# SELF: a collaborative platform to share and create free content about free software and open standards<sup>\*</sup>

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#### ABSTRACT

The advance in the implantation of Free Software and Open Standards is a key factor for the economical and technological development of different regions in the European Union and other areas. Although the dissemination of Free Software and Open Standards is growing at a maintained rate, their usage is still far from a prominent position. Among the reasons which justify this limited growth, the lack of qualified teachers and appropriate materials for different educational levels deserve careful attention. In order to mitigate these deficiencies, a consortium formed by seven groups of different nationalities has initiated a project to develop the SELF (Science, Education and Learning in Freedom) platform which is both a material repository to centralise contents for the teaching of free software and open standards and a production facility for the collaborative creation of new contents. This project has received financial support within the 6<sup>th</sup> Framework Programme for Research and Technological Development of the European Commission. This paper presents an overview of the main features of the SELF platform and its different development stages.

Keywords: Free Software, Open Standards, Free Educational Contents, Collaborative Platform

### **1 INTRODUCTION**

Learning is at the heart of every society in the world. In order for humankind to evolve, we have had to learn from the past, through imprints made upon us while growing up, knowledge passed onto us from our parents and the environment around us, or more recently, formal training through schools and universities. While the process of learning has changed significantly over the years, the accumulation of knowledge through millennia of human life, has never ceased. However, in order for this reservoir of human knowledge to be equally available to all, measures have to be taken to ensure its continued evolution and dissemination, and the subject of this paper should be seen as one such measure.

Software has become a strategic societal resource in the last few decades, and has been identified as an important cultural technique which regulates citizen participation in society [1]. The emergence of **Free Software and Open Standards**, which have entered in major sectors of the software market, is drastically changing the economics of software development and usage.

A formal definition of **Free Software** [2] is based on the following four freedoms:

- 1. The freedom to run the programme for any purpose.
- 2. The freedom to study how the programme works, and adapt it to your needs.
- 3. The freedom to make and redistribute copies.
- 4. The freedom to improve the programme and release such improvements.

The accelerated growth of Free Software has been driven in part by the success of platforms such as the GNU/Linux operating system– now the second most used operating system in the world after Microsoft Windows– and the Apache server– by far the most widely employed public Internet web server with more than two thirds of the market. Such high profile systems are just the tip of the iceberg, with a plethora of other Free Software applications operating and being continually developed in a wide range of specific areas.

On the other hand, there are several definitions of Open

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Standards, such as that of the European Interoperability Framework for Pan-European eGovernment Services of the European Commission [3] or the motion B 103 of the Danish Parliament [4]. The SELF project understands as Open Standards those formats or protocols which satisfy the following conditions:

- 1. Complete and public documentation is available.
- 2. Freely implementable.
- 3. No proprietary hooks.
- 4. Open standardisation process.
- 5. Reference implementation in Free Software.

Some governments have already defined the migration to Open Standards and the use of Free Software applications as a strategic goal. Among them, in Europe are the Norwegian national government (and all government bodies), the Spanish state Extremadura, the German Ministry of Interior, the city of Munich, the city of Vienna and various French ministries. Outside Europe, the national governments of Brazil, China, India, Japan, Australia, Korea and Malaysia are some of the early adopters. For more details see the Open Source Observatory of IDABC [5] or the Worldbank infoDev report "Open Source Software - perspectives of development" (2004) [6].

SELF, an acronym for Science, Education and Learning in Freedom, is a research and development project [7] 2 STATE OF THE ART AND OBJECTIVES funded by the European Commission within the 6<sup>th</sup> Framework Programme of Research and Technological Development. This project is carried out by a consortium formed by seven groups belonging to seven institutions in different countries, namely: Internet Society Netherlands (ISOC.NL), Universitat Oberta de Catalunya (UOC), Free Software Foundation Europe (FSFE), University of Gothenburg (UG), Internet Society Bulgaria (ISOC.BG), Fundación Vía Libre (CIPSGA) and Homi Bhabha Centre for Science Education (HBCSE), which are settled in Holland, Spain, Europe, Sweden, Bulgaria, Argentina and India, respectively.

The SELF project starts from three main assumptions:

- 1. Free Software and Open Standards are crucial to support the competitive position of the European software industry;
- 2. the real and long term technological change from proprietary to free software can only come by investing in education and training; and
- 3. the production of educational and training materials on Free Software and Open Standards should be done collaboratively by all the parties involved.

