

## INNOVATION BRIEF

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# Open Content and Source: European Schoolnet Riding the Wave

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### **Abstract**

This paper summarises the actions that European Schoolnet and its members have taken in the area of open content and free and open source (FOSS) development in the field of e-learning. European Schoolnet provides insight into the educational use of information and communications technology (ICT) in Europe for policy-makers and education professionals. This goal is achieved through communication and information exchange at all levels of school education using innovative technologies, and by acting as a gateway to national and regional school networks. In the recent years European Schoolnet and some of its member networks have, little by little, started trending towards awareness building, piloting and the rolling-out of open source software programmes for schools, as well as investigating possibilities in the area of open content. Advances have been made in all the areas from analysing and visibility studies to the development of educational software based on open source.

Keywords: open source, open content, e-learning, Europe, policy making, Xplora, science teaching

## 1. Introduction

European Schoolnet is a network of 26 European Ministries of Education, it was funded in 1996 with the mandate of the Council of the European Union. European Schoolnet (EUN) promotes the use of information and communication technologies (ICT) in European schools acting as a gateway to national and regional school networks. The mission is two-fold, on the one hand EUN works closely with national and regional policy-makers and shapers by setting up special interest committees, involving them in transfer of best practices, and in research and development. On the other hand, EUN works directly with a large network of European schools through special on-line events organised in collaboration with a variety of stakeholders.

European Schoolnet is committed in following open standards in e-learning research and development that it conducts in the field partnering up with different stakeholders from public, private and industry partners. This has resulted in services that allow multiple players' access to the field. Furthermore, the use and development of open source software in education is becoming more of a concern, whereas the promotion of interoperable content-based services such as federations of learning resources repositories has long been in the centre of EUN's attention.

This paper introduces actions that European Schoolnet and its members have taken in the area of open content, and free and open source software (FOSS) development in the field of ICT and education. The paper has four main focuses. First, it will describe European Schoolnet's recent development in the field of content provision focusing in promoting a rightful use and re-use of educational content. This section explains the implementation of Digital Rights Management Framework in EUN's current educational content network development. Also, it explores the current development of a Learning Toolbox to support collaborative learning based on open source development.

The second main section of the paper looks at emerging campaigns lead by a number of EUN's members, which amounts to 28% of EU member states (7/25). This section describes the feasibility studies and promotion of the use of open source software in Belgium's Flemish Community, in the Netherlands, in Estonia, in the UK, Slovenia, Ireland and Lithuania. The third section presents the Xplora- project that promotes science education in European schools. Xplora takes a stance towards the true nature of science - sharing open source educational software for science. Finally, the paper draws an outline of EUN's Special Reports service where policy briefs can be found on the issues dealing with open source and content in education.

## 2. EUN content services in pipeline

Since 2000 European Schoolnet has lead EU-funded projects to give better access to digital educational content for teachers and learners across Europe. The CELEBRATE project (2002-2004) provided the first large-scale demonstration and evaluation of Learning Object (LO) interoperability and the use of LOs in schools at a European level.

In 2004, a survey of thirteen Ministries of Education participating in European Schoolnet also indicated that they wished to take forward the vision of a European Learning Resource Exchange (LRE) based on the architecture demonstrated in the project. Furthermore, many communicated that LOs are increasingly seen as an important, and in some cases a key component in the content development strategies of Ministries of Education. Also, majority expressed interests in open source content development strategies where "Learning Object economy" were created for open source and commercial content to co-exist.

EUN continues its work towards an enhanced architecture for learning resources in Europe. Within a recent 6<sup>th</sup> Framework Programme the CALIBRATE project was funded. EUN will continue to lead the development of the LRE based on a Brokerage System Architecture (of which the code for the Brokerage System is licensed under the LGPL) involving a variety of stakeholders from content providers, both public and commercial, to end-users in European schools.

A set of more tailored services will be offered to the members of LRE such as federated searches, learning resource exchanges, and digital rights management. It is envisaged to support multiple digital right expression languages and permit content providers to select the level of digital rights management that best fits their needs in terms of intellectual property protection. This requires a proper Digital Rights Management (DRM). The objective is to design and implement a DRM framework that takes into account requirements from all stakeholders, thus supports available DRM standards like ODRL and Creative Commons.

