ESCALATE

Module 2
Unit 1

Unit 1 – Open Source Technologies in Education

Module 2: ENABLING OPEN-SOURCE TECHNOLOGY AND INNOVATIVE SOLUTIONS FOR EDUCATORS AND STUDENTS

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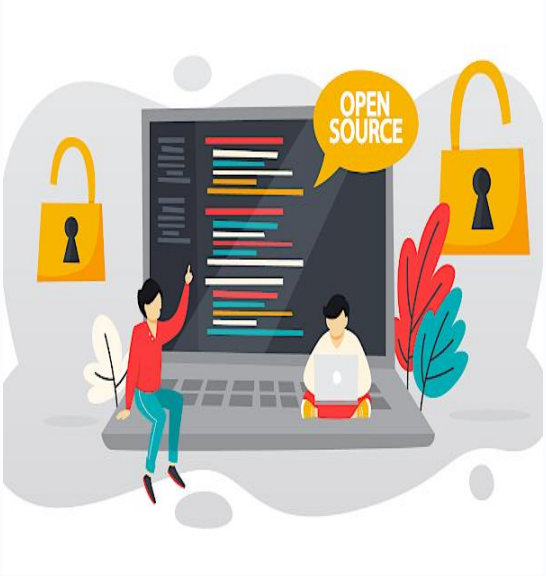
Unit 1: Open Source Technologies in Education

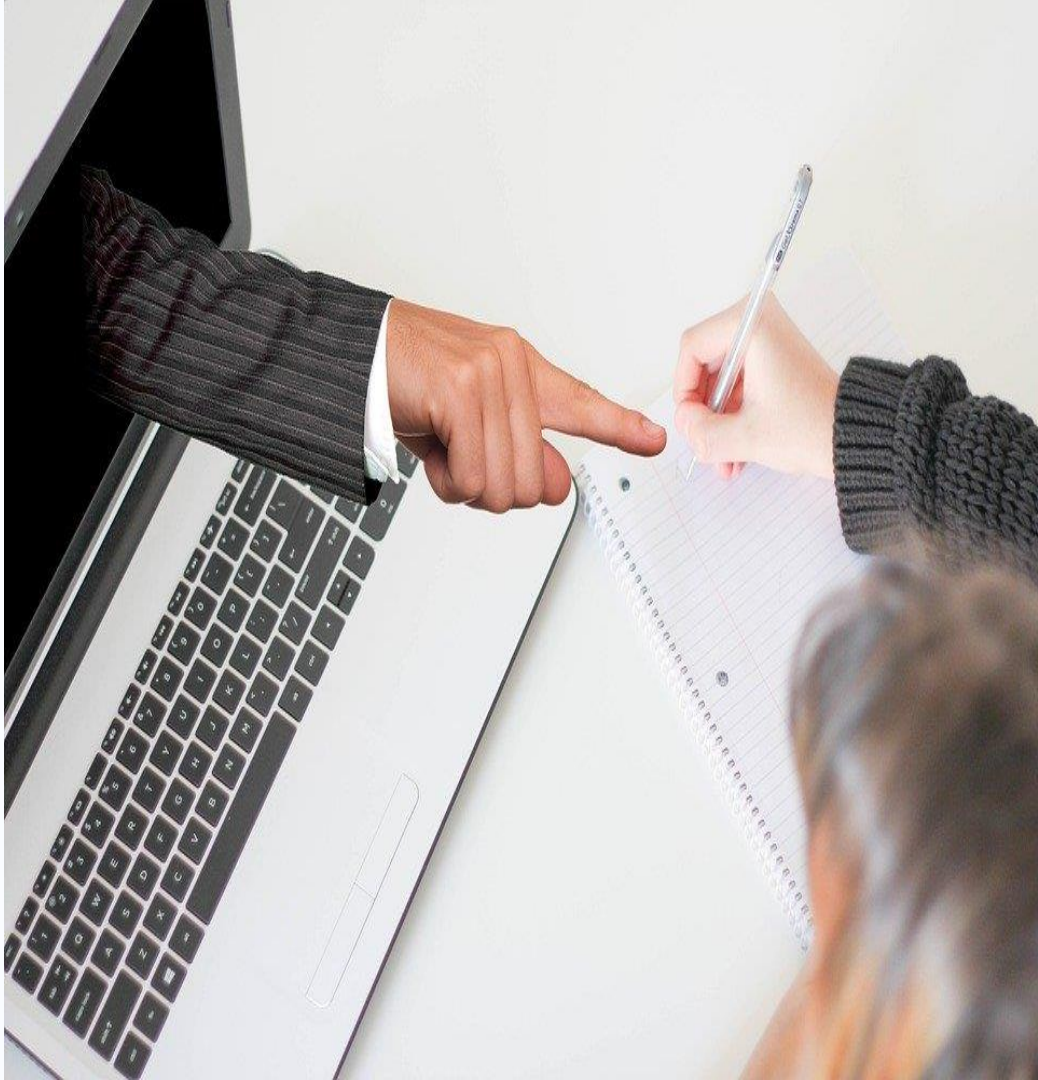
Module 2: Enabling Open-Source Technology and Innovative Solutions for Educators and Students

