

OLPC Deployment in Sminthi

Xenofon Papadopoulos, Athanasios Priftis, Pavlos Hatzopoulos, Theodoros Karounos

Re-public Online Magazine, Greek Free/Open Source Software Community, TEI of Athens

xenofon@edu.teiath.gr, priftis@re-public.gr, phatzopoulos@re-public.gr, karounos@re-public.gr

Abstract. From September 2009 students in the Greek high school of Sminthi will use OLPC XO-1 laptops inside and outside the classroom. In this paper we present our methodology for the OLPC deployment, ranging from the creation of a human network of teachers, members of the local community, social researchers and IT specialists, to the acquisition of the laptops, the development of applications and educational content, and the technical support of the project. We describe the holistic approach used to implement the project, and highlight the role of communities as the means to bring together and mobilize end users and technical experts. We present the use of Free Software as a fundamental component of such an approach, and demonstrate how it can be used to address both technical and non-technical aspects of the implementation. Finally, we present our plans for further development and future OLPC deployments.

1. Introduction

Modern educational approaches promote blended learning, collaboration and multiple educational resources. The Greek Pedagogical Institute, designing and overseeing the educational process in the Greek public schools of Primary and Secondary education, advocates the creation of "an open and attractive educational environment, through the application of alternative pedagogical approaches and the development of teaching practices based on communication (student-centered approach, collaborative teaching)"[1]. Furthermore, the Pedagogical Institute distinguishes the notion of educational *concepts* to that of the book's *content*, requiring teaches to deliver the first by any means necessary, using the official book as a reference. However in many Greek schools a traditional approach - use of only the official book, recited by the teacher - is still prevalent. The special conditions at the high school of Sminthi expose the shortcomings of that approach, and offer a fertile ground for the adoption of the new teaching methods.

Located on the remote, mountainous region of Xanthi, in Greece, the high school of Sminthi has approximately 140 students enrolled, but attendance varies each year. The lessons are exclusively in Greek. Students, however, are all members of the Muslim minority living in Greece, with their mother tongue being either Pomak or Turkish (or a mix of both), and have graduated from elementary schools where lessons are given in Turkish and Greek. Thus their grasp of the Greek language is weak. The language barrier alone imposes great obstacles to the education of the students.

In 2008, two high school teachers, Dionysia Psychoyos and Vasilis Rigas, explored alternative teaching approaches that would help them transcend the language barrier. Their subjects, Mathematics and Computer Programming respectively, seemed promising since they are based on concepts, abstractions and symbolisms that depend less on a firm grip of the spoken or written language. They had already ventured in collaborative learning approaches when they encountered Thanasis Priftis and Pavlos Hatzopoulos, editors of the Re-public on-line magazine, who suggested exploring the possibilities

offered by the One Laptop Per Child (OLPC) initiative.

2. The One Laptop Per Child initiative

2.1 General

The mission of the One Laptop Per Child organization is "to create educational opportunities for the world's poorest children by providing each child with a rugged, low-cost, low-power, connected laptop with content and software designed for collaborative, joyful, self-empowered learning"[2]. Its current focus is on the development, construction and deployment of the XO-1 laptop, an inexpensive notebook computer initially intended to be distributed to children in developing countries around the world, to provide them with access to knowledge, and opportunities to "explore, experiment and express themselves"[2]. It is shipped with a stripped-down version of the Fedora GNU/Linux operating system and a GUI and set of applications called Sugar, that is intended to help young children collaborate.

The OLPC project involves several organizational and technological decisions. We could, very broadly, sum them up as follows:

- Innovative, worldwide compatible, children friendly, hardware.
- Free / Open Source educational operating system and applications influenced from the constructionists movement and other learning theories.
- A deployment plan focused on decisions and funding of the centralized government.
- A third-world development theory based on education as an answer to poverty.

There has been a well documented critique[3] on all of these issues and several more. Again, a brief layout:

- Developing countries have different kind of basic priorities (clean water, better nutrition, infrastructures, need for teachers, schools and so on). The OLPC project exploits their resources without taking under consideration local needs, networks, and practices.
- Although around 800.000 XO1 have been shifted to different developing countries, there is a wider consensus that smaller orders are very difficult to be placed and they were definitely not encouraged or planned.
- Local teachers' participation during the projects deployment has been low, campaigning on the wider educational changes needed in order to apply the learning and technological innovations of OLPC in schools has been insignificant.
- The OLPC project has fallen short on the Free / Open Source tool promise by, among other things, inviting Microsoft to install a trimmed-down Windows XP version on the laptop.