European Schoolnet supports the use of Creative Commons licenses within its services and have already implemented an integrated interface for its users to choose an option of Creative Commons license for the resources that they submit to various EUN projects.

## ***2.1. Open source learning toolbox to support collaborative learning***

European Schoolnet's research into the use of learning environments confirms that a number of its members favours the development of open source VLEs. Moreover, many expects the next generation of new learning platforms to facilitate the adoption of more learner-centred and collaborative pedagogical approaches. However, the same survey and subsequent observations suggest that these high expectations are not yet being met. Most teachers are still using VLEs as little more than a “digital distribution” space, somewhere to upload store and distribute content and to issue assignments to students.

Within the above mentioned CALIBRATE project EUN will lead the development of a VLE which brings together two quite distinct and somewhat opposing methodologies for pedagogical affordance; the first comes from a background of social constructivist pedagogies and collaborative knowledge building, whereas the second has a background in SCORM and LCMSs. By drawing on both these approaches, a new open source toolbox will be built using the existing code from Future Learning Environment 3 (FLE3) based on Plone/Zope. The VLE will offer a richer feature set and which will be developed with the help of practicing teachers.

## **3. Start of the tidal wave: EUN's members actions in the quest for educational open source software**

A number of European Schoolnet's partners has explicit roles in promoting the use and development of open source software as an alternative choice for schools. A review on a selection of partners acting upon this challenge is provided in this section presenting the Ministry of the Flemish Community, Education department in Belgium, Kennisnet in the Netherlands, Becta in the UK, Tiger Leap foundation in Estonia, the Ministry of Education and Sport in Slovenia, the National Centre for Technology in Education in Ireland and the Ministry of Education and Science of the Republic of Lithuania .

### ***3.1. Belgium: The Ministry of the Flemish Community, Education department***

The Ministry of the Flemish Community, Education department in Belgium has an explicit role in promoting the use of open source software as an alternative choice for schools. In 2004 the former minister of Education Ms Marleen Vanderpoorten commissioned an advise on the issue, which lead to a vision and a proposed action plan.

In 2005 a large campaign has been organised to introduce free and open source software (FOSS) in Flemish schools aiming to highlight its educational possibilities. In this campaign a publication, a CD and an educational tools database are drafted and a conference is organised.

By means of the publication “free software in the education” a practical guide for the use of FOSS and open educational tools is spread amongst all schools. Beside general information on the “what and how” of FOSS one finds descriptions of a number of interesting open source applications. In association with the educational portal Klacement an educational tools database was developed for these applications. This is also the general campaign website. Additionally, a conference was organised addressing FOSS and open educational tools targeting audiences such as teachers, headmasters and ICT co-ordinators.

Furthermore, the Education Department in Flanders has created didactic sheets on the use of educational freeware and open content based on the primary education curriculum topics. The didactic sheets have been published as a book "ICT on the menu", as well as they are searchable in a database through the portal. The scenarios are a helpful means to make the ICT integration in primary education more concrete. In 2005, a similar project was developed for secondary education. This time the work was carried out by teachers from the secondary ENIS schools. The result is a publication, both on paper and on-line, called "Digital resources for secondary education. In 2006 a CD will be published with open learning tools and open source educational software that is currently under a validation process by the European Network of Innovative Schools (ENIS).

### ***3.2. The Netherlands: Open source and open standards in education (OSS in het onderwijs)***

Since 2003 in the Netherlands the government has brought open standards and open source into the central focus of its attention. A variety of initiatives has been set up to work on cross-sectoral issues that touch upon open standards as well as open source development. As for the education, there are initiatives, programmes and actions taken to foster the efforts in the field and to muster the common efforts.

The programme "OSS in het onderwijs, translated as open source and open standards in education, is a joint

initiative between Kennisnet, ICT op School and a government wide programme called OSSOS, the Programme for Open Standards and Open Source Software. Additionally, to involve a diversity of partners in the field of education a new association called EduStandaard has been set up. The association aims to manage the standards that are used in the Dutch educational field comprising stakeholders such as publishers, schools etc. Also Kennisnet promotes a programme to improve the use of open standards for content.

A central point for "OSS in het onderwijs" is a webspace where the Dutch education community can discuss open source and open standards aiming at both the novices and experts. The main focus is on primary and secondary education, but also on the field of vocational training. The programme is informative, aiming at offering alternative solutions for schools who have an independent budget to spend on educational technologies. The programme targets mainly the IT coordinators, administrators, and teachers who are responsible for IT set-ups in schools, but also at teachers who use computers and ICTs in their lessons.