1. **Open Source Technologies in Education**
2. Impacts and Benefits of Open Source Technologies in Education
3. Examples of Solutions



The objectives of this Unit are:

- To better understand what open source technologies are and what's the difference with the open educational resources
- To provide a classification of typologies of open source technologies
- To understand how the teaching process is changing with the support of open source technologies



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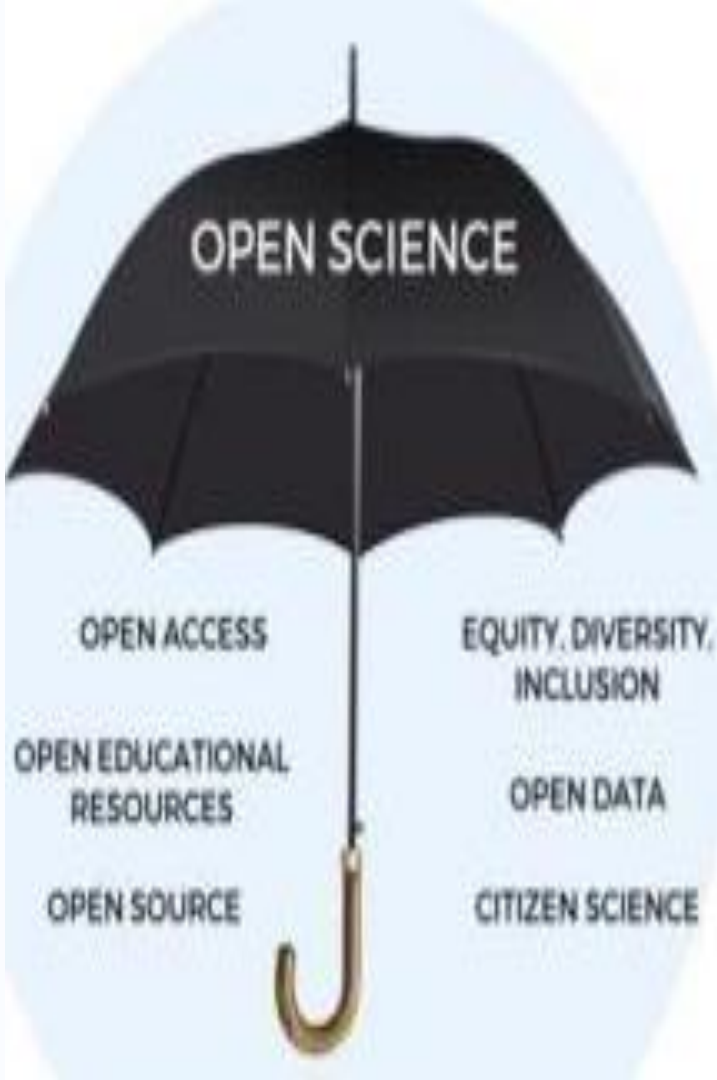
1.1. Definition of Open Source and Distinction from Open Educational Resources

Open science is the movement to make scientific research (including publications, data, physical samples, and software) and its dissemination accessible to all levels of society.