2.2 The case of Greece

In Greece, as well as elsewhere, a group of school teachers, academics and open source developers formed an initiative to promote the adoption of OLPC in the Greek primary and secondary education. The initiative promoted the use of the OLPC tools and created tutorials for the development of educational applications on the platform. Furthermore, it proceeded to develop educational content based on concepts included in the school books, including material on astronomy, physics and mathematics[4].

The original model of deployment as conceived by the OLPC was based on large scale orders by the central government and distribution to the students by the Ministry of Education. As the original model failed to deliver, our team attempted to exploit what it perceived as the legacy of the OLPC project:

- A fresh, better documented, initiative-based discussion on new educational practices, stemming from a reinforced need to look upon new paradigms of learning.
- A better, more affordable, technology built on F/OSS principles and tools, creating a new market of educational applications.
- A concept focused on motivating local actors, one worth building local communities upon.

Based on the above, the Re-public team sought an alternative model that would not depend on the central government, but on local communities facing their own, specialized needs. As part of these efforts, the team in cooperation with the Union of African Women has in the past organized an evening of "play and experiments" with the OLPC, aiming to support the free distribution of XO-1 laptops to the children of immigrants, and has issued an open call to the community for cooperation in projects related to the OLPC. The case of the OLPC deployment in the high school of Sminthi emerged as a result of these actions.

3. The OLPC Deployment in Sminthi

The project aims to provide XO-1 laptops to the third grade students of the high school of Sminthi, along with a set of applications ("activities" is the term used by the OLPC to highlight their interactive and educational nature) fully translated in Greek. The laptops will belong to the school, however the students will keep them for an entire year, both inside and outside the classroom, at the end of which they will be returned to the school.

The project does not plan to use the laptops as a means to deliver the official educational material already distributed in the classroom, i.e. it does not plan to employ it as an e-book reader of the official school books or as a platform for the existing educational software. Although both are possible, the main goal of the project is to give the teachers and students a platform to develop their own activities, as they see fit. Also the project aims to aid the teachers to develop new content, based on the exclusive needs of the class, and deliver it to the students in any way they deem proper. We should note that, regardless of the need to translate all the applications in Greek, according to the Sugar HCI guidelines the interface of most activities is based on icons and interactive graphical elements, reducing the effects of the language barrier.

The project is based on the creation of a human network with a broad and mixed background, centered around the local school community. Participants of the network deliver their own special skills to the project; communication, coordination and cooperation among the team members are essential. Furthermore, a major goal of the project is communicating and delivering its results to a broader circle of researchers, teachers and IT practitioners not involved with the Sminthi case, thus attempting to expand its human network, discover synergies and form links with other communities.

3.1 Roadmap

The following roadmap outlines the history of the project so far and highlights the creation and growth of the human network as the core factor of the project:

- The local teachers met the Re-public team, and discuss the conditions in the classroom of the Sminthi high school. The Re-public team suggests using OLPC as an experiment.
- Theodoros Karounos, coordinator of the Greek OLPC initiative and member of the Re-public Board of Directors works with the team to publicize its idea and seeks links with communities and experts from several disciplines to realize the project. Furthermore, funding is acquired to purchase 30 XO-1 laptops, part of which will be given to the high school of Sminthi.
- The Re-public team contacts members of the Greek Free/Open Source Software (F/OSS) Community (ELLAK) to handle the technical aspects of the project, which involve the configuration of the XO-1 laptops, the translation of selected activities into Greek and the development of new applications.