One powerful means to transfer good practices and ideas of the use of FOSS in education are the case studies that can be found at the website of "OSS in het onderwijs". These case studies are simple descriptive interviews with practitioners on topics such as how to use GIMP for manipulating images, etc.

Moreover, "OSS in het onderwijs" has prepared an info package on a CD that focuses on the use of open standards in all processes in school that can involve the use of information technologies from administrative tasks to using applications for learning purposes, gathering content about the student for portfolios, as well as other actions for creation, exchange and alteration of the content. The idea was to identify all actions and propose alternatives where closed systems or standards are used. This aims at better overall interoperability within schools' information systems. The CD is out around November 2005. In the same spirit, a booklet on open source software was created in 2004 for schools. These information packages can be requested from the website, but they are also handed out at local ICT conferences.

Furthermore, the programme "OSS in het onderwijs" can help schools to implement open source, not only in advisory terms, but they can make small amounts of money available to pay for a third party programmer or consultant to, for example, find compatibility solutions between an existing system and the new one based on open source and standards. On the website, there is also a FOSS helpline for schools to help them to solve small scale problems. In this regard, the programme tries to match the need that schools have for support with existing supply in the market. On the website one can find an overview of companies with experience of FOSS and education.

"OSS in het onderwijs" has been running for three years, 2005 being the final year with a big push, the continuation for the next year is still unsecured. A conference with one day education track on the topics will be held in December 8 2005.

### ***3.3. The UK: Evaluation on open source software in schools***

In May 2005 the British Educational Communications and Technology Agency (Becta), released an evaluation on the use of open source software within a number of schools. In the UK some previous government studies have suggested that the use of OSS within the UK public sector can provide a viable and credible alternative to proprietary software and lead to significant cost savings.

The study, funded by the Department for Education and Skills, had three main aims; to examine how well the open source software approach works, compared with proprietary offerings, in supporting delivery of the school curriculum and administration; to compare the total cost of ownership (TCO) of using OSS within school environments against that of non-open-source solutions.; and to highlight examples of successful school-based open source implementations.

The report *Open Source Software in Schools: A study of the spectrum of use and related ICT infrastructure costs* demonstrates that although the implementation of OSS in schools needs careful planning and support, its can offer a cost-effective alternative to proprietary software. For the ways forward with FOSS the report examines cost-effective models of support in OSS schools, best practice in licensing solutions, successful implementation to run the school's servers, to provide school-wide facilities, operating systems and administrative PCs, and OSS applications on classroom and administrative PCs.

According to Becta's Chief Executive Owen Lynch, Becta believes that software used in schools should be of a high quality and adhere to open standards, enabling compatibility and interoperability between products. Becta will now be undertaking more extensive research across a wider range of institutions to allow further analysis of these issues.

### ***3.4. Estonia: Tiger Leap Foundation (Tiigrihüppe Sihatusutus) financing educational FOSS development***

In 2004 in Estonia the Tiger Leap Foundation (TLF) initiated a project for distribution and promotion of freeware in schools aiming to be launched at county level in the autumn of 2004. In the course of the project it is foreseen to release a Linux distribution that is suitable for schools, to prepare training materials and to train teachers. Furthermore, since the spring 2005 TLF only supports projects which will be released under General Public License for the code as for the content a Creative Commons License will be required.

A number of Estonian educational open source software applications have been developed with the financial support of TLF in collaboration with Tallinn University (TU). The development of Virtual learning environment VIKO started in 2001. Schools do not have to set up their own server, VIKO is offered as a free service by Tallinn University. Furthermore, KooliPlone, a Plone-based Content Management System for school websites is also developed in TU, the expected release is in autumn 2005.

Another large scale development of a Learning Management System called IVA was supported by Estonian Ministry of Education and Science, the Estonian Information Technology Foundation and Hansapank, the largest bank in Estonia. IVA is also developed in TU, based on Zope and an existing educational platform called Fle3. It has Estonian, Russian and English user interfaces and is currently used by more than 2000 users in TU.

Additionally, Estonia being a country representing a small market, the government has funded the translation of OpenOffice's spell-check programme in Estonian.