Open science is the more frequently used term, more so in the realm of pure sciences, while often alternatively referred to as **open scholarship** or **open research** in the arts and humanities environment.

The six principles of Open Science are:
- Open methodology
- **Open source**
- Open data
- Open access
- Open peer review
- **Open educational resources**



Source: [1]

1.1. Definition of Open Source and Distinction from Open Educational Resources

Open Source

The term **open source** refers to something people can modify and share because its design is publicly accessible. The term originated in the context of software development to designate a specific approach to create computer programs.
Today, however, "open source" designates a broader set of values - what we call **"the open source way."** Open source projects, products, or initiatives embrace and celebrate principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development.

Open Educational Resources

Open educational resources (OER) are freely accessible, openly licensed text, media, and other digital assets that are useful for teaching, learning, and assessing as well as for research purposes. The term OER describes publicly accessible materials and resources for any user to use, re-mix, improve and redistribute under some licenses.
MOOCs are an example of OER. Massive Open Online Courses (MOOCs) are online courses accessible to anyone with a computer and access to the Internet. People call these courses "massive" because their enrollment is open to more students than traditional educational institutions might permit.

Source: [2]

1.1. Definition of Open Source and Distinction from Open Educational Resources

Open Source Software (OSS)

- Open Source Software is software with source code that anyone can inspect, modify, and enhance. "Source code" is the part of software that most computer users don't ever see; it's the code computer programmers can manipulate to change how a piece of software - a "program" or "application" - works. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that don't always work correctly.
- Many features distinguish open source software from closed or proprietary software. The Open Source Initiative (OSI) has set a standard—the "open source definition"—by which software qualifies for an open source license.

[Next Slide]

Source: [3][4]

1.1. Definition of Open Source and Distinction from Open Educational Resources

The software must meet the following criteria:

- *Unrestricted distribution*. Users can distribute or sell the software without paying royalties.
- *Source code distribution*. The source code of the entire open source product must be easily modifiable. In the absence of the source code, the product must cite a low-cost resource where users can obtain it.
- *Modifications*. The license allows modifications, and its terms remain unchanged for distribution of improved versions.
- *Author's source code integrity*. If the license allows patch file distribution along with the original source code, a user cannot modify the code and distribute it[2] except by giving the new version a new name.
- *No personal discrimination*. No person or group shall be discriminated against during open source product distribution.
- *No restriction on application*. Open source software can be used in any field and for any purpose.
- *License distribution*. The privileges attached to the original program extend to all who receive the program, so recipients do not need to apply for a separate license.
- *License must not be product-specific*. The rights associated with a license extend to products extracted from a larger software aggregate.
- *No restriction on other software*. No restrictions are allowed on distribution of open source products bundled with products developed on other software platforms.

