



International Institute for Educational Planning

INTERNATIONAL COMMUNITY OF INTEREST  
OPEN EDUCATIONAL RESOURCES OPEN CONTENT FOR HIGHER EDUCATION

# Report of the discussion on Free and Open Source Software (FOSS) for Open Educational Resources

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## INTRODUCTION

The IIEP Free and Open Source Software (FOSS) Community came into being following a discussion forum held in June 2004 with 265 participants from 67 countries. Since that time, the Community has continued, largely in an informal manner, to exchange information and intelligence on FOSS for education.

Given the scope and expertise of the Community it was surmised that the members would have valuable advice and resources to propose for use in the development of Open Educational Resources (OER).

## OBJECTIVES OF THE DISCUSSION

The objective of the discussion in the FOSS Community was to engage the members in a consideration of:

- the potential of Free and Open Source Software for the open content movement and the lessons that could be drawn from the FOSS movement;
- potential FOSS solutions for creating, storing, locating and re-using Open Educational Resources.

## 1. WHAT IS FOSS?<sup>1</sup>

“Briefly, Open Source Software/Free Software programs are programs whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program (without having to pay royalties to previous developers).” *David Wheeler*

Free and Open Source Software (FOSS) has become an international phenomenon, moving from relative obscurity to being an established movement. However, there is still a lack of understanding about what really constitutes FOSS.

There are two major philosophies in the FOSS world: the Free Software Foundation (FSF) philosophy and the Open Source Initiative (OSI) philosophy.

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<sup>1</sup> This section is adapted from the Background Note to the first IIEP FOSS forum, held in June 2004. The full text can be found at: [http://www.unesco.org/iiep/virtualuniversity/forumsfiche.php?queryforumspages\\_id=5](http://www.unesco.org/iiep/virtualuniversity/forumsfiche.php?queryforumspages_id=5).

## THE FREE SOFTWARE FOUNDATION (FSF) VIEW

According to the FSF, free software is about protecting four user freedoms:

- The freedom to run a programme, for any purpose.
- The freedom to study how a programme works and adapt it to a person's needs. Access to the source code is a precondition for this.
- The freedom to redistribute copies so that you can help your neighbour.
- The freedom to improve a programme and release your improvements to the public, so that the whole community benefits. Access to the source code is a precondition for this.

## THE OPEN SOURCE INITIATIVE (OSI) VIEW

The OSI philosophy is somewhat different to the FSF.

When programmers can read, redistribute and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, and people fix bugs. And this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing.

The OSI is focused on the technical values of making powerful, reliable software, and is more business friendly than the FSF. It is less focused on the moral issues of Free Software and more on the practical advantages of the FOSS distributed development method.

While the fundamental philosophy of the two movements are different, both FSF and OSI share the same space and cooperate on practical grounds like software development, efforts against proprietary software, software patents, etc. As Richard Stallman, founder of the FSF, says, the Free Software Movement and the Open Source Movement are two political parties in the same community.

## IS FOSS REALLY FREE?

There are two senses in which free software is free: it has zero direct cost to the user, and it provides the freedom to modify the software.

Stallman, in common with most FOSS advocates, emphasizes the latter usage. Free software, he explains, is “free as in ‘free speech,’ not as in ‘free beer’”. This distinction is important for two reasons: First, free software is not at all the same as ‘freeware’, which is zero-price software with closed source code that is often provided as a trial product. Second, it is highly misleading to view the main economic attribute of free software as its price. As is well known, the total cost of installing a software program includes many other costs; even with proprietary software, the price of the software is usually only a modest portion of the total user cost. Large economic benefits arise from the freedom to modify the source code.

## 2. LESSONS FROM THE FOSS MOVEMENT FOR THE OER MOVEMENT

During the discussion of FOSS solutions for OER, the FOSS Community highlighted a number of important points of convergence, as well as some distinct differences between the two movements. The FOSS movement benefits from many years of experience and mature practices, and the Community put forward the following conclusions and recommendations with respect to OER.

## OER AND FOSS ARE COMPLEMENTARY

The fundamental principle underlying both FOSS and OER is the freedom to share knowledge – whether this takes the form of making software code open for collaborative modification and improvement, or allowing unrestricted access to learning resources.

The objective of widening access to educational materials by means of technology brings OER and FOSS into a complementary and potentially mutually beneficial relationship. It is the conclusion of the FOSS Community that such relationship manifests itself on two levels:

- development of FOSS software tools to support OER;
- development of OER content by the principles of FOSS.

