Module 2
Unit 2

Unit 2 – Impacts and Benefits of Open Source Technologies in Education

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

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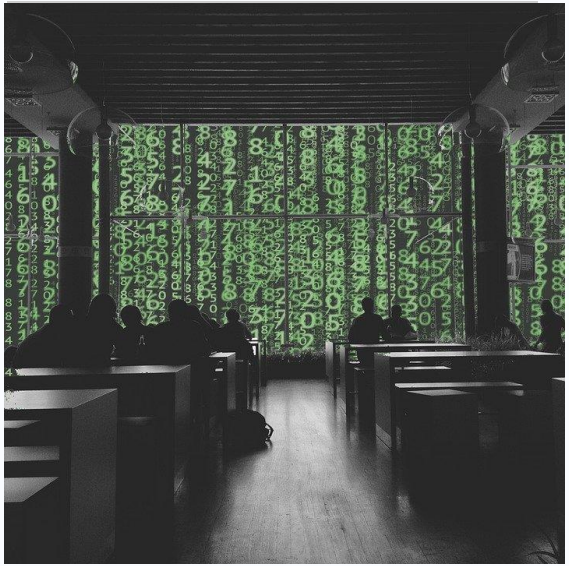
Unit 2: Impacts and Benefits of Open Source Technologies in Education

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 provide an overview of the main open source technologies and solutions available for universities and schools
- To evaluate impacts and benefits of these technologies
- To discuss and explorate some potential impacts

Contents

2.1. Overview of technologies and solutions available for universities and schools

The digitization of education is a relatively new phenomenon that has transformed the education sector. Universities and schools explore the potential for digitizing
education through

- Virtual universities
- Online courses
- Education portals
- Courseware

The Internet offers opportunities to combine educational and economic goals on a common, globally accessible platform. This requires extensive technical support to create and sustain the software infrastructure on which digital education primarily depends.

Universities increasingly adopt the collaborative model of open source software development, which enables educational institutions to pool their financial and technical resources.

One reason to invest in developing open source application software is to work out a more cost-effective way of meeting e-learning software challenges.

Source: [5]

2.1. Overview of technologies and solutions available for universities and schools

Different Options

Educational institutions must consider multiple issues before making a choice among software options. Many nonprofit organizations provide information about open source products and their applicability, several workshops and conferences are organized to help gauge the impact of open source products within educational institutions.

Open source resources can be divided in:

- Open Educational Resources (OERs)
- Open Source Curriculum (OSC)
- Open Source Learning Management Systems (LMS)

Source: [5]

2.1. Overview of technologies and solutions available for universities and schools

Open Source (LMS) examples and features

Open Source LMS Tools

LMS Tool	Compatibility	Usage
Moodle http://www.moodle.org	Linux, UNIX, Windows, Mac OS X, FreeBSD, and any other system that supports PHP	Downloaded about 500 times a day. More than 28,000 registered sites, over a million courses, a learning community of 10 million.
Bodington http://www.bodington.org	Shibboleth, Linux, Microsoft, Mac OS X, or UNIX	Implemented at University of Leeds, UHI Millennium Institute, and University of Oxford. Provides services to 15,000 users with a single server.
Claroline http://www.claroline.net	Microsoft, Linux/GNU, Mac OS X; complies with SCORM and IMS/QTI.	Available in 35 languages and has users in more than 80 countries.
Dokeos http://www.dokeos.com	Supports SCORM import and LDAP. Data can be imported using CSV or XML files.	In 30 languages and more than a thousand organizations. Implemented at Ghent University and Vrije Universiteit Brussel. More than 28,000 users and 3,600 courses.
.LRN http://www.dotlrn.com	LORS Central, Curriculum, LORS Management, .LRN Ecommerce, Project Manager, Page Editor, Staff List, Syllabus, Expense Tracking	Almost half a million users in 18 countries.
ATutor http://www.atutor.ca	Complies with W3C WCAG 1.0 and W3C XHTML 1.0; supports content developed in IMS or SCORM.	More than 17,000 registered installations worldwide.
OLAT http://www.olat.org	Microsoft Windows, Mac OS X, Linux, Solaris, and UNIX. Conforms to SCORM, IMS QTI, and IMS Content Packaging.	Popular within the European higher education community.
Sakai http://www.sakaiproject.org	Complements commercial software like WebCT, Blackboard, ANGEL Learning, and Desire2Learn.	Adopted by many reputable universities worldwide.

Source: [5]

2.1. Overview of technologies and solutions available for universities and schools

Web 2.0 tools, a new horizon for Open Source in education

- Although Web 2.0 technologies are not designed specifically for digital learning, the academic community looks to Web 2.0 for interactive models. Web 2.0 technologies has changed digital education and learning by evolving it into a mainstream concern.
- Web 2.0 enables students to participate in a many-to-many information-sharing operation. The traditional learning structure has undergone a radical change with the adoption of Web 2.0 technologies. Students have become an important component in the development and distribution of learning content (**E-Learning 2.0**).
- This change of the student's role is in line with open source movement, as Ian Davis wrote:

"Web 2.0 is an attitude, not a technology. It's about enabling and encouraging participation through open applications and services. By open, we mean technically open with appropriate APIs but also, more importantly, socially open, with rights granted to use the content in new and exciting contexts."

