Unit 3 – Examples of Solutions

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

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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**

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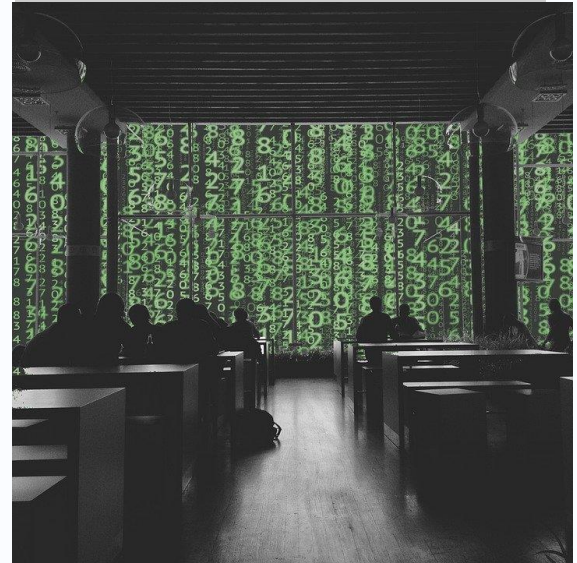
The objectives of this Unit are:

- To highlight some examples of solutions adopted in Education, mainly to address the COVID-19 emergency

- To highlight some tools following the Open Source criteria that are used in Universities

- To give some recommendations and draw some conclusions on the state of the art of open source in education, with a particular focus on Italian situation

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Contents
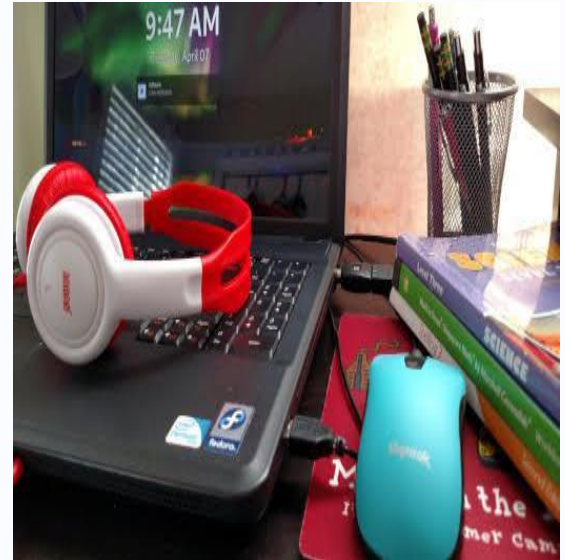
3.1 Examples of solutions adopted in Education and why

Examples of Open Source tools

The COVID-19 pandemic required a paradigm change in education in 2020, as face-to-face interaction between teachers and students was largely replaced by remote learning.

To document the transition to online instructions and help people adapt to it, some examples will be shown about content-creation tools and lesson ideas that will help teachers and students.

Examples cover the following categories:

1. **Open source tools for students**
2. **Learn a new language**
3. **Open source tools for families**
4. **Open source tools for teachers**

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Source: [1]

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3.1. Examples of solutions adopted in Education and why

1. **Open source tools for students**

Because work and learn from home became the new normal, students and teachers needed a stronger infrastructure for teaching and learning.

Many students need to have a computer and a dedicated learning space to meet their remote learning needs. A solution can be **repurposing an older computer using Linux** with a great cost saving. Linux supports all the hardware in the laptops. Most Linux distributions include the main web browsers installed by default, and provide a full operating system, so it is possible to install any applications students might need.

2. **Learn a new language**

With most students working from home, great educational content is more important than ever. An innovative way to learn a coding language is by Scratch. **Scratch is an open source platform** for kids learning to code. It is a visual programming language designed for ages 8 and up. Scratch is not just about coding, though. It also encourages an open online community by empowering users to share and remix projects. There's also an offline version available for classrooms and households with limited internet connectivity. Source: [1]

3.1. Examples of solutions adopted in Education and why

3. **Open source tools for families**

Many people adapted and looked for opportunities in other places as museums, state fairs, and other cultural and educational opportunities were shuttered. Open source tools supply some amazing activities to keep family learning when they stay home. With **Jupyter** kids can have ready an endless supply of coloring book pages; the **StreetComplete** mobile app makes possible a scavenger hunt with which whole family can enjoy together; with Jupyter Notebook it is possible to teach people **Python** by making an interactive game; **Hummingbird** is an open source robotics kit ideal for kids ages eight and up.