“Definitely in my view free content cannot be developed in the absence of FLOSS technologies. The reason being that free content must adhere to the principles of the free content definition – namely the freedom to use, distribute and modify the resource. The freedom to modify free content includes the requirement to be able to modify the resource with free software tools. We must also respect the choice of users to use proprietary tools for the modification of resources as long as these are saved using open standards.”

“Many people have realized that higher education and the FLOSS movement share many values such as community work fostering the open development and exchange of ideas, peer review, etc. It came about that higher education might use an open source (FLOSS) metaphor or model when integrating technology for content development, management and delivery.”

## OER DEVELOPMENT CAN MIRROR AND TAKE ADVANTAGE OF THE FOSS COLLABORATIVE MODEL

The Open Educational Resources movement holds undisputed potential. Although it may have significant advantages over FOSS, it also faces significant challenges in aiming to achieve the same degree of success:

- contributions to OER can be made by a much broader and more varied community of educators, in contrast to smaller professional groups of software developers in FOSS;
- on the other hand, due to a more diverse population of contributors, the OER movement will face greater challenges in attaining the standards of efficient, structured, peer reviewed, and self-organizing collaborative work that is characteristic of FOSS.

“The new frontier for OER development is to look for excellence through team structured, peer reviewed work, in collaboration, online, adopting/adapting methods and tools used for FLOSS development.”

“I expect that the uptake of collaborative authoring of free content will be revolutionary when compared to FLOSS - simply because there are more people that can participate. In the case of FLOSS this is limited to people who have the necessary programming skills.”

## FOSS CAN PROMOTE CREATION OF OER CONTENT IN DEVELOPING COUNTRIES

In considering the use of available software tools for creation of open content, it is argued that developing countries in particular may play a leading role in promoting the integration of FOSS and OER development. Furthermore, FOSS projects supporting computer literacy (such as the

International Computer Driver License) open up opportunities for wider participation of local educators in OER development from poorly resourced areas.

“Many of the contributions from developing countries seem to suggest that, for large scale widespread usage in a country with not much funding, Microsoft is not within their budget so they can only use those FOSS programs that are relatively low tech.”

“Having main donors and development organizations using FOSS and implementing FOSS in developing countries should be a priority. We are not seeing enough engagement in that area. If big institutions were adopting FOSS it would directly invite and convince local / national partners and official institutions to do the same.”

### OER DEVELOPERS SHOULD COMMIT TO OPEN LICENSES

The success of FOSS can in part be attributed to an ongoing commitment to free licenses, which are essential for unrestricted collaboration and sharing, and lead to progressive development of the movement.

Faced with recent initiatives in digital rights management and patent submissions on learning management systems, the community wishes to stress more than ever the necessity of becoming informed about open licenses such as those offered under the Creative Commons. Open Educational Resources will be well served by licenses that provide legal support to the objectives of free and open access to educational materials through the provision of appropriate and realistic standards for their use, modification, and distribution.

“However, exponential growth of free content will require an unashamed commitment to free copyleft licenses. This is something we have learned from the FLOSS experience - namely the essential freedoms that are protected. Deviations from these freedoms will stall growth of the free content movement.”

“There is an increasing awareness among participants of the OER initiative to choose a license that meets the requirements of the free content definition (<http://freedomdefined.org/Definition>). This is a sign that the OER movement in education is maturing, because not all resources that are ‘open’ are free for reuse, modification and distribution.”

### MANAGING OER CONTENT DESIGN AND EDITING IS EASIER THAN FOSS PROGRAMMING

Unlike FOSS, the structure of OER content is more flexible and accommodating to a diversity of approaches. Contributions to open content can be accomplished with far fewer steps, compared to those of open source. Wikipedia is singled out as a prime example of a content development platform that facilitates contributions without excessive reliance on technical expertise.

“Free content is less demanding than the requirements of central control for maintaining the main code branch of a FLOSS development. Content is also far more tolerant of “errors” - the application won’t break because of a grammatical error. It is far easier to manage the versioning of content, as successfully demonstrated by the Wikipedia project.”

### MORE INCLUSIVE FORMATS FOR DOCUMENT EXCHANGE SHOULD BE USED

Some practical advice was communicated with respect to basic production of open content using desktop publishing applications. OER developers now have more options for document production

and exchange, with increasing interoperability among different formats. Open source OpenOffice.org (version 2) is a step in that direction with the development of the Open Document standard (ODF), recently approved by independent standardization bodies.