### ***3.5. Slovenia: actions by the Ministry of Education and Sport***

Slovenian Ministry of education and sport has a focus on three main areas providing basic tools, didactic tools and promoting open source for teachers, headmasters, and pedagogical specialists.

What come to the category of providing basic tools, the Ministry includes Linux, OpenOffice.org, CMS, LMS as well as some distance learning services in it. First of all, all new computers in schools, which are cofinanced by the Ministry of education and sport, have a dual boot for Windows and Linux, and have OpenOffice.org installed for both operating systems. The Linux distribution is called Pingo and is provided in Slovene. Pingo has been developed by a local association called Lugos with the Fedora Linux 3 open source community in Slovenia. For the last two years the Ministry of education and sport, the Ministry of information society and the (governmental) Centre for informatics have financed the localisation in Slovene language. Currently a tender to cofinance the localisation for the next two years is under preparation.

Secondly, in the area of basic teacher training, among other ICT skills, the programs include the use of Windows Office as well as OpenOffice.org. The Ministry financed an expert group which supports schools with open source software such as some CMS and LMS, and support books have been distributed to schools about the use of Linux and OpenOffice.org. Moreover, the Ministry with National Education Institute and Center for vocational training promotes the use of open source software among teachers, headmasters, and didactic specialists.

As for didactic tools and open content, the Ministry finances teacher training in the area of open source didactic materials (i.e. open content). It has also cofinanced some new open content didactic material on the Web for the use in classrooms, with some support given for teachers in training to use this material. As well, the Ministry will cofinance in the future creation of didactic material which is not open source, but can be used freely by schools.

To promote the use of open source and open content, the Slovenian Ministry of education and sports has started the portal OKO. This project is with the intention to make the introduction of open source and free educational software into education environments faster and more efficient. The OKO project has started in 2003.

### ***3.6. Ireland: Start Office for all Irish schools***

In late 2004 the National Centre for Technology in Education (NCTE), the Irish Government agency established to provide advice, support and information on the use of ICT in education, concluded a licensing and distribution agreement with SUN Microsystems to provide all Irish schools with Star Office, an office suite based on popular OpenOffice.org. The offer was made to schools in a joint move by the NCTE and SUN Microsystems.

To help schools appreciate the opportunity and to explore the implications of taking up Star Office or substituting the commonly used MS, schools were notified and local information sessions were organised for schools representatives. These sessions were well attended and, following participation, the take up has been significant to date. Schools receive a free CD which allows unlimited copying for staffs and students.

Prior to the large scale offer of Star Office, in 2004, the NCTE carried out a number of evaluations of Star Office in a number of schools in order to assess the appropriateness of this software for schools. The outcomes of these trials proved very positive. Star Office was identified as being a relevant and very useful software tool particularly for schools at primary level.

### ***3.7. Lithuania: Research study and recommendations for actions in open source in education***

The Ministry of Education and Science of the Republic of Lithuania has commissioned a study in 2004 to further investigate the possibilities of open source software in education in Lithuania. In the goals of the study the following issues were outlined as important to go forward with the study: the global fight against the use of illegal software and piracy, and the openness of the source code to guarantee more transparency and ease of localisation.

The conclusions of the Study outlined the following; open source software has an indirect positive impact on the economy of education through the emergence of a competitor to commercial software forcing a reduction in the price of commercial software; open source software has a positive impact on teaching by showing in a practical way the advantage of universal information technology knowledge compared with knowledge of specific software; translations into the languages of small nations spoken by few people.

The Study furthermore proposed some actions both at the State level and Ministerial level. The State level proposal included among others the following: it is necessary to ensure the adaptation and localisation of general purpose open source software at the state level; it is necessary to take care of the cultural and linguistic quality of open source software; the promotion and support for open source software could help solve the problem of the legality of software.

At the Ministerial level of the Ministry of Education and Science the proposed actions included analyses of localisation of educational Linux distributions and open source virtual learning environments to determine which one would be appropriate to be localised and used in Lithuanian schools. What comes to introducing FOSS in education the following was proposed: higher schools training educators should introduce their students to both commercial software and equivalent open source software necessary for teaching and learning; at school, students should be introduced to general purpose software of both types: commercial software necessary for teaching and learning as well as to equivalent open source software. Furthermore, to assure the quality of localisation an interesting proposal was made: a course on localisation of software for some students specialising in information technologies and philology.

