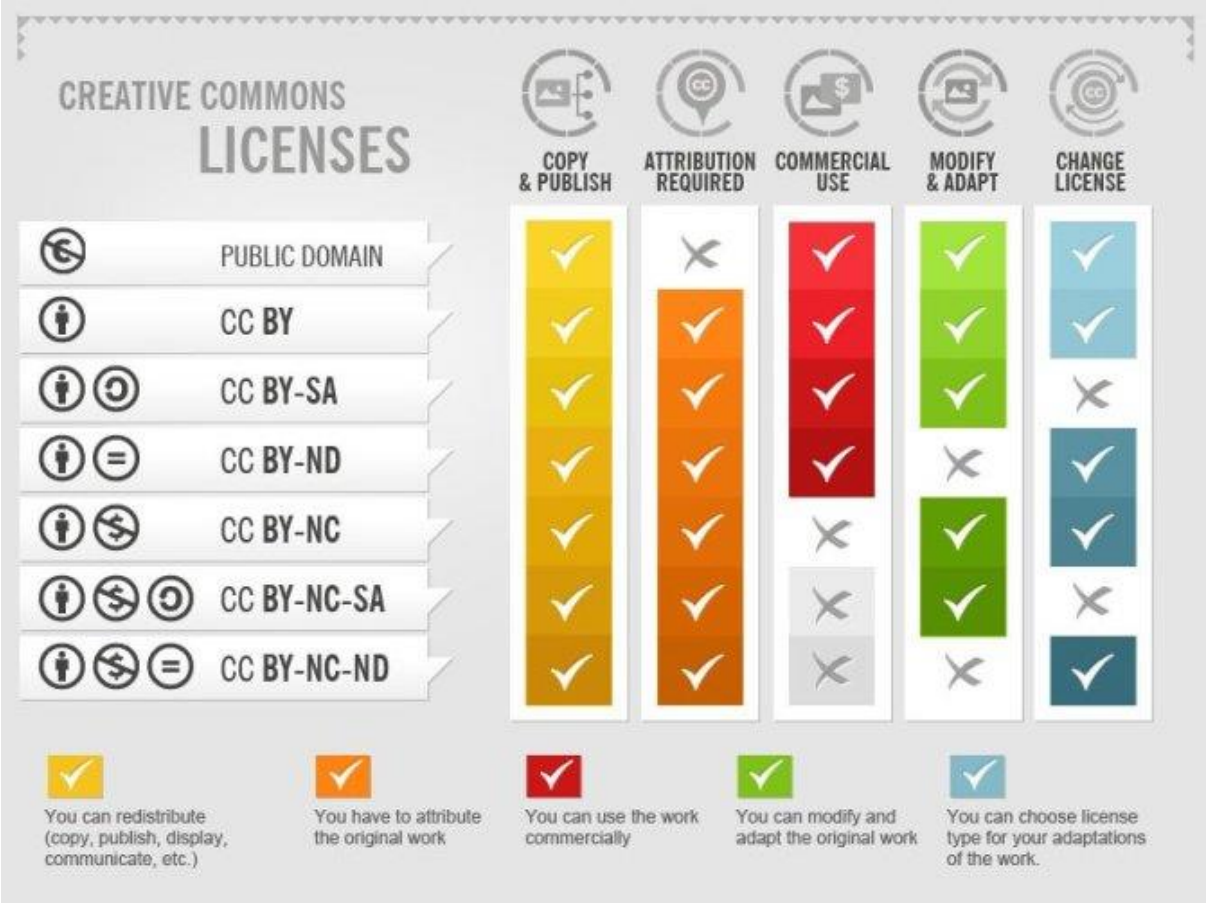

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Getting Started to Search for OERs

The Internet contains a lot of content and information. It's normal to get into a mess and have a hard time researching OERs. To facilitate this, using some techniques may simplify the research.

- **Start Broad**

First of all, we need to determine the relevant **keywords** for our study. In this direction, we should start with general terms: energy efficiency, digital footprint, AI and IoT, sustainability by design, etc.