“Frequently PDF is a more appropriate format than either MS Office or ODF. The exception would be documents that you actually want the receiver to edit. You might use RTF here.”

“RTF (Rich Text Format) is a proprietary format but the format is documented and seemingly in the public domain. Thus it might claim a role in OER if there is a need that other more truly open formats cannot fill.”

“Another future solution is being visible through Web 2 solutions, such as Writely, which is a free tool enabling you to edit documents online, even in parallel.”

### FOSS CAN SUPPORT BETTER SEARCHING OF OER

In anticipation of OER content proliferation on the Web, the FOSS community can provide recommendations and solutions for locating learning resources. The impact of OER is directly dependent on its visibility and accessibility on the web. Streamlining content development and distribution is one of the ways the FOSS and OER communities can work together to contribute to a more inclusive and open web landscape.

“The potential value of free content is enormous but the problems of finding good, usable material are often overwhelming and this is where innovative structures are urgently needed.”

“Comment has already been made on finding and using learning objects – and the necessity for excellent search strategies so teachers can find existing stuff. That coexists with the challenge of the ‘rate of content development’: it doesn’t necessarily follow that, because content is available free of charge, teachers will use it.”

### FOSS CAN EASE CONCERNS OVER PERCEIVED TECHNICAL DEMANDS OF OER DEVELOPMENT

The FOSS Community acknowledges the wide-ranging skills in the use of technology among potential OER contributors. However, many educators are intimidated by computer environments and are sceptical about the value of technology to education. This is where recent developments in FOSS software, especially those grouped under the label of Web 2.0, are offering increasingly accessible solutions for web-based content production and collaboration. Due to a more transparent production process and the flexibility of software that allows for innovation and creativity, the new FOSS solutions may contribute to changing attitudes about the relationship of web technologies and education, thereby furthering the progress of the OER movement.

“There is a perception where I work in Australia that Open Source belongs to techos – teachers would be interested in Open Source if it provided them with functionality or particular aids to learning that were not readily available, or more easily accomplished, with proprietary software.”

“With the advent of social software the entry barriers to participation are lowered. In comparative terms free content does not require a very high level of technical skill (for example you can publish on the web using a wiki without the need to become proficient in XHTML mark-up).”

## THERE ARE DIFFERENCES BETWEEN OER CONTENT AND FOSS SOFTWARE

Even though they share an underlying philosophy rooted in freedom of knowledge and education, the nature of the FOSS and OER content is distinctly different. In part, such differences are due to the largely subjective notions of value in educational resources, as a function of learning objectives, context, or subject matter. The establishment of standards of quality is a considerably more complex process than is the case with FOSS products. This can present a major obstacle to modelling the principles of FOSS by OER practitioners.

“The key distinction between open source software and open content is that the underpinning dynamics are very different. Open source software, if meeting a need, attracts a community which then fine-tunes and extends the code. It is possible for an application with, say 20,000 lines of code, to be reduced to 10,000 lines of code but have increased functionality. [...] In contrast, our human tendency with content is to not be so ruthless with a purge and replace approach. We simply add to it and this, I believe, is a major challenge to the OER movement. How many repositories have you been to where you've searched through so much dross to find the good "nuggets" that you've simply given up in despair?”

### 3. FOSS TOOLS FOR OER DEVELOPMENT, MANAGEMENT AND DISSEMINATION

The discussion in the FOSS Community generated a large number of suggested tools for OER. These have been grouped in the following categories, progressing from the most elementary to the most advanced:

1. FOSS tools to design, edit and publish OER
2. FOSS tools to implement learning technology standards in OER
3. FOSS tools to design and implement Learning Object Repositories
4. FOSS tools to design and implement Virtual Learning Environments/Learning Management Systems
5. FOSS online collaborative environments to design, edit and publish OER

Under each of these categories is a list of suggested software for OER identified in the FOSS group discussion, and reference information:

- a brief description of the software that has often been taken from the site;
- the direct link to the site.

As this is a very long document and intended for reference for the OER Community, it will be loaded as a PDF on the OER section of the project website.

It is also available on the OER Community wiki, at [http://oerwiki.iiep-unesco.org/index.php?title=Appendix: FOSS tools for OER development%2C management and dissemination](http://oerwiki.iiep-unesco.org/index.php?title=Appendix:_FOSS_tools_for_OER_development%2C_management_and_dissemination).