Hence, the SELF platform provides both a knowledge base

and a collaborative production facility. On the one hand, it furnishes information, educational and training materials which can be presented in different languages and forms: from course texts, presentations, e-learning programmes and platforms to tutor software, e-books, instructional and educational videos and manuals. On the other hand, it offers a platform for the evaluation, adaptation, creation and translation of these materials. The production process of such materials is based on the organisational model of Wikipedia [8], but quality assurance (QA) mechanisms have been devised in such a way that academic and scientific correctness of the contents is secured. In short, SELF is conceived as a web-based, multi-language, free content knowledge base written collaboratively by experts and interested users.

While the SELF platform has been started by the members of the consortium, its final goal is to become a community of different interested parties (from governments and educational institutes to companies) which can not only exploit the SELF materials but also participate in its production. The commercial and educational interests of exploiting the SELF materials will assure the selfsustainable character of the SELF platform beyond the first EC funding period.

Although the use of Free Software is increasing, it still remains limited. The EC funded FLOSS report [9] (2002) on the use of some sort of Free Software in Germany, Sweden and the UK indicates percentages of 43.7%, 17.7% and 31.5% respectively. An IDC report from March 2005 [10] states that one third of 625 respondents from West-European companies said they were making "significant live use" of "open source"1 databases.

The Scientific Advisory Board of the UOC's Master Programme in Free Software, headed by Manuel Castells, in the Barcelona declaration for the advance of Free Software [11] pointed out that four main factors hold back the massive adoption of Free Software and Open Standards:

The general lack of awareness on the advantages 1. of the use of Free Software. Free Software applications are available in all fields and can be obtained from their respective project websites.

The terms "Open Source Software" (OSS) and "Libre 1 Software" are often used in place of the term "Free Software". While all these terms often refer to the same software licenses, the philosophical underpinnings are different. For reasons of consistency, this document adheres to terminology of the first publication on the subject, which is "Free Software".

However, to use them you must first know their existence and practical value. One of the reasons behind this lack of awareness is the fundamental difference in economical model between proprietary software development and Free Software development. In the first case, companies heavily in marketing budgets invest to communicate their products. The return on investments is generally based on license fees. In contrast. Free Software development implies zero cost license fees and therefore does not include formal marketing budgets. Consequently, this limits the budgets to educate potential end users about Free Software.

- 2. The perceived **lack of technical support** on Free Software applications. The lack of technical support has been called upon as a reason to failure or delay for the adoption by many companies, governments and other organisations. In this context Rishab Gosh points out in his FlossPols [12] report: "Fear of a lack of technical support closely related to the first mover problem. Countries where technical support exists (or is perceived to exist) face less 'first mover' reluctance".
- 3. The **lack of qualified teachers**. One of the main barriers in education is the lack of teachers for primary and secondary school as well as professional education and universities specialised in free technologies. This reinforces the tendency of continuing to educate students in the use of proprietary applications.
- 4. The **lack of educational and training materials** to learn how to use Free Software applications. IST education in schools and universities is currently still mainly based on proprietary software. IST departments and IST training companies are also focused on proprietary software.

This lack of training has also been identified by the Swedish International Development Cooperation Agency, in particular in relation to the work in developing countries where the use of Free Software is seen as a technological enabler for an inclusive society, and a technology which can bridge the gap between developing and industrial countries in all areas, provided that the necessary infrastructure which includes access to knowledge and education on Free Software exists [13].

Aware of these limitations, the European Union is and has been funding an increasing number of projects in the field of Free Software. These projects can be divided in five main categories:

- projects on Free Software in eGovernment,
- projects directed to technology development of Free Software applications,
- projects on developing Open Standards,
- projects to study the development of Free Software in particular fields and
- projects in the field of education.

In the field of education and training, several initiatives have been undertaken inside and outside the European Union. On the one hand, there are projects which provide educational and training content on Free Software. On the other hand, there are projects which offer learning environments and platforms based on Free Software to develop and distribute general educational materials (but not on Free Software).

The first type of projects, those that provide **educational and training content** on Free Software, are scarce and still in development. Moreover, the materials they provide are fragmented in form, place and language. In form, because some content is just available in text books, on websites or in complex e-learning environments. In place, because they reside in different institutes, on-line communities and universities which at the same time are in different countries. In language, because these materials and programmes are developed in different languages and hence their sharing becomes almost impossible.