## **4. Power Surfing: Xplora, distributing science in its true way - openly**

Xplora, the European Science Education Gateway, is operated by European Schoolnet. Xplora portal is supported by the PENCIL project, a project funded by the European Commission's Directorate General for Research as part of Science and Society.

Xplora offers science teachers tools, information and resources to help them to conduct engaging science lessons that make students attracted to science. Commonly with 30+ students in classes, science teaching is somewhat blocked by poorly equipped school laboratories. Among the resources that Xplora offers are the usual web based tools like on-line games, downloadable materials and guides to software that is usable in science lessons.

Xplora portal also offers new tools which have not been used in the classroom before. Among these tools are the web experiments or remote controlled experiments (RCL), in which real experiments are shared via the Internet. Such experiments do not only solve the problem of the true way of science teaching by experiments, but it also opens new pedagogical concepts for science classes. These web experiments deliver results, which students have to process in order to get a lab report.

### ***4.1. Using software – a key skill in scientific research***

Participating in science education today means extensively using software. Especially for the web experiments where in many cases students get the result of an experiment as an image, the image analysis is a fundamental task. The main tasks for students in science education are: (1) Create a lab report with mathematical expressions, chemical formulas, feynman diagrams, images, tables and graphs; (2) Analyse images, e.g. measure length, angles, area, and intensity; (3) Calculate results, e.g. numerical processing, creating graphs, regression and curve fitting; (4) Create animations; (5) Run simulations; (6) Create and play with mathematical models and (7) Use CAS software to

verify results of calculations.

While office suites text processing software is useful and broadly applicable to be used in schools, it is in many cases not sufficient for specific science tools. One of the examples is simple text editing. For science lab reports, a text writer must be able to handle mathematical equations, chemical formulas and Feynman diagrams, just to mention the most exotic pitfalls.

Many of the open source software packages have origins in scientific environments. Thus, there are many applications which can be used for science teaching in classroom with some prior training. Xplora recommends the use of the following software packages displayed in the table (table 1) below for science teaching. On the portal one can find articles and short descriptions for their usage.

<i>Name of software</i>	<i>URL</i>	<i>Description</i>	<i>Application</i>
OpenOffice.org	<a href="http://www.openoffice.org">http://www.openoffice.org</a>	The Open Source office software for scientific text processing, database applications, graphics creation.	Lab reports. Calculation of results Creation of simple charts
LyX	<a href="http://www.lyx.org">http://www.lyx.org</a>	Scientific text processor software, making use of LaTeX properties. Full support of mathematical expressions and all Postscript output from scientific programs.	Lab reports with even the equations, and output of all X11 science software.
Xfig	<a href="http://xfig.org">http://xfig.org</a>	Vector drawing program with a large and extendable parts library.	Preparation of schematic drawings (experimental setups) for lab reports.
Grace	<a href="http://plasma-gate.weizmann.ac.il/Grace/">http://plasma-gate.weizmann.ac.il/Grace/</a>	Data analysis program	Plots diagrams of every complexity. Good software for creating regression and line fit.
GIMP	<a href="http://www.gimp.org">http://www.gimp.org</a>	Graphics program to analyze images	Image analysis (length, angle)
ImageJ	<a href="http://rsb.info.nih.gov/ij/">http://rsb.info.nih.gov/ij/</a>	Image analysis program	Analysis of intensity distribution in an image.
Xdrawchem	<a href="http://xdrawchem.sourceforge.net/">http://xdrawchem.sourceforge.net/</a>	Program to draw chemical structures	Report on chemistry lab exercises.
OpenRasmol	<a href="http://www.openrasmol.org/">http://www.openrasmol.org/</a>	Program to visualise 3d molecules	Chemistry classroom use and creating images for reports.
Feynman	<a href="http://rpmfind.net/linux/RPM/suse/9.0/i386/suse/i586/feynman-1.00-581.i586.html">http://rpmfind.net/linux/RPM/suse/9.0/i386/suse/i586/feynman-1.00-581.i586.html</a>	A program to create Feynman graphs	Particle physics teaching.
Ghemical	<a href="http://www.uku.fi/~thassine/ghemical/">http://www.uku.fi/~thassine/ghemical/</a>	A molecular modeling software package	Chemistry teaching in high schools
Gcompris	<a href="http://www.ofset.org/gcompris">http://www.ofset.org/gcompris</a>	A software package for the kids	For elementary schools. Many different applications around elementary schools teaching
KDE Edu	<a href="http://edu.kde.org/">http://edu.kde.org/</a>	The KDE Education	Many educational software

<i>Name of software</i>	<i>URL</i>	<i>Description</i>	<i>Application</i>
		project	packages mainly focusing on lower level education.