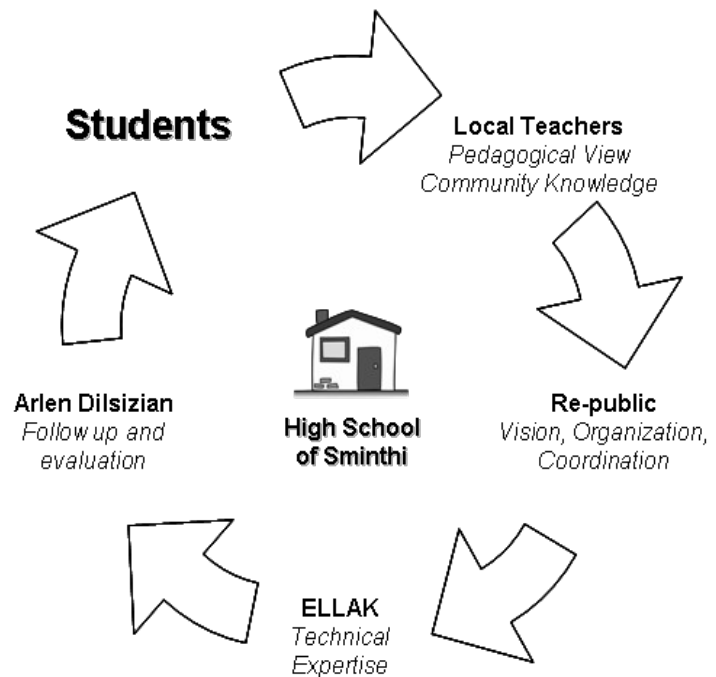


Figure 1 - Roadmap of the OLPC Deployment in Sminthi

- The project is presented at a workshop of the F/OSS Conference(<http://conf.ellak.gr/2009/>) at the National Technical University of Athens. In the workshop several activities around the OLPC in Greece are presented. Apart from the core team members, participants in the workshop include high school teaches and independent open source programmers. During the workshop, an elementary school teacher requests additional XO-1 laptops for use in his own school.
- The local teachers, having explored the capabilities of the XO-1 laptops and the Sugar platform running on them, request the development of two new applications that will help introduce the students to the concepts of 1st and 2nd degree polynomials and the properties of simple geometrical shapes. Xenofon Papadopoulos, a member of the Greek F/OSS community working for the

Technical Educational Institute of Athens, agrees to develop the polynomials activity for the Sugar platform.

- Arlen Dilsizian, a researcher in social anthropology, gets involved with the project and decides to live in Sminthi for one year and study the impact of the OLPC deployment to the classroom, the broader educational process, and the students' life in general on behalf of the Re-public team.
- The Re-public team, in cooperation with the Greek Research and Technology Network (GR-Net), organizes an event where the 30 laptops are tested. In the same event, a prototype of the new polynomials activity is presented for public trial and comments, and a roadmap for further action is laid out.
- The Greek F/OSS community finalizes the translation Sugar, Etoys and selected activities into Greek. A wiki, describing the entire project and on the development of the new activity, is created at <http://olpc-gr.wikia.com>. After several iterations of improvements, the activity is uploaded to the central repository of Sugar and announced to the community, which offers suggestions to improve it and better integrate it with the entire Sugar ecosystem.
- The Re-public team organizes the integration of the various components (laptops, configuration, network connectivity, translated and newly developed activities) and lays out the plans for the deployment.

As Figure 1 demonstrates, the entire project is revolving around the local school. It begins with the students' needs, as perceived and understood by the local teachers. It is co-ordinated by the Re-public team, its technical aspects are implemented by the Greek F/OSS Community, and it is evaluated by an independent researcher of social anthropology, who will live and work with the children for the duration of the project. Subsequently, the results will be processed by the teachers and delivered to the rest of the team, which will provide feedback and technical support in a cyclic, iterative process.

3.2 The Role of Free / Open Source Software

Open source software has been a core ingredient of the project in every step from its conception to its implementation. An important pedagogical goal of the project is to encourage the high school children - and other IT practitioners, such as university students and teachers - to explore the platform and its applications and possibly develop their own content. The open nature of the platform and all its tools makes it possible to look at the current code, learn from it, modify it and use it as the basis for further development, unencumbered of both technical obstacles and licensing issues. Furthermore, the community-based development and support model practiced by the open source movement makes it possible to realize the project by drawing upon the resources of local and remote communities such as the Greek F/OSS and the Sugar Development communities.

4. Conclusion

The project of the OLPC deployment in Sminthi does not attempt to introduce IT technologies or alter the educational approach in the Greek Primary and Secondary education. Nor does it care about the digital representation of existing material. It is a project revolving around the students and the local teachers, their exclusive needs as they, themselves, understand them. It advocates and supports the creation of ad-hoc applications and content, and monitors the projects' impact on the teachers' and

students' both inside and outside the classroom. It is based on a new model of action: a model of small, low-cost deployments, supported by unofficial communities forming a human network with a broad and mixed multidisciplinary background, centered around local representatives and end-users to address real, local needs.

5. Future plans

Future plans of the project include the actual deployment, that will take place at the beginning of September 2009. Of particular interest to the project is the evaluation of the deployment's effects, both inside and outside the classroom, which will take place during the entire year. Finally, the project aims to create links that will result to an active community which will advocate and promote the use of free software in education.

6. References

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