The second type of projects, those that offer **learning environments and platforms** based on Free Software to develop and distribute general educational materials, show very interesting solutions like tools and methodologies for creating digital educational content and learning environments. Two of the most relevant projects in this category are Wikiversity [14] and EdukaLibre [15].

In short, we can conclude that **there is a double gap** regarding education and training on Free Software: on the one hand, educational and training materials on Free Software are limitedly available and fragmented; on the other hand, open content education platforms use Free Software technologies but are not about Free Software. In order to cover these gaps, the SELF project aims to combine the strengths of the platforms with the centralisation and creation of accessible information, educational and training programmes on Free Software and Open Standards.

The **general strategic objectives** of the SELF project are the following:

1. To **bring together** universities, training centres, Free Software communities, software companies, publishing houses and government bodies to facilitate mutual support and exchange of educational and training materials on Free Software and Open Standards.

- 2. To **centralise, transmit and enlarge** the available knowledge on Free Software and Open Standards by creating a platform for the development, distribution and use of information, educational and training programmes about Free Software and its main applications.
- 3. To **raise awareness** and contribute to the building of a critical mass for the use of Free Software and Open Standards.

These general objectives can be detailed in a set of more specific ones, as follows:

- 1. To **research the state of the art** of currently available Free Software educational and training programmes and detect the potential gaps.
- 2. To **create an open platform** for the development, distribution and use of information, educational and training programmes on Free Software and Open Standards.
- 3. To develop educational and training materials concerning Free Software and Open Standards.
- 4. To make the SELF platform **self-sustainable** by forming an active community of individuals and institutions (universities, training centres, Free Software communities, software companies, publishing houses and government bodies) around it.

## **3** SELF FREE MATERIALS AND PRODUCTION CYCLE

The SELF platform provides two different types of materials. On the one hand, it offers general information on Free Software applications and technologies. This consists of accessible introductory information for non-technical users describing the most relevant Free Software applications, standards, technologies and related concepts. Each entry can be related to one or more educational programmes. In this way, this general information does not only provide a broad overview of what is available on Free Software but also establishes bridges with educational and training materials.

On the other hand, the SELF platform offers educational and training programmes related to Free Software applications and technologies. By "educational and training programmes" we understand not only the strict school or university oriented training but also those designed to inform and train other sectors of the population: from companies or NGO's to

governments. These educational and training programmes can include didactic content on two main levels. First of all, a more general level on the implications of using Free Software and Open Standards. Secondly, a more practical level on how to use particular applications and technologies. Besides, these materials can be in different levels of expertise, *e.g.* from basic to advanced knowledge on the subject, and for different school types (or educational levels).

These materials are both harvested and new. The harvested materials are evaluated, transformed, edited, revised and translated. The new contents are being created according to the main gaps identified by the SELF community. These materials are offered in different languages and in different forms: from course texts, presentations, e-learning programmes and platforms to tutor software, e-books, instructional and educational videos and manuals.

The SELF contents are organised as a knowledge base which is compatible (through an import/export feature) with some existing learning content standards or specifications, such as the Learning Object Meta-data Standard (LOM) [16], the Shareable Content Object Reference Model (SCORM) [17] and, IMS Learning Design (IMS LD) [18]. The well known application profile SCORM consists mainly of IMS specifications, such as IMS Metadata and the IMS Content Packaging. In 2003, the IMS published Learning Design, a specification for the definition of units of learning. It is a language which can describe educational activities within any pedagogy in terms of roles, activities and educational resources. The result is an XML document which can be processed by a "player", which over the web, coordinates the interactions between the learners, with the teachers and with the learning resources. The first version of the SELF platform includes only SCORM import/export filters, but other filters will be developed as the platform evolves.

The SELF materials are particularly oriented to three main target groups:

- First of all, education institutes: schools, universities and knowledge centres. Here the SELF platform focuses on the teachers and departments in the field of IST. Educating the educators and giving them the necessary tools permits to spread knowledge and awareness among students.
- Secondly, **training organisations**: NGO's and companies which are active in the dissemination and training of IST. Through these entities the SELF platform can reach a more general public.
- Thirdly, **local and national governments**: IST departments of public administrations. One of the main problems that governments face when

adopting Open Standards and Free Software is the lack of qualified personnel and training programmes to teach their employees/civil servants on the use of Free Software. Since governments are key players in the use of IST, the adoption of Open Standards and Free Software by governments will have major impact on the awareness and spreading of it.