*Table 1: Open source software for use in science teaching.*

#### ***4.1 Xplora – Knoppix, making science accessible for schools***

To ease some of the organisational problems that schools face in terms of software availability, installation and access in general, the Xplora team developed a live bootable DVD called Xplora – Knoppix. It is based on the Linux Debian distribution and completely contained on a self booting DVD. As this Knoppix version is especially mastered for Xplora, the team has added software applications needed for science education (table 1), as well as a number of educational material from the Xplora repository. The Xplora – Knoppix has a multilingual support. This concept ensures an easy access to scientific tools for education. Being open source software it can be given away freely and copied as many times as needed.

Xplora produces 600 DVD to be given freely to schools. Moreover, the ISO image of the DVD is freely downloadable from the Internet and can be used to produce the copies needed for the students. Additionally, Xplora has partnered with a company who sells the Xplora – Knoppix DVD for the production plus shipping cost.

Knoppix has proved to be reliable to boot, however for any exceptions there are workarounds described in the trouble shooting section of Xplora.

### **5. Watching the waves: European Schoolnet's Special Reports**

This sections gives a short review of Special Reports published by European Schoolnet's Insight Team. Insight is a knowledge base for policy-makers, researchers and practitioners about e-learning in European schools. A series of Reports is published in the areas of e-learning policy, innovation and interoperability. Of interest to this paper some Reports are reviewed where the issues touch upon the use of open standards for development of virtual learning environment, a report on open source and open content, and lastly a report highlighting the obstacles that e-learning could face if software patents (i.e. the directive on Computer Implemented Inventions) would pass. These Policy Briefs and Special Insight Reports have attracted some discussion among European Schoolnet's partner organisations, but they have not managed to summon any large scale attention or discussion on the European scale among policy-makers.

#### ***5.1. Insight Policy Brief: VLEs, Open Standards and Open Source in European Schools***

In the series of Insight Policy Briefing, the fourth publication *VLEs, Open Standards and Open Source in European Schools* came out in late 2003. The brief presented four sections: (1) Importance of VLEs: Views from National Agencies, (2) VLEs and Interoperability Issues, (3) Situation in Schools and (4) Future Developments. The report was based on a survey results on the use of VLEs in European schools, and on the policies of EUN's partners. The reports claimed that when the data was gathered (in late 2002), it appeared that decision-makers and national agencies have taken short term measures to get up and running with VLEs, without considering the adoption of a longer-term e-learning strategy that includes thorough consideration regarding interoperability on a large scale and the use of open standards. The report further proposed that instead of each country continuing developing their separate VLE-initiatives, a pooled effort of resources and development skills be used to develop a system that is open and adaptable. Each country could customise the VLE giving it “the look and feel” desired.

#### ***5.2. Insight Special Report: Why Europe Needs Free and Open Source Software and Content in schools***

In the serie of Insight Special Reports a publication *Why Europe Needs Free and Open Source Software and Content in schools* came out in March 2004. The report was an attempt to open discussion among European Ministries of Education, national educational agencies, school networks, teachers and other stakeholders. The Special Report brought forward four main areas of consideration and possible collaboration in the area of FOSS and open content: (1) the use of free and open source software in schools; (2) the use of GNU/Linux on servers and

desktops in schools; (3) issues related to the open source development of VLEs, LMSs, LCMSs, etc. and (4) the creation and re-use of “open content”.

In addition to above mentioned areas the report discussed other issues at the stake such as the use of free-of-charge educational software, localisation of software for small language groups, greater levels of accessibility, fighting piracy, spending public money wisely and creating new service and local job opportunities. Also, the Report covered the area of open educational content offering interesting opportunities for sharing and reusing content.