- **Compile OERs**

We will bring together the OERs we found due to our research on the most general terms. At this stage, we should not be too selective and **collect all the content** we can find relevant to the subject, but we need to pay attention to the condition of use while researching and make sure that it has the open license described above.

- **Determine Options**

Determine your best options. We should **narrow down our content** over the OERs we have listed and determine the appropriate OERs.

The next thing to do is **look at the resource itself**. Does it work? Is it all there? Is it up to date? Sometimes the link may break after the content is created, the content cannot be viewed in current versions because it is old, etc. We need to check that all our OERs are working.

Then we have to **check again** whether the OERs we have listed have open licenses. We should be careful not to include content with copyrights in our archive even though it is free. Because if it's an only free content and you don't have an open license, you have to link to it where it is. That means if it disappears, we won't be able to access this content in the future. You can't keep your copy of free content; you have the original copy. That means, if they change it, you can't do anything about it.

We need to **answer some questions** regarding the OERs we have left: Does it cover the content it needs to? If it is too much or too little? Can you edit? Is it appropriate for your audience? Can you make improvements? We will have created our OER collection by deciding with the answers in the light of these questions.

Finally, it is helpful to **back up the domains** where the OERs we have chosen are located. Although there is an open license, we can archive via archive.is in case we cannot reach the source due to a problem or access problem on the website. This website is a backup tool for archiving a domain and uploading it as a re-openable link.

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Before Starting OER Research

After describing how we will proceed in the general framework, some points need to be clarified before starting the research. These points will also finalize our OER template.

First of all, it is necessary to **decide whether our OERs will be for disabled users**. While it may seem vital that all of our content is disability-inclusive, it can be challenging. For this reason, it may be an alternative to starting by stating whether the OERs we found during our research has this feature or not, and then update the materials we have as disability-inclusive. Audio access for visually disabled users, arrangement of visual materials for the hearing disabled users, etc.

Another point is in **which language we want educational materials**. First of all, I would like to state that we will host the English and local languages of the partners as stated in the proposal. However, all materials must have an English translation (subtitles, book translations, etc.). The ideas of the partners will be sought on the adaptation of all materials to all local languages.

To carry out the research more efficiently, **keywords should be determined**. Apart from the keywords given as an example above, partner countries are expected to have an opinion on keywords.

Finally, the essential point is **what kind of task distribution** the research will be carried out. Task allocation is necessary when researching OERs. At this point, there are different alternatives.

Distribution of tasks based on subject: In this distribution of tasks, partner countries will carry out their research on the determined keywords. For example, Turkey will search for OERs containing the digital footprint keyword, while Italy will compile resources on AI and IoT efficiency keywords.

Distribution of task based on material type: In this task distribution, different material types will be listed, and it will be decided which materials will be used, and distribution will be made accordingly. Accordingly, while one country compiles open textbooks, the other country will compile video content.

Distribution of tasks based on resources: In this task distribution, each country will research the resource websites given to them. Care will be taken to search for an equal number of websites. However, some resources contain much more and more complex content, while others contain few and specific types of material. Therefore, this distribution of tasks is likely to create inequality.

Distribution of tasks based on training modules: A draft training plan should be created to implement this distribution of tasks. Accordingly, OER research will be conducted through different modules. For example, while the first module introduces digital efficiency, another module will include digital education tools, and partner countries will only research the relevant module.