1.1. Definition of Open Source and Distinction from Open Educational Resources

OSS in Higher Education

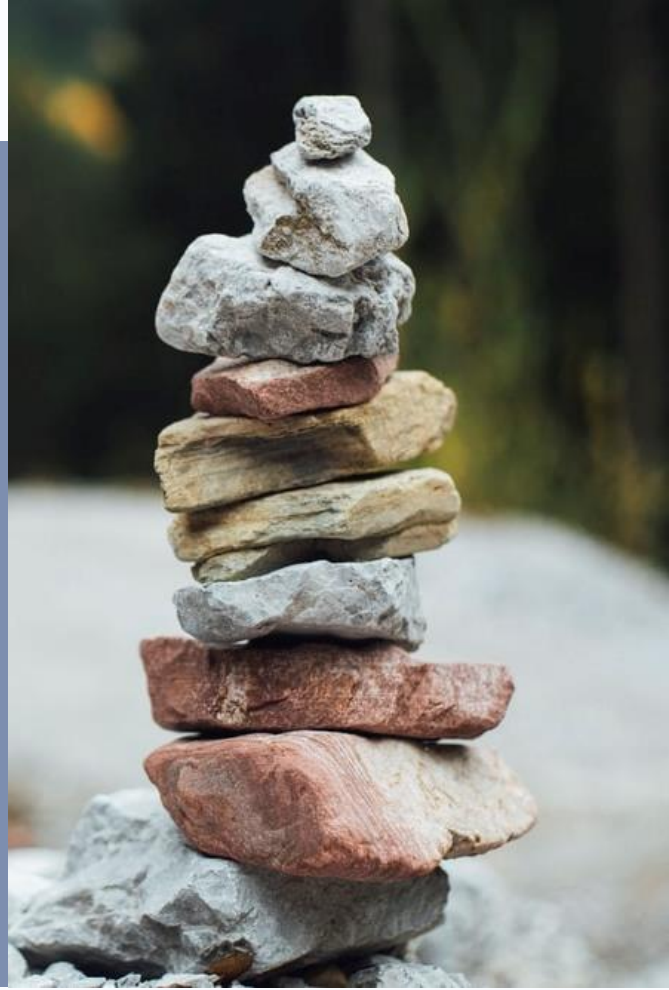
- Open source is changing the nature of the software business in many settings, but the movement is particularly impressive in education.
- In the past few years colleges and universities have begun to produce enterprise open source applications like Course Management Systems and electronic portfolios that compete directly with their proprietary counterparts. These e-learning applications are leading a movement in higher education from proprietary software toward open source.
- At the heart of the cultural fit between academia and open source are common philosophy and values. Creating and sharing knowledge for public good is a key part of the mission of colleges and universities, and a core part of the philosophy driving open source software.
- The open source model provides colleges and universities a way to leverage cultural values of collaboration and sharing to gather resources and work together for the common good. Unlike contexts outside of education, working together doesn't blur institutional brand or threaten a school's income. As a result, higher education not only boasts some of the best software engineers, but also has a plentiful

Source: [5]

Good practice

The EU Commission adopts Open Source Software Strategy 2020-2023

On October 2020, the European Commission approved its new Open Source Software Strategy 2020-2023 of the Commission. This is an important step towards achieving the goals of the overarching Digital Strategy of the Commission and contributing to the Digital Europe programme.
The internal strategy, under the theme ''Think Open'', sets out a vision for encouraging and leveraging the transformative, innovative and collaborative power of open source, its principles and development practices. It promotes the sharing and reuse of software solutions, knowledge and expertise, to deliver better European services that benefit society and lower costs to that society.
The implementation of the strategy will be guided by 6 principles: think open, transform, share, contribute, secure, stay in control. In practice, the Commission aims to reinforce an internal working culture that is already largely based on the principles of open source. The Commission will undertake a number of actions to achieve the goals of the strategy such as: creating open source innovation labs, removing the administrative burden for publication of software as open source, developing open source software



Source: [13]

Reflection

Questions

- What is the difference between Open Source Software and Open Educational Resources?
- What can a user who has access to the program's source code do?
- What are the most important criteria of open source software?

1.2. Typologies of Open Source Technologies in Education

Different educational institutions have different ICT infrastructure requirements, depending on the level of education, the nature of the courses they offer and the available funding. For educational institutions, Internet is a service that facilitates effective administration of the institution and provides a channel of communication between educators and students that can lead to more effective learning. It is also necessary for the implementation of e-learning and distance learning. All these require appropriate Web server hardware and software.

The following list summarizes the main educational technologies in which to use OSS:

- Server Software
- Workstation Software
- Library Management Systems
- Learning Management Systems
- Other Educational Software

Source: [6]

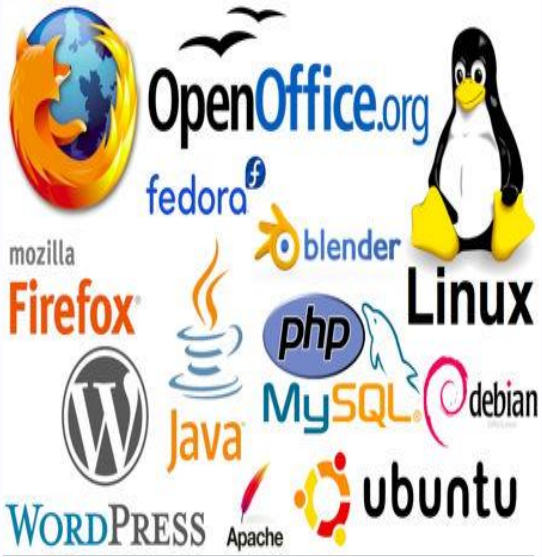
1.2. Typologies of Open Source Technologies in Education