### **5.3. *Insight Special Report: Software Patents - a potential hindrance of ICT in education***

Lastly, in the end of 2004 an Insight Special Report on *Software Patents - a potential hindrance of ICT in education* came out. The report attempted to open discussion on the European software patent i.e. on the directive on Computer Implemented Inventions. At that moment the directive in question was in a political limbo being ping-bonged between EU institutions. The Report attempted to explain the situation at the time with software patents in Europe and compare the situation against the goals for European e-learning in a knowledge-driven society.

Furthermore, the Report on Software Patents examined three main arguments concerning how software patents could potentially harm the European e-learning field if passed. First, the cost of applications could become higher because of the software patent system; the choice of available software could become limited and costs of using underlying communication structures, operating systems and any software could increase. Second, it could have an effect on in-house development of educational applications which seems to be high in European schools<sup>1</sup> and still at the end of 2002 10 out of 17 Ministries of Education financed in-house VLE development. Third, the roll-out of educational FOSS in schools could be jeopardised by the danger of software patents.

## **6. Summary**

Currently in the European educational policy and practices landscape the existing open content and free and open source software initiatives are rather dispersed on a local, national and European level as well as being spread throughout all educational levels and systems. It is challenging to get a comprehensive overview on the state of the art being available, as well as capitalising on the transfer of knowledge gained in one context. However, as this report clearly summarises, European Schoolnet and its members are more and more focusing on the issues around open source and content development. It must be stated, though, that these activities still remain somewhat marginalised in discussions, country reports and conferences, and they rarely receive the limelight that they merit.

The area of open content seems to be rather well accepted concept among EUN's partners. Thus, creating infrastructure and facilitating the content exchange of learning resources in schools is one of EUN's core areas where significant work is conducted to facilitate the co-existence of open and “closed” content. For example, the implementation of Digital Rights Management Framework is a step towards the co-existence of multiple stakeholders in the field of educational content. Also, some important work will be carried out in the context of CALIBRATE where the development and implementation of an open source collaborative 'learning toolbox' for schools is being done.

What comes to actions taken by European Ministries of Education and other national educational authorities, it seems like they are keen to explore the advantages that open source software and content can offer to education. According to the desk research done for this paper, it can be stated that 28% of EU member states (7/25) have taken actions in some sector related to the use of FOSS in education. Interestingly, many have already moved from pilot phases to large-scale implementation. It seems that it would be important to bring these somewhat disparate, but very pertinent national and regional initiatives into the European level to better help the transfer of good practices and to learn from one and other. Furthermore, peer-learning possibilities on the policy level should be better exploited in this area, as have been done in other areas of ICT implementations.

Xplora carries out important work promoting science in education in European schools. The multiple ways to distribute software that is suitable for scientific studies allows schools a better access to the core of science, participate by practicing it.

Finally, the work EUN has carried out in publishing the Insight Special Reports has given a more prominent voice for FOSS in education and been an important source of information for EUN's members and audiences on national levels.

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<sup>1</sup> <http://www.eun.org/goto.cfm?did=25201>

## 7. References

### Links related to the section 1:

EUN: <http://www.eun.org> and <http://www.europeanschoolnet.org/>

### Links related to the section 2:

CELEBRATE: <http://celebrate.eun.org>

CALIBRATE: <http://calibrate.eun.org>

### Links related to the section 3.1 Belgium:

The Flemish advice on FOSS in education is available in English at <http://www.ond.vlaanderen.be/ict/english/>

Rortal Klascement: <http://vrijesoftware.klascement.net>

ICT on the menu: <http://www.klascement.net/ictophetmenu>

Digital resources for secondary education: <http://digitaalso.klascement.net>

ENIS: <http://enis.eun.org>

### Links related to the section 3.2 the Netherlands:

Kennisnet <http://www.kennisnet.nl>

OSS in het onderwijs <http://www.ossinhetonderwijs.nl>

In the section 'voorbeeldprojecten' one can find short descriptions of different case studies

OSSOS, Open Standards and Open Source Software in Government in English

<http://www.ososs.nl/index.jsp?alias=english>

ICT op School <http://www.ictopschool.net>

Dutch association for a wide range of stakeholders in e-learning standards <http://www.edustandaard.nl/>

Kennisnet on content: <http://contentketen.kennisnet.nl/>

Conference announcement: <http://www.ossos.nl/article.jsp?article=1820>

### Links related to the section 3.3 Estonia:

Distribution based on Mandriva (Mandrake) developed by an NGO called Offline.ee and supported by Tiger Leap Foundation, expected release fall 05.