4. **Open source tools for teachers**

Many teachers need new ways to manage their educational content: **Hugo** leverages Markdown and prebuilt themes to provide a simple and easy-to-use content management system (CMS); **WordPress** is a go-to content management system, and provides some educational plugins that extend WordPress to meet any classroom's needs; just as useful and performing **Moodle** with which you can create a Moodle server on an extra computer. We can't forget **Wikipedia** as an open source tool providing a huge amount of educational material for teachers.

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3.1. Examples of solutions adopted in Education and why

- The **Digital Response to COVID-19** is a rich of information resource on the state of the art of open source solutions used to respond to the Covid-19 emergency.
- The Digital Resonse gives access to a large resource database including open source software, websites, and platforms that are useful for public administrations, businesses, and citizens dealing with the ongoing crisis. The listed solutions and resources cover a wide range of areas education included.
- A list of open source solutions helping citizens to study from home is provided. The solutions are developed by private or public entities and have a geographical coverage ranging from a specific country to the whole world.
- From the point of view of the school level, solutions ranging from primary to university are offered.
- One of these solutions is the next **Good Practice**

Source: [2]

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Good practice

Moodle and UNESCO's COVID-19 Education Coalition

Since 2002, Moodle has become a standard learning platform for nearly two-thirds of universities, as well as countless schools around the world. Driven by hundreds of thousands of educators worldwide, it's used in 180 languages and dialects and in every country of the world.
Moodle is part of The Global Education Coalition, an open partnership facilitated by UNESCO formed in response to COVID-19, to ensure the continuity of education for all learners. What binds the coalition is a commitment to help countries assure the inclusive and equitable provision of distance education.
Moodle is open source, non-proprietary software. The platform allows teachers to create quality online classrooms using a mix of asynchronous activities such as forums, quizzes, and assignments with live sessions through a variety of integrated conferencing tools.

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3.1. Examples of solutions adopted in Education and why

Coronavirus learning resources: online platforms

The European Commission is coordinating a common European response to the coronavirus outbreak. Online tools can serve different educational purposes:

- connecting educators and learners with each other when in separate locations

- accessing information and environments not usually available in every home or institution

- supporting continued professional development of educators in a flexible way

To help ensure continuity in education and training activities, there is a wide range of online learning materials made available online:

- Online platforms

- EU funded projects

Source: [3]

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Reflection

Discussion

- In your opinion, among the examples presented in the previous slides, are there any experiences that seem more significant than others? Why?
- Do you know of other similar experiences or projects that could be included among them?

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3.2. Additional Tools that are or could be used by Universities

Open Badge

- An Open Badge is a digital photo of student' skills. Like a photo which not only has a picture, but also provides information on the place and time it was shot, the Badge too contains extra information – metadata – which can be read by all the applications which can read Open Badges.

- Metadata allow one to make sure that the Badge was really assigned to a student and to access all the descriptive contents of the Badge, hosted on the platform which issued it. Metadata are written in the Open Badge using an open source format: so a great many platforms assign Open Badges and allow one to collect and show them. Bestr is one of these.

- On Bestr, there is a page describing the contents for each Badge, and anyone who obtains a Badge has a dedicated page, with his name, the date on which he obtained the Badge and a description of the Badge.

Example

Open Badge Bicocca

The University of Milano-Bicocca assign Open Badges through Bestr to its graduates, first in Italy and probably in the world. The experience begins on July 20, 2017 with the graduation session of the English-language master's degree course in International Economics, active from the 2015-2016 academic year.
Another 68 badges follow for all other degree courses, in addition to the Open Badge International student which is issued to those who complete one or more study periods abroad as part of international mobility programs.
An innovation that University of Milano-Bicocca was the first to adopt in Italy, and of which today the numbers testify to its success. In fact, the quota of 1000 for the Open Badges issued to Bicocca students has been exceeded upon graduation, three-year or master's degree.