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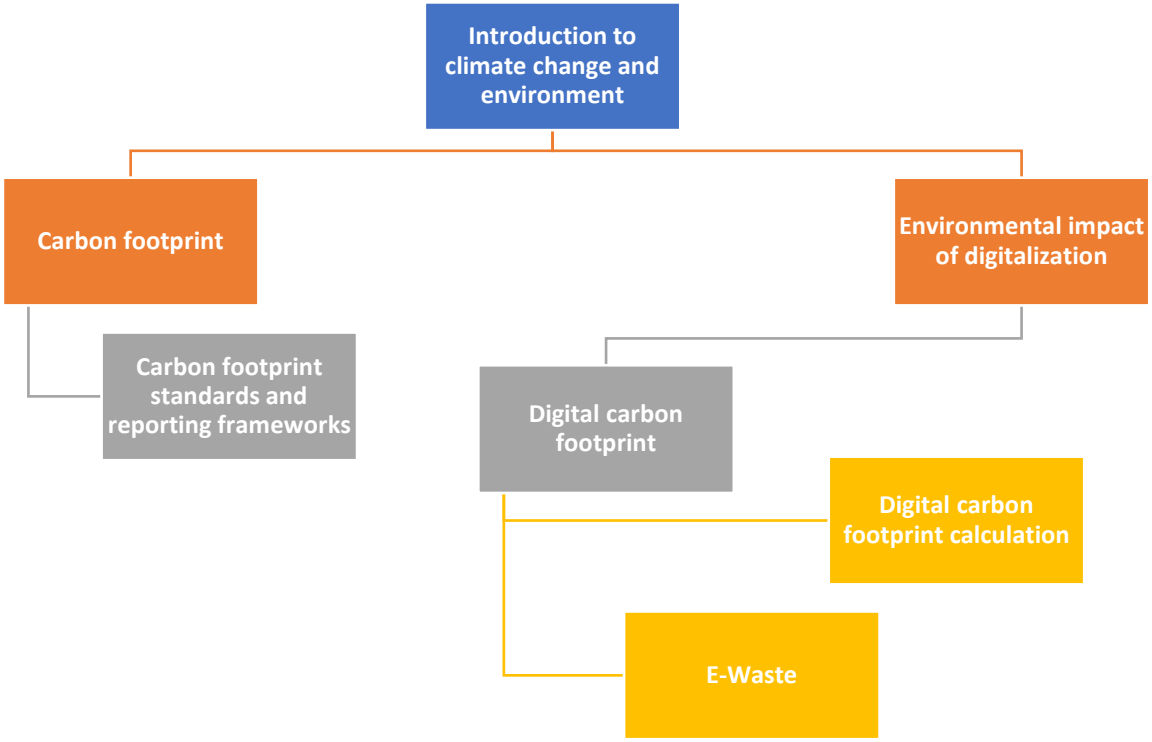
Suggested Modules