Figure 1: SELF materials' life cycle

The SELF production cycle consists of four main stages:

- 1. identification of the needs and selection of available materials,
- 2. adaptation or production of the content,
- 3. revision and quality control and
- 4. conversion of a final version into a stable end product.

In a first stage, the content needs on particular issues or applications are being detected and possible available materials have been identified. The second stage consists of the transformation of available content (if any) into a workable format, the creation and editing of the content following the SELF guidelines and the translation into the languages required and provided by the participants. The third stage will lead to a revised version of the contents produced in the previous stage. This is an ongoing process since the quality control mechanisms of the third stage can lead to new adding and editing as well as precede the translation of content into other languages. The fourth stage will freeze a final content version into an end result (in one or various particular formats such as course texts, presentations, e-learning programmes, etc.) and include it into the SELF repository that will guarantee the

adopting Open Standards and Free Software is the identification as well as permanency of the final product. lack of qualified personnel and training Figure 1 illustrates the materials' life cycle in the SELF programmes to teach their employees/civil servants platform.

### 4 THE SELF PLATFORM DEVELOPMENT ROADMAP

The most important milestones in the development of the SELF platform are the following:

- 1. Kick-off of the SELF project. A meeting was held in the Netherlands where the SELF Consortium discussed the plans of the SELF project. Press releases were sent to related media.
- 2. Call for Free Software and Open Standards materials. An index with existing materials has been built and different categories have been further developed. In addition, an overview of the organisations, communities and platforms related with the production of these educational materials has been obtained. A gap analysis has been performed identifying the most important materials that are lacking in the defined categories.
- 3. Setting up of the Learning Standards Expert Group (LSEG). Definition of the didactic / learning standards and formats to be supported by the SELF platform.
- 4. Setting up of the Legal Expert Group (LEG). Definition of the SELF Legal Policies.
- 5. Technical Specifications and content structure definition.
- 6. Development of the platform and presentation of the initial results in the form of a pilot in English.
- 7. The SELF platform in multi-language version. Thorough testing will be performed.
- 8. The SELF platform with an initial set of materials will be launched on September 2007, with events taking place in several countries simultaneously.
- 9. The Quality Assurance Expert Group (QAEG) has been established and the main QA mechanisms are being defined and implemented. The QA team will perform QA checks on the main materials launched on the platform.
- 10. At this point an international launch of the SELF platform will be held to invite potential users to start making use of the platform.

- 11. A communication and dissemination strategy has been defined and is being executed to include as many of the target organisations as users of the platform.
- 12. At the end of the start-up period of SELF, an international conference will be held to bring together the many parties that integrate the community around the SELF platform. The SELF International Conference "Free Knowledge, Free Technology" will be held in Barcelona in July 2008.
- 13. On the conference, community projects will be highlighted, plans for a self-sustainable future of the platform will be presented, including strategical partnerships and the SELF Constitution which will regulate the functioning of the SELF Community. More information will be announced<sup>2</sup>.

The SELF development roadmap with all these stages is illustrated in Figure 2.

### 5 PLATFORM DESIGN

The SELF platform will be the central meeting place for any number of individuals and organisations, each with different requirements from the platform. In the SELF project, eight different target audiences have been identified and grouped into three different roles in the platform, namely authors, instructors and students. Each role needs has been accounted for when developing the platform, making the development itself a unique challenge. Two important aspects of any web platform are accessibility and usability, the former related to making web pages accessible to a wide range of people using various user agents to access the web pages, not limited to standard web browsers, and the latter related to making the web pages easy to use for the users. The exact details on how this is done is discussed in the SELF Platform Definition, but it is important to note that work on accessibility often has positive effects also for users with standard web browsers. The work done to address users with visual, motor/mobility, cognitive/intellectual or auditory disabilities, or that are suffering from seizures, also addresses the overall goal of usability.



Figure 2. The SELF Roadmap

A significant part in the development of the platform is being focused on how learning materials are created and maintained in the platform, contributing to the life cycle of each material. Special care has to be taken in this area to recognise the diverging requirements in the fields of quality control. Whereas, on the one hand, the platform should be easy to use, inviting to newcomers, and easy to learn without any significant amount of time, it must also maintain a high level of quality for the material in order to encourage its use by the instructors interested in the materials from the platform. Given this, some important aspects of the authoring model will be:

Low-effort contributions, meaning very limited requirements for registration, enabling contributors to register quickly and easily and contribute in the platform.