- The Web 2.0 tools most commonly used in education are **blogs** and **wikis**, although **podcasting** and **media-sharing** sites are becoming more common. Teachers all over the world encourage their students to get more involved in creating blogs and other interactive web applications to enhance peer communication in and

Source [17]

Did you know...

UNESCO's COVID-19 Education Response

More than half the world's students are still affected by partial or full school closures, and over 100 million additional children will fall below the minimum proficiency level in reading as a result of the health crisis. **UNESCO** is supporting countries in their efforts to mitigate the impact of school closures, address learning losses and adapt education systems, particularly for vulnerable and disadvantaged communities. UNESCO is providing a **list of educational applications, platforms and resources** to help parents, teachers, schools and school administrators facilitate student learning and provide social care and interaction during periods of school closure.
Most of the solutions curated are free and many cater to multiple languages, and many are open source.
They are categorized based on distance learning needs:

- **Digital learning management systems**
- **Systems built for use on basic mobile phones**
- **Systems with strong offline functionality**
- **Massive Open Online Course (MOOC) Platforms**
- **Self-directed learning content**
- **...**

Source: [1]

Reflection

Questions

- What is a motivation for choosing the open source model in education?
- What are LMS and what are the main features?
- Why can we say that web 2.0 technologies are a new horizon for open source in education?

2.2. Benefits of Open Source Software in education

There are many benefits of open source software to students, teachers and education institutes.

Open source adoption in education shall give each stakeholder control over its computer resources.

It shall help one to make informed choices for their future, be it individual or collective.

Some key benefits that the open source ecosystem has to offer with respect to education:

1. Learn computing concepts, instead of products:
   - Not to learn how to use Microsoft software but the emphasis is on to learn computing concepts.
2. Lower total cost of ownership:
   - It has been observed that an open source software mostly costs less than its proprietary equivalent.
3. Affordable computing at student homes:
   - Not every student has access to a sufficiently powerful computer to run proprietary software, children in lower income group households can use OSS with less powerful computer

Source: [8]

2.2. Benefits of Open Source Software in education (2)

4. Customise and reuse software:
   - Open source software allows you to customise which the proprietary ones don't
5. Extend lifetime of old hardware:
   - Many Linux distributions as well as open source packages can run quite well on old machines
6. Lucrative career opportunities:
   - Several business and government organisations have embraced open source software because its value in better security, quality, customisation, zero vendor lock-in

Source: [8]

2.2. Benefits of Open Source Software in education (3)

Many other studies **delineated** several benefits of open source software for learning. They are as follows:

- The software evolves more rapidly and organically.
- Users' needs are rapidly met as the Open Source Software model harnesses their collective expertise and contribution.
- New versions are released very often and rely on the community of users and developers to test it, resulting in superior quality software tested on more platforms, and in more environments than most commercial software.
- The development "team" is often largely volunteers, distributed, many in numbers, and diverse. Often, paid members of the development team will manage the project and organize the work of the volunteers.
- Security is enhanced because the code is exposed to the world.
- Furthermore, in the open learning environment, Coppola and Neelley (2004) suggest that open

Source: [4]

2.2. Benefits of Open Source Software in education (4)

Learning Objects benefits

The latest entrant in the e-learning environment is learning objects. Learning objects are small pieces of instruction that are granularized and reused in various instructional contexts. Learning Objects have many benefits. These benefits are:

- Reduced costs,
- Personalized learning,
- Interoperability,
- Standardization,
- Customization

Source: [3][4]

Example

Learning Objects sites

There are many open source websites that offer free learning objects.
A list of selected organizations that are providing free learning objects:

- Apple Learning Interchange (http://ali.apple.com/ali/resources.shtml)
- CAREO (http://careo.netera.ca)
- Distributed Learning Object Repository Network (DLORN) (http://www.downes.ca/cgibin/dlorn/dlorn.cgi)
- Educational Object Economy (http://www.eoe.org)
- Educational Software Components of Tomorrow (ESCOT) (http://www.escot.org)
- Filamentality (http://www.kn.pacbell.com/wired/fil)
- Gateway to Educational Materials (GEM) Project (http://www.thegateway.org)
- MERLOT (http://www.merlot.org/Home.po)
- Open Course (http://opencourse.org)
- OpenCourseWare (MIT) (http://ocw.mit.edu/index.html)
- Universitas 21 Learning Resource Catalogue (LRC) (http://www.edlrc.unsw.edu.au)
- Wisconsin Online Resource Center (http://www.wisc-online.com)

Just recently, the Informing Science Institute (http://www.informingscience.org) has announced that it is developing an open resource learning object repository ISLO (http://www.islo.org).