Module.1



Module.2

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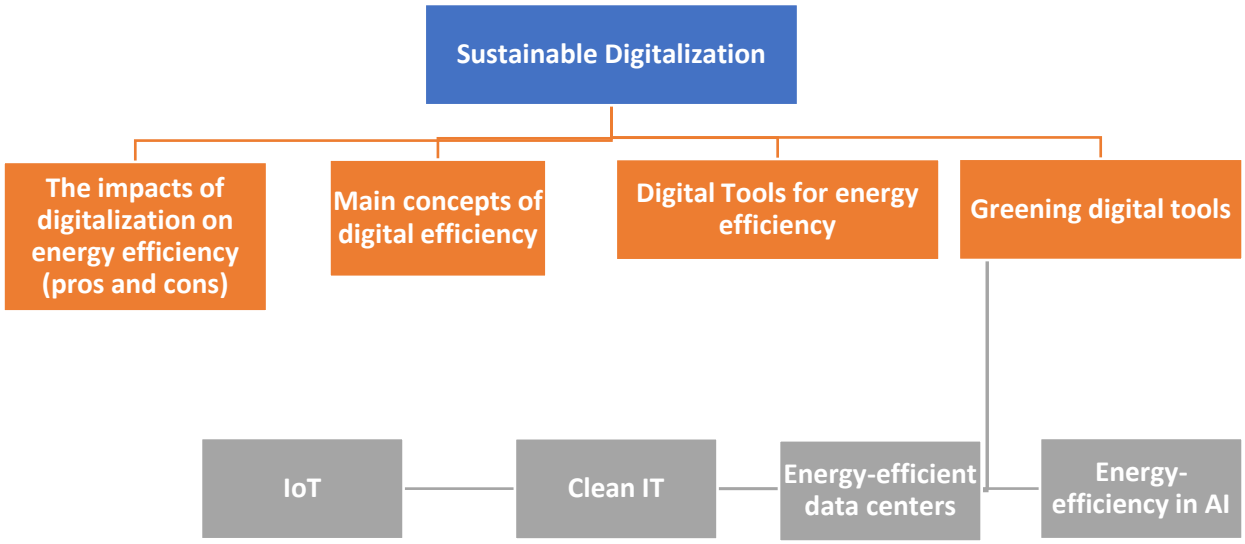
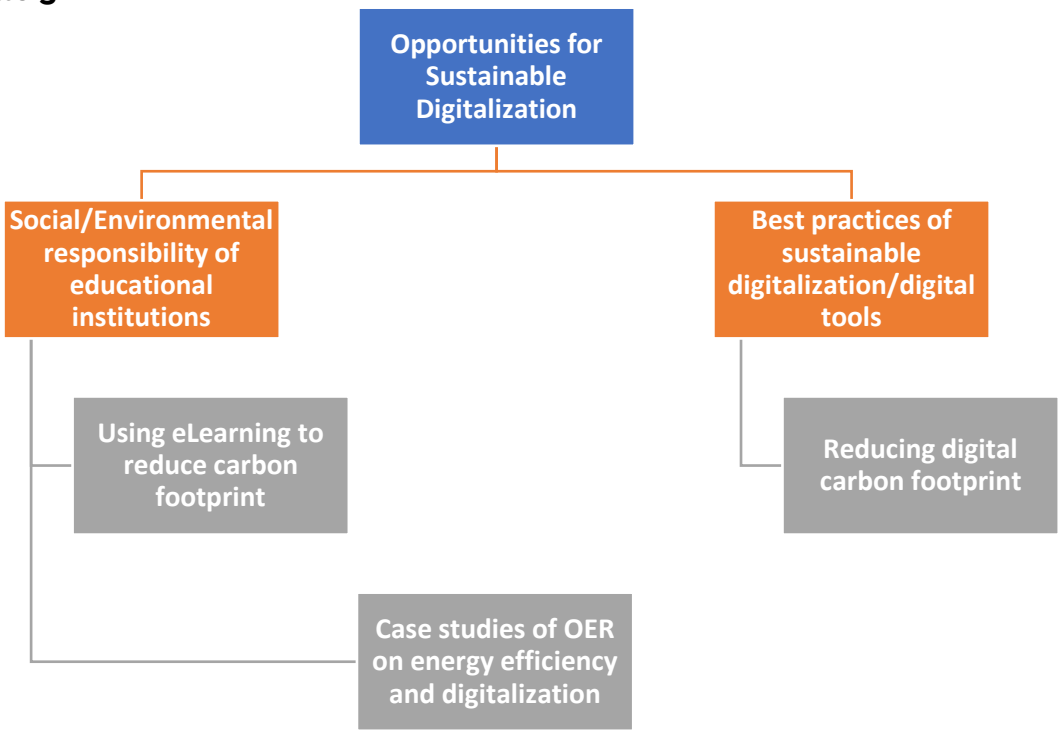