Server Software

A main component of the ICT infrastructure of an organization are the servers that provide various services such as email, file and print services, etc. OSS have been found to be appropriate for this purpose and in certain cases they have a higher market share as proprietary competitors.
One characteristic of ICT usage in an educational institution is the "nomadic - mobile" user, that is, students who use the network services from different computers. This requires a file server that would allow them to save their work and configurations in a central server instead of in the local workstations. The most popular Web server is Apache (Web server software), which is also OSS.

Workstation Software

Although there has been increasing adoption of FOSS for desktops, its penetration is still relatively low. In educational institutions, both staff (administrative and academic) and students require a suite of office productivity software consisting of a word processor, spreadsheet and presentation software. The OSS productivity suite, OpenOffice, is gaining popularity as its features are becoming comparable to the proprietary Office suite.

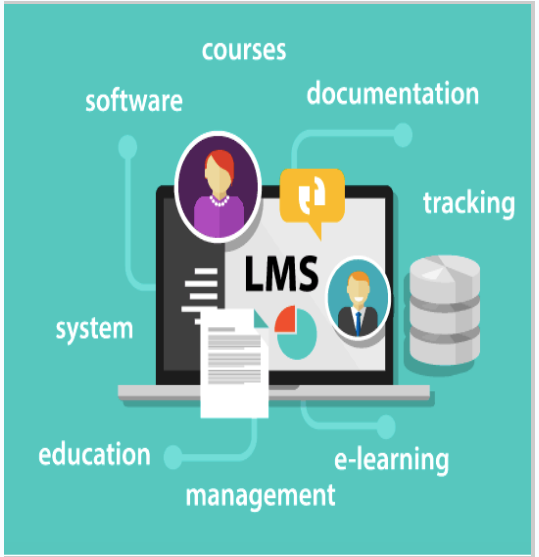


Source: [6]

1.2. Typologies of Open Source Technologies in Education

Learning Management Systems

A Learning Management System is a software application or a Web-based system that provides an instructor with tools to create and deliver online content, monitor student participation and assess student performance.
A Learning Management System may also support collaboration and provide features such as chat facilities and discussion forums.
Learning Management Systems are sometimes referred to as Course Management Systems. Several OSS Learning Management Systems are now available. Moodle is currently the most famous and used in universities.



Library Management Systems

Library management systems are commonly used in all educational related institutes. Many commercial products are available. However, many institutions may not be able to afford the cost of using commercial products.
Therefore, an alternative solution in such situations is OSS. These systems help automate acquisition and inventory management functions. Users can make changes to the source code of the software to make it better at catalogue management, generating reports and much more. Many open source library management systems are free to download.

Source: [6][7]

Did you know...

The Top Open Source Software in Education

The top five open source learning management systems in 2019 were **Moodle**, **Chamilo**, **Open edX**, **Totara Learn** and **Canvas**, as published by eLearning Industry site based on online reviews.

The top five open source softwares for school management in 2021 are **Edisapp**, **AscendSMS**, **EduSis School**, **RosarioSis** and **Open School**, ranked by Software Suggest site based on online reviews.

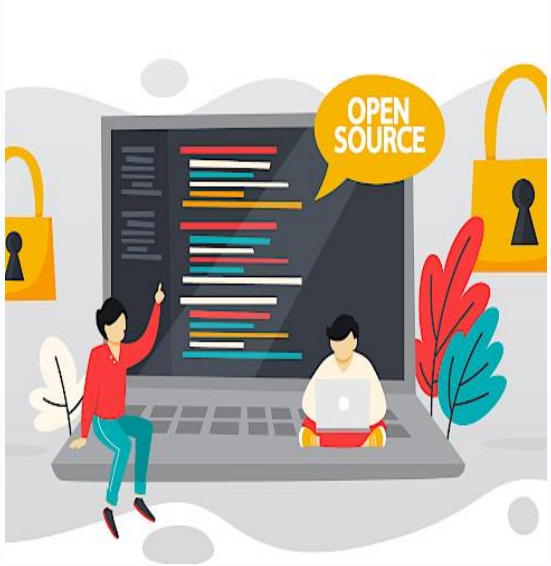
The top five open source library management softwares in 2019 were **Koha**, **Evergreen**, **BiblioteQ**, **Opals** and **OpenBiblio**, as published in a comparison by GoogFirms site.