Briefing on open parental code software use in school (12/04/2004):

[http://www.tiigrihype.ee/eng/arhiiv\\_1.php?uID=49](http://www.tiigrihype.ee/eng/arhiiv_1.php?uID=49)

VIKO is released under GPL in 2003. It is a simple PHP/MySQL based system, currently available only in Estonian. The development continues by user community and there are plans to make it possible to localise the system. <http://www.htk.tlu.ee/viko/>

IVA <http://www.htk.tpu.ee/iva/>

Papers:

Laanpere, M., Põldoja, H., Kikkas, K. (2004). The Second Thoughts about Pedagogical Neutrality of LMS's. In: The 4th IEEE International Conference on Advanced Learning Technologies. Joensuu, Finland. 30

August - 1 September 2004. Los Alamitos: IEEE, 807-809.

Põldoja, H. (2003). Learning Management System IVA. e-Learning in Science and Environmental Education.

In: Proceedings of the International Conference October 1-4, 2003, Tartu, Estonia. Tartu:

University of Tartu, 52-54. <http://www.ut.ee/eLSEECConf/Kogumik/Poldoja.pdf>

Põldoja, H., Laanpere, M. (2004). IVA - Learning Management System based on Fle3. [Unpublished].

[http://www.hanspoldoja.net/work/pdf/iva\\_flebook\\_article.pdf](http://www.hanspoldoja.net/work/pdf/iva_flebook_article.pdf)

Blog on freen and open content in education: Vabavere <http://www.htk.tlu.ee/vabavere/>

### Links related to the section 3.4 the UK:

Open Source Software in Schools: A study of the spectrum of use and related ICT infrastructure costs – Project

report [http://www.becta.org.uk/corporate/publications/documents/BEC5606\\_Full\\_report18.pdf](http://www.becta.org.uk/corporate/publications/documents/BEC5606_Full_report18.pdf)  
Open Source Software in Schools: A case study report  
[http://www.becta.org.uk/corporate/publications/documents/BEC5606\\_Case\\_Study\\_16.pdf](http://www.becta.org.uk/corporate/publications/documents/BEC5606_Case_Study_16.pdf)  
Using Open Source Software in Schools: Information sheet  
[http://www.becta.org.uk/publications/documents/BEC5606\\_Information\\_Sheetrev.pdf](http://www.becta.org.uk/publications/documents/BEC5606_Information_Sheetrev.pdf)  
Previous UK Government studies include: Office of Government Commerce [2004] "Open Source Software Trials in Government: Final report" <http://www.ogc.gov.uk>

#### **Links related to the section 3.5 Slovenia:**

OKO <http://oko.edus.si>

#### **Links related to the section 3.6 Ireland:**

Irish news on Star Office <http://www.ncte.ie/NewsandEvents/Newsletter/d2413.HTML.html> and a press release in pdf-format:<http://www.ncte.ie/documents/pressreleaseforStaroffice.pdf>

#### **Links related to the section 3.7 Lithuania:**

The Ministry of Education and Science of the Republic of Lithuania, Centre of information technologies of education, Institute of mathematics and informatics: Report of the research study open source in education  
[http://www.ipc.lt/english/apie/skelbiami\\_dok/2004/Open\\_Source\\_in\\_Education\\_Abstract\\_of\\_Research\\_Study.doc](http://www.ipc.lt/english/apie/skelbiami_dok/2004/Open_Source_in_Education_Abstract_of_Research_Study.doc)

#### **Links related to the section 4**

Xplora: <http://www.xplora.org>  
Web experiments: [http://www.xplora.org/ww/en/pub/xplora/megalab/web\\_experiments.htm](http://www.xplora.org/ww/en/pub/xplora/megalab/web_experiments.htm)  
GI-Knoppix, a predecessor of Xplora-Knoppix:  
[http://www.xplora.org/ww/en/pub/xplora/library/software/gi\\_knoppix\\_software\\_for\\_scie.htm](http://www.xplora.org/ww/en/pub/xplora/library/software/gi_knoppix_software_for_scie.htm)  
Linux-cd.info: <http://linux-cd.info/>

#### **Links related to the section 5**

Insight: <http://insight.eun.org>  
Insight Special Reports <http://insight.eun.org/ww/en/pub/insight/misc/specialreports.htm>

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