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Source: [10]

3.2. Additional Tools that are or could be used by Universities

MOOCs

- Massive Open Online Courses (MOOCs) are free online courses available for anyone to enroll. MOOCs provide an affordable and flexible way to learn new skills, advance career and deliver quality educational experiences at scale.
- In addition to traditional course materials, such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums or social media discussions to support community interactions among students, professors, and teaching assistants, as well as immediate feedback to quick quizzes and assignments.
- MOOCs often emphasized open-access features, such as open licensing of content, structure and learning goals, to promote the reuse and remixing of resources.

Source: [4]
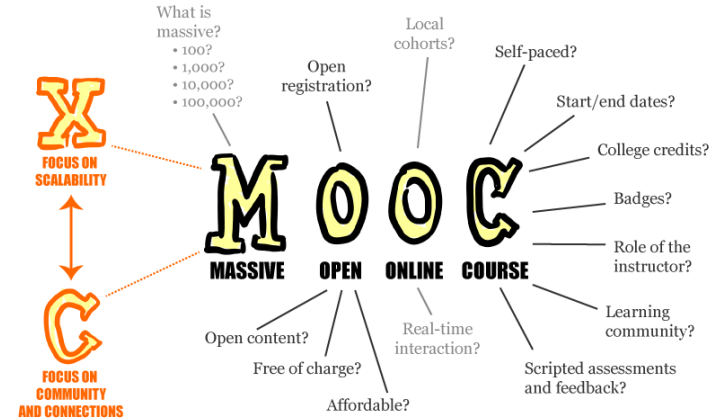
Did you know...

Federica.eu

An **eLearning platform** of the University Federico II which operates in partnership with the **most prestigious** public **Italian Universities** to deliver **university** education in **MOOC** modality (Massive Open Online Courses). Up to date, **Federica.eu** serves **200.000 users** globally

Thanks to **300** MOOCs which include **2000** lessons provided with different digital tools (6000 videos, **50.0000** slides) is the **leading platform** in Europe for **open access multimedia education**, and in the **world's top ten for the production of MOOCs**

with its
offer courses on:

The **University** Milano-**Bicocca** joins the partnership leading experience in **Data science** to

Machine learning, Python, R and Data Science

(https://www.federica.eu/en/partners/bicocca/)

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3.3. Recommendations and Conclusions

From everything that has been analyzed and described in these lessons, some recommendations and conclusions can be drawn for a more widespread use of open source software in education.

Numerous reasons show that open source software is suitable for use within educational institutions:
- The open source code of OSS provides students with the ability to learn more about software programming and architecture. They can understand better how computers and operating systems work.
- OSS encourages the creation of different skills and widens the learning spectrum of the students.
- OSS helps to reduce the total cost for hardware and software. Due to low hardware requirements of the operating system Linux, older systems can be refurbished and reinserted.
- OSS is more secure from virus attacks than proprietary ones.

Source: [5]

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3.3. Recommendations and Conclusions

From the teaching point of view:
- The use of open source packages together with proprietary applications helps students to understand that there is a wide choice and numerous software alternatives are available.
- The open source code of OSS helps teachers demonstrate the principles and techniques of computer science e.g. the organisation of a compiler or the structure of a network server.
- Open source software can also play an important role in advanced laboratory work in the field of development and integration of OSS. It can significantly increase the capabilities and skills of the students.
- Teachers can modify open source software to meet their own needs or to develop utilities for teaching and school administration.

Source: [5]

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3.3. Recommendations and Conclusions

State of the art in Italy

Through some surveys available online it is possible to draw up a general picture of how and to what extent open source software is adopted in Italian schools and universities. The majority of them have implemented the operating Linux within their server environments. Research as well as development projects in various educational institutions show the interest of open source software based system. The list of experiences received by schools shows the trends of OSS in Italian education world. The results are presented in next slide

Source: [5]

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3.3. Recommendations and Conclusions

- The schools involved are distributed throughout the national territory, with some areas of excellence and others participating in clusters.
- Many experiences are **computer science training oriented** and consist of courses or lectures on open source software for students.
- The experiences include the implementation of network and ICT **infrastructures** (laboratories, test centres, etc) in the school, implemented with OSS.
- Refresher **courses for teachers** are held on the basic issues of OSS, often related to previous teacher training processes.
- In some schools open source platforms are used for **E-learning and Content Management System.**
- The use of the suite StarOffice together with OpenOffice.org is frequent.
- Several kinds of OSS are used (not only LINUX).
- A few very interesting projects are focused on OSS development.
- There is significant partnership with local corporations and public administrations