Source: [9][10][11]

1.3. Description of the teaching process based on Open Source Technologies

Teaching through an open source approach

The approach based on OSS suggests any Internet infused educational initiative should hold the human part of human-Internet interactions as primary, where teaching/learning processes are created and recreated through participant activities, and based to a great extent on the quality of those interactions.
There is a focus on human contributions and ultimate control of educational experience; even pervasive technologies remain in the background, as platforms that serve, but do not drive, teaching and learning.
At the individual level open source educative approaches are concerned with the skills and motivations that provide students entry points into productive online learning ecologies.
At the community level an open source approach works towards building online social ecologies that meet students where they are (based on experience and motivation) in their relationship with information and learning in cyberspace.
At the institutional level open source projects should ultimately work towards development of tools recognizable as valuable, not only to the immediate project community but the social group and/or institution at large.



Source: [8]

1.3. Description of the teaching process based on Open Source Technologies

- At the heart of open source educative processes is recognition that knowledge is a shared, ongoing endeavor, and that the sources of that knowledge are integrated within a continuous stream of knowing.
- The open source educative processes outlined in this module are presented as a beginning of a longer term project and are meant to serve in helping to create an initial general framework for translating Internet activities and possibilities into formal education initiatives.
- Open source educative processes are generally focused on individual learners engaging and eventually working with other participants in assuming a sense of control over their Internet activities, and through these activities developing and mastering a unique set of basic and advanced Internet skills.
- Skills that empower users to find, join and work towards sustaining productive online project/educational communities; and to develop a selfefficacy to adapt these skills to advanced critical learning activities that are separate from or even challenge traditional everyday activities.

Source: [8]

1.3. Description of the teaching process based on Open Source Technologies

Goals of open source educative process

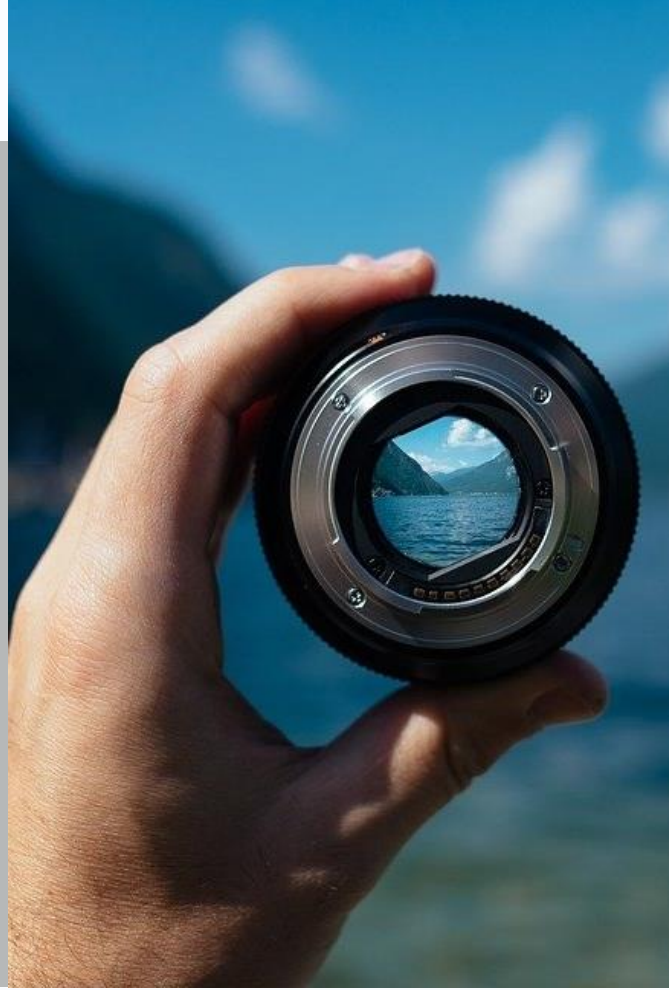
- A focus on learner agency where the student drives the educative process through their own activity.
- Willingness of teachers to give up ownership of the educative process to the students and trust that they will act as responsible stewards of problem solving and knowledge development.
- Use of a “web of trails” approach where students are encourage to be explorers rather than simple consumers of knowledge.
- Moving students from an authority based model of acceptable knowledge to knowledge that is more fluid. This includes a developing a larger awareness of how information is disseminated, used and challenge in the information age through their own participation in knowledge development.
- Emphasis on developing process oriented intelligence that increases students' capabilities in using the Internet as a source of reliable knowledge and a tool in problem solving.
- Recognize the role that user efficacy plays in Internet use - especially user efficacy is activities such as responding to and augmenting information found online and generating new information for an online.
- Developing strategies that recognize how Internet infused education is simultaneously a teach student issue, a (school) institutional issue and a societal