Module.3



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Resources for OERs

Type	Website Name	Link
Book	Online Books Page	http://onlinebooks.library.upenn.edu/
	The Assayer	http://theassayer.org/
	The Universal Digital Library	http://ulib.isri.cmu.edu/index.html
	Feedbooks	http://www.feedbooks.com/publicdomain
	Perseus Digital Library	http://www.perseus.tufts.edu/hopper/
	Read Print	http://www.readprint.com/
	Dickinson College Commentaries	https://dcc.dickinson.edu/
	DOAB	https://directory.doabooks.org/
	LibriVox	https://librivox.org/
	Online Library of Liberty	https://oll.libertyfund.org/
	The University of Oxford Text Archive	https://ota.bodleian.ox.ac.uk/repository/xmlui/
	HathiTrust Digital Library	https://www.hathitrust.org/
	Open Book Publishers	https://www.openbookpublishers.com/
Education	Carnegie Mellon University Open Learning Initiative	http://oli.cmu.edu/get-to-know-oli/learn-about-our-courses/
	Open Course Library	http://opencourselibrary.org/course/
	Serendipity	http://serendipity.utpl.edu.ec/
	Wikimedia Commons	https://commons.wikimedia.org/wiki/Main_Page
	Wikiversity	https://en.wikiversity.org/wiki/Wikiversity:Main_Page
	Encyclopedia of Life	https://eol.org/
	Lumen Learning	https://lumenlearning.com/
	Moodle	https://moodle.net/
	John Hopkins School of Public Health OpenCourseWare	https://ocw.jhsph.edu/
	TU Delft OpenCourseWare	https://ocw.tudelft.nl/
	SUNY OER Ready-to-Adopt Courses	https://oer.suny.edu/
	OER World Map	https://oerworldmap.org/
	PhET Simulations	https://phet.colorado.edu/
	CTE Online	https://www.cteonline.org/
	Google Advanced Search	https://www.google.com/advanced_search
	Open Education Consortium Course Search	https://www.oeconsortium.org/courses/
	OER Africa	https://www.oerafrica.org/oer-courseware
	OER Commons	https://www.oercommons.org/
	OER Knowledge Cloud	https://www.oerknowledgecloud.org/
	Saylor Academy	https://www.saylor.org/
	SOFA	https://www.sofa-framework.org/
	World Digital Library	https://www.wdl.org/en/
	wikiHow	https://www.wikihow.com/Main-Page
Icon	Zondicons	http://www.zondicons.com/
	Aiconica	https://aiconica.net/
	Feather	https://feather.netlify.app/
	IconStore	https://iconstore.co/
	The Noun Project	https://thenounproject.com/
Journal	Wiley Open Access	https://authorservices.wiley.com/open-research/open-access/index.html
	Bentham Open	https://benthamopen.com/index.php
	DOAJ	https://doaj.org/
	PLOS	https://plos.org/
	OpenDOAR	https://v2.sherpa.ac.uk/opendoar/index.html
	BioMed Central	https://www.biomedcentral.com/
	Elsevier Open	https://www.elsevier.com/open-access/open-access-journals
	Hindawi	https://www.hindawi.com/journals/
	Open Library of Humanities	https://www.openlibhums.org/
	SpringerOpen	https://www.springeropen.com/
Music/Sound	dig cc mixter	http://dig.ccmixter.org/
	Free Loops	http://free-loops.com/