Reflection

Discussion

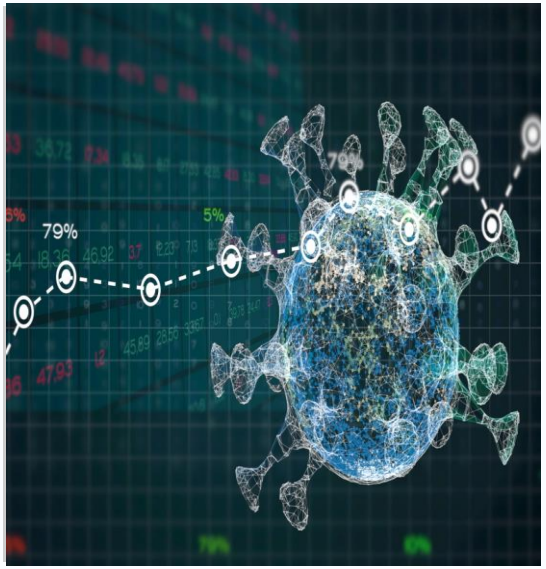
- We have delineated many benefits of open source software, some are economic, some related to customization, some related to product development. What do you think are the most important for choosing open source rather than proprietary software?

2.3. Exploration of potential impacts (also to respond to the needs emerged during COVID-19 period)

Due to the COVID-19 worldwide outbreak societies changed their way of functioning and adapted to the new circumstances.

One of the preventive actions most countries took in order to control the spreading of the virus, was closing down schools and universities. This brought on new challenges for education systems worldwide. Schools and students had to quickly adapt to a fully online environment. Fortunately, there is a variety of online educational softwares that are helping schools to keep moving forward.

The open source software allows anyone in the education system create a customized solution to meet different needs. An open-source educational software can offer better communication and enable teachers and parents to monitor the child's performance.



Source: [13]

2.3. Exploration of potential impacts (also to respond to the needs emerged during COVID-19 period)

Open-source software designed for educational purposes supports and impacts:

- Increasing productivity
- Improving communication
- Providing access from anywhere
- Reduction of workload
- Complete monitoring of students
- Cost-effectiveness
- Easy to use and access
- Customer support
- Data security
- Multi-user functionality

Source: [9]

2.3. Exploration of potential impacts (also to respond to the needs emerged during COVID-19 period)

Open Science in general, and Open Source Software in particular, is serving to help solve the COVID-19 pandemic and what more needs to be done.
Some key initiatives were launched to address the pandemic in the world of education:

- **OER4Covid initiative**

The Commonwealth of Learning (COL) and the OERu join forces with the UNESCO IITE and ICDE to support online learning using open educational resources (OER). https://mautic.oeru.org/oer4covid

- **CORONAOVIRUS | ICDE**

Tips for online teaching, webinars, and news and resources provided by the International Council for Open and Distance Education (ICDE) https://www.icde.org/corona

- **COVID-19 Open Education Community Contributed Resources**

Open Educational Resources for Teaching and Learning in the COVID-19 Era contributed by the OE community
https://docs.google.com/spreadsheets/d/1iQtZoDphA5XYKHR32zUYJ9imjCh4c1DOfg14MRB7G_I/edit#gid=0

- **Creative Commons' Response to COVID-19 | Creative Commons**

Its call to action, and promoting Open Access to education, culture and research and providing resources for online access to knowledge. https://creativecommons.org/creative-commons-response-to-covid-19/

Good practice

Open Source Community during COVID-19 Pandemic

According to the UN's Framework for the Immediate Socio-Economic Response to the COVID 19 Crisis, "The COVID-19 pandemic is far more than a health crisis". COVID 19 affects societies and economies at their core, there are higher possibilities of an increase in poverty and inequalities on a global scale, thereby making the achievement of SDGs (Sustainable Development Goals) urgent than ever before. It's worth digging into open source in order to minimize the negative impacts on individuals as well as on companies throughout this time.

- The National Health Service (NHS) in the United Kingdom has recently launched a new text message notification service for individuals who are put at home quarantine with suspected coronavirus symptoms using the open-source GOV.UK Notify application.
- Regional governments have also started the battle against COVID 19 by developing new open-source tools, such as the Government of Ontario Self-Assessment Tool. This step is an initiative to help members of their community to make safer and more informed

Source: [11]

Key takeaways

- This lesson focuses on impact and benefits of Open Source Software in Education, in particular, which university and school activities can be provided with these tools
- Universities and schools can choose different options and approaches in using OSS
- Open Source has a major impact on the production of educational resources, such as OERs and LMS
- The main benefits that the open source ecosystem has to offer are deeply analyzed
- Finally, some explorative impacts of open source adoption during Covid-19 pandemic are shown, but other important examples will be outlined in next unit

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