Source: [8]

Example

The French Open Source Educational Platform

The French Ministry of National Education and Youth (Ministère de l'Éducation nationale et de la Jeunesse) launched the beta version of the Apps.education.fr platform. Relying on open source software. Apps.education.fr is a platform which compiles software solutions recommended for teachers and professors who must provide distance education to their students. The service has been launched as a temporary beta version to meet the specific needs brought in the wake of the COVID-19 pandemic. However, the Ministry of National Education and Youth aims to make this initiative sustainable in the long term at the national level.
The platform offers six tools for distance learning, mainly based on open source software, that meet the conditions recommended in the framework of the General Data Protection Regulation (GDPR).



Source: [12]

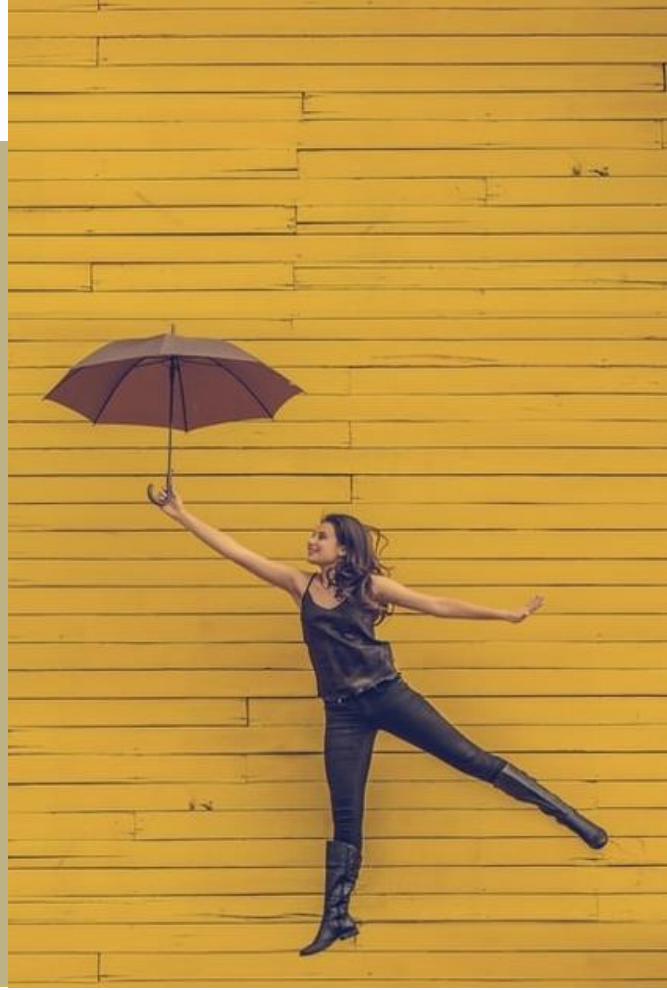
Reflection

Questions