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	Free Music Archive	https://freemusicarchive.org/
	Sound Bible	https://soundbible.com/
	What Funk	https://whatfunk.com/
Photo	Burst	https://burst.shopify.com/
	Fancy Crave	https://fancycrave.com/
	Broadly Gender Photos	https://genderphotos.vice.com/
	Gratisography	https://gratisography.com/
	Kaboompics	https://kaboompics.com/
	Negative Space	https://negativespace.co/
	Pic Jumbo	https://picjumbo.com/
	Pixabay	https://pixabay.com/
	Pxhere	https://pxhere.com/
	Scatter Jar	https://scatterjar.com/
	StockSnap	https://stocksnap.io/
	Unsplash	https://unsplash.com/
	Visual Hunt	https://visualhunt.com/
	Flickr	https://www.flickr.com/creativecommons
	WOCinTech	https://www.flickr.com/photos/wocintechchat/
	Life of Pix	https://www.lifeofpix.com/
	The MET Public Domain Artworks	https://www.metmuseum.org/art/collection/
	Pexels	https://www.pexels.com/tr-tr/
	SplitShire	https://www.splitshire.com/
	Stockvault	https://www.stockvault.net/
Textbook	Textbook Revolution	http://textbookrevolution.org/index.php/Main_Page
	Wikibooks	https://en.wikibooks.org/wiki/Main_Page
	Bay Collage Library	https://library.baycollege.edu/oer
	LibreTexts	https://libretexts.org/
	Lyryx Learning	https://lyryx.com/
	Milne Open Textbooks	https://milneopentextbooks.org/
	Noba Project	https://nobaproject.com/
	National Science Digital Library	https://nsdl.oercommons.org/
	Bccampus	https://open.bccampus.ca/browse-our-collection/find-open-textbooks/
	Open Textbook Library	https://open.umn.edu/opentextbooks/
	eCampus Ontario	https://openlibrary.ecampusontario.ca/
	Open Stax	https://openstax.org/
	SOL*R	https://solr.bccampus.ca/wp/
	SPARC*	https://sparcopen.org/
	Affordable Learning Georgia	https://www.affordablelearninggeorgia.org/
	Cool4Ed	https://www.cool4ed.org/
	Directory of Open Access Books	https://www.doabooks.org/
	Project Gutenberg	https://www.gutenberg.org/
	InTech	https://www.intechopen.com/books
	OAPEN Library	https://www.oapen.org/home
	Open Culture	https://www.openculture.com/free_textbooks
	Saylor Academy Open Textbooks	https://www.saylor.org/books/
	Siyavula	https://www.siyavulaeducation.com/work-oer.html
	Skills Commons	https://www.skillscommons.org/
Video	Vidlery	http://vidlery.com/
	Coverr	https://coverr.co/
	Mazwai	https://mazwai.com/#/
	Life of Vids	https://www.lifeofvids.com/
	Pexels Video	https://www.pexels.com/videos/
	Videvo	https://www.videvo.net/
	Vidsplay	https://www.vidsplay.com/
	Youtube	https://www.youtube.com/
Web template	Google Fonts	https://fonts.google.com/
	HTML5 UP!	https://html5up.net/
	Templated	https://templated.co/

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OER	OpenStax CNX	https://cnx.org/
	IUP Indiana University of Pennsylvania	https://libraryguides.lib.iup.edu/oer/subject
	OASIS	https://oasis.geneseo.edu/
	MIT OpenCourseware	https://ocw.mit.edu/
	Oregon State University	https://open.oregonstate.edu/
	Open Michigan	https://open.umich.edu/find/find-open-educational-resources
	Open Yale Courses	https://oyc.yale.edu/
	WikiEducator	https://wikieducator.org/Main_Page
	The Community College Consortium for Open Educational Resources	https://www.cccoer.org/
	Curriki	https://www.curriki.org/
	KHAN Academy	https://www.khanacademy.org/
	MERLOT	https://www.merlot.org/merlot/index.htm
	OpenLearn	https://www.open.edu/openlearn/
	The World Digital Library (WDL)	https://www.wdl.org/en/

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Bibliography & Helpful Resources

- For the concepts in the suggested modules section and for a summary of the overall scope of the project, see the **Main Concepts** document.
- **Understanding OER**
- You can find detailed information about different usage conditions and licenses at **creativecommons.org**
- **Rubrics for Evaluating Open Education Resource (OER) Objects:** The following rubrics represent an evaluation system for objects found within Open Education Resources
- **Searching Google for OER**
- **Filter YouTube Videos by Creative Commons License**
- **Search for Creative Commons content**
- **Open Educational Resources (OER): Where to Find Videos and Images**
- **Open educational resources: policy, costs, transformation** : This book, drawing on 15 case studies contributed by 29 OER researchers and policy-makers from 15 countries across six continents, examines the implementation of the pivotal declaration through the thematic lenses of policy, costs, and transformation.
- Organisation for Economic Co-operation and Development (2007). Giving Knowledge for Free. The Emergence of Open Educational Resources. Centre for Educational Research and Innovation (CERI).

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