<sup>2</sup> http://selfproject.eu/fkft2008/

- Easily identifiable authors of each learning object, enabled by disallowing anonymous editing and displaying authors and their qualification together with the learning objects.
- Rating of each learning object by other users.
- The ability to comment on learning objects and, after gaining a reputation for good quality work, the ability for the contributor to edit the object directly.
- The formation of groups of interested people around each learning object. These groups care for the quality of the object and cater to the comments of other users.

In this way, it is believed that the SELF platform will enable a self-regulating community of users to work on materials that meet the expected quality of the instructors and students, without significantly limiting the ability for users to contribute to the production cycle of materials (as mentioned in <u>Section 3</u>).

The SELF project believes that an important aspect for users to contribute to the platform is the reputation they can build in that work, making attribution of changes an important aspect of the platform development and a key factor in the overall rating of a user. It is believed that the exact mechanism by which the overall rating for a user is calculated will be changed over time to take into account new developments and new experiences, but will initially comprise the following set of criteria:

- Contribution Ratio: the relative contribution of a user to the overall size of a learning object.
- Accepted Contribution Ratio: the acceptance of the users contribution relative to the total number of contributions.
- Harvester's Credit: additional rating to encourage the contribution of materials in subject matters which are lacking.
- Contribution to Quality: improving the quality of a material will result in a higher rating for the user.
- Density of involvement: higher rating for sustaining and recent contributions.
- Expertise in Specific Area: contributes to the creation of an expertise index showing how a user relates in a specific area to others in that area.

Apart from his or her rating, users contributing to learning their improvement, enlargement and translation. As it is an objects will be identified as authors of that learning object, open community platform, no guarantees can be given on the

but only prominently so if their contribution exceeds 10% of the original learning object. *ie*, if a user significantly updates, changes or adds 10% or more of a learning object, that user will be shown as an author of the learning object together with other authors that have contributed as much.

Together with the authoring model, one must also consider the legal aspects, especially when it concerns the collection of learning materials into learning trajectories. When submitting some material to a learning object, a user may choose to license the material under one of the licenses accepted by the SELF project, but the selection must be limited to such licenses which are compatible with the licenses already applied on the learning object by other contributors. For additional protection of the legal status of a learning object, authors may choose to sign a Fiduciary License Agreement (FLA) to transfer some rights to a legal guardian. Tracking such agreements will also be part of the platform and support built into the software.

Finally, the SELF platform will be inherently distributed to allow for separate instances of the SELF platform to contain different learning objects. For instance, schools may decide to install a SELF platform for their own use only containing the learning objects relevant to their curricula. Changes made to local installations, potentially in remote rural areas, may or may not propagate to the rest of the SELF network, depending upon the peering setup between the servers in the network. It is believed that this peering will be relevant only once the SELF database grows beyond a certain size, but it is important to enable this functionality from the onset to make this kind of sharing of information possible for those who wish.

### **6** CONCLUSIONS

The promotion and adoption of Free Software and Open Standards is a strategic objective of the European Commission. Because of this several projects aim to promote Free Software and Open Standards but none of them provides accessible educational and training materials. Since these materials are fundamental for the adoption of Free Software and Open Standards, it becomes urgent to provide a platform for the production and sharing of such materials. The best way to achieve this goal is, following the example of Free Software communities, to involve the interested parties in the production of such materials. This is exactly what the SELF project facilitates: it provides a leading platform for the collaborative production and sharing of educational and training materials on Free Software and Open Standards.

Educators and trainers are invited to use these materials freely, add new materials to the platform and participate in their improvement, enlargement and translation. As it is an open community platform, no guarantees can be given on the quality of its materials. Instead, a set of quality indicators facilitate the users to find out about the current status, rating, usage and level of activity for each learning object. In order to reach an optimal and frictionless way of exchanging knowledge, the SELF Platform uses both free licences (copyleft) and Open Standards for importing and exporting.

Finally, SELF is presented as a strategic enabler to facilitate our societies at large on their way to a sovereign use of information technologies. Its success depends on the number of people benefiting from the platform and participating in its growth.

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