Source: [6]

3.3. Recommendations and Conclusions

Some Conclusions

- Due to the information gathered, it is possible to evaluate positively the wide diversity of experiences, profusion of ideas and operative solutions and the variety of adopted open source solutions within the Italian Educational Insitutions.
- A critical issue is the lack of **professional human resources** in schools both in terms of open source skills and of the number of IT stuff available.
- Another critical point is the **integration** of various open source and proprietary systems. Schools interested in the open source software have to decide if they want to adopt free software in a radical change or to realise a mixed IT environment OSS and proprietary software use.
- To encourage the adoption of open source software in education, it is essential to provide solutions and distribution channels **designed specifically for educational sector**. Schools need an information portfolio of realistic and well documented software solutions that can be inserted in schools and meet the requirements.
- Fostering the growth of a network of open source related **competence** at schools and universities is of fundamental importance.

Key takeaways

- The examples shown in this Unit highlight how the open source approach can innovate many different educational needs

- The European Community is increasingly investing in Open Source, not only in research but also in education

- Educational resources such as LMS and MOOCs are characterizing the most interesting open source initiatives in the university environment

- But not only those, also Open Badge is a new important tool for universities to certify soft and hard skills

- Finally, among the critical points, it is necessary to highlight the lack of adequate skills and specific projects to introduce open source in schools, a topic of debate that hopefully can be addressed soon.

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References

[1] Watkins, D. "4 ways open source transformed education in 2020", December 25 2020, https://opensource.com/article/20/12/open-source-education

[2] "Digital Response to COVID-19" https://joinup.ec.europa.eu/collection/digital-response-covid-19/useful-information-and-resources#Education

[3] "Coronavirus: online learning resources" https://ec.europa.eu/education/resources-and-tools/coronavirus-online-learning-resources_en

[4] Hill, P. (2012). Online Educational Delivery Models: a descriptive view. Educause Review, Nov-Dec 2012, 85–97. http://www.educause.edu/org

[5] "Open Source Software Survey in Italian Schools", Last update: 16/10/2017, https://joinup.ec.europa.eu/sites/default/files/document/2012-02/survey-in-italian-schools.pdf

[6] Bogliolo A.,Donzelli P.,Mainetti L.,Mezzalama M.,Stefanelli C. (2012). Il Software Open Source nel Sistema Universitario Italiano. In: ARCHIVI & COMPUTER, vol. XXIII n. 1/012, pp. 114-127 https://iris.polito.it/handle/11583/2489100#.YJVAJWYzau4
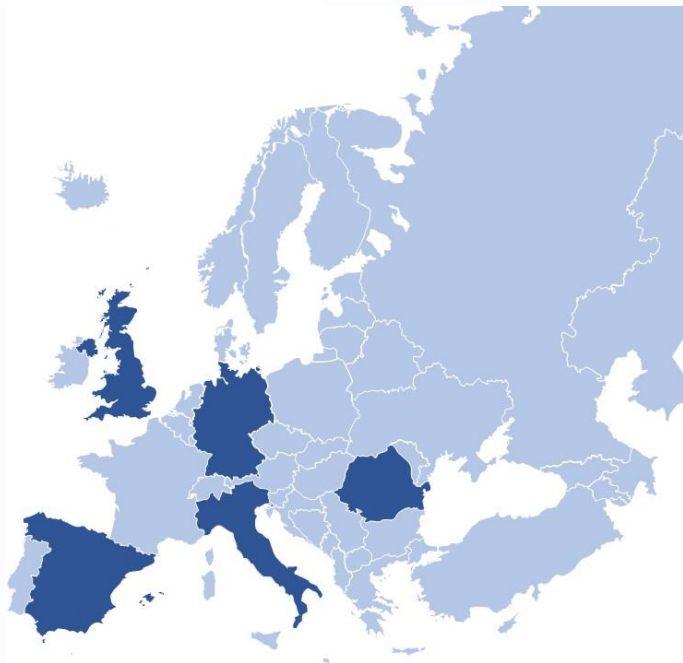
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