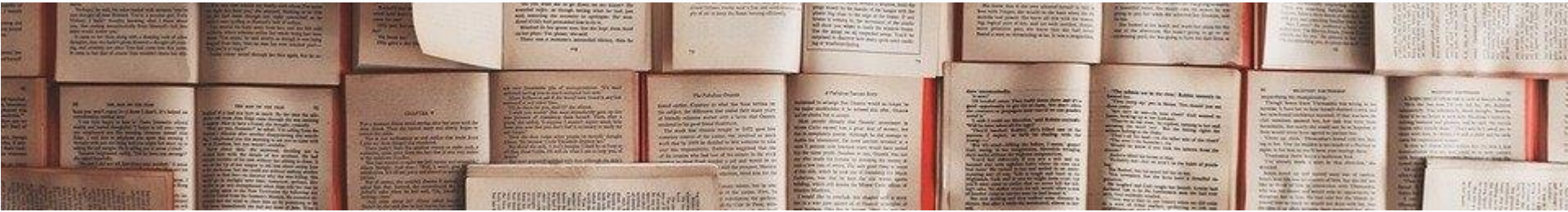
- What is the focus in the educational process based on the open source approach?
- What are the three levels on which the open source approach works?
- Reflect and discuss the main goals of open source educative process

Key takeaways

- Open Source and Open Educational Resources are two principles of Open Science Movement.
- Open Source Software is software whose code is free and editable by anyone.
- Open Source Movement is changing education processes. A transition is taking place leading the higher education from proprietary software toward open source.
- One of the main changes in the educational process based on the open source approach is the demand for new skills and methods of knowledge.



References



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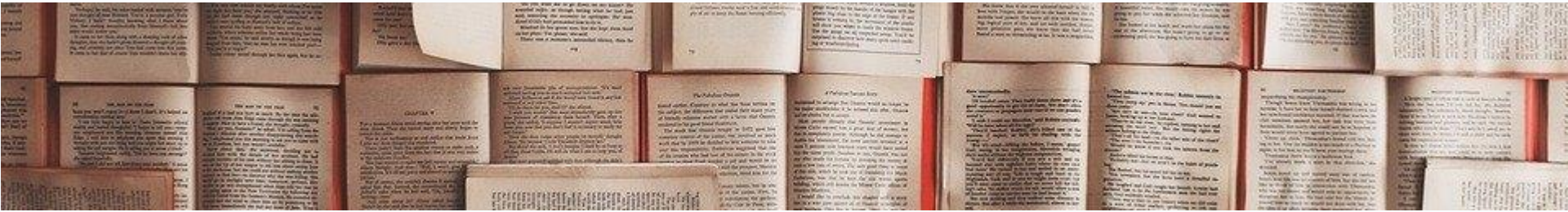

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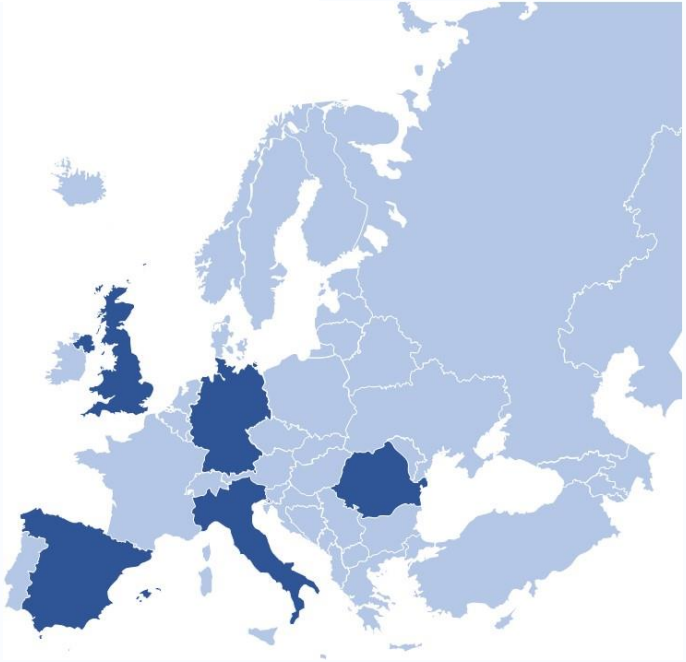

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