

Taking sharing to the classroom

The case for Free/Libre and Open Source Software (FOSS) in schools

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Schools the world over increasingly seek to harness the benefits of deploying software in the classroom.

They do so for diverse reasons. Their aim is sometimes to educate their students about its potential, to improve the upcoming generation's knowledge and overall efficiency, or also allow them to better wield a vital tool. There can be little debate that the computer is to be the preferred tool of the promised 'knowledge economy' that we hope to see further

unfolding in this century.

While doing so, the question that increasingly arises is: what role, if any, can Free/Libre and Open Source Software (FOSS) play in bringing closer the promised benefits of this new world?

There have been some arguments made against the use of FOSS in schools:

ranging from its perceived (more in earlier times, but less so now) difficulty of use; the fact that it is proprietorial software which still dominates the marketplace and even the syllabi; and FOSS users' difficulty to find support easily. At an unstated level, teachers and parents are themselves often more familiar with proprietorial software. And, apart from the resistance to change, there is also a problem of not knowing where to get started with FOSS in the classroom.

These issues have been addressed to varying levels. The need to build up easy-to-find support remains a critical one; and building support isn't tough in a region rich in software skills, like South Asia.

As FOSS becomes easier to use, more visible (even if still in small numbers as compared to proprietorial software, at least at the desktop), and support skills are proving to be easy to build specially in regions like South Asia, there are growing reasons for FOSS to be adopted in the classroom.

FOSS's potential needs to be better understood.

WHY FOSS, OPEN CONTENT

For countries in the regions described

FACTOID:

Number in the 14-18 years age group in India: 88.5 million (2001 Census)

Number from this age group in schools: 31 million.

Two-thirds of the population remains out of schools.

http://education.nic.in/secedu/sec_overview.asp

variously as the 'developing' world, the South or the Third World, issues of costs and affordability are often prime issues. Though, proponents of FOSS have argued that cost alone is not the only or even the most important reason for deploying Free/Libre and Open Source Software.

Using FOSS is increasingly seen as an issue that goes beyond just costs or affordability. Even though it is important that this form of sharable software doesn't cost huge sums of money to buy and install. And you are not pushed into costly, almost-compulsory software upgrades.

Richard M. Stallman¹, the founding-father of the Free Software Movement², and one of the most passionate and consistent supporters of Free Software use, argues that schools should exclusively use free software. As the Wikipedia points out³, "the Free Software movement is a new social movement which aims to protect the rights of users to access and modify software."

Stallman writes⁴: "There are general reasons why all computer users should insist on free software. It gives users the freedom to control their own computers -- with proprietary software, the computer does what the software owner wants it to do, not what the software user wants it to do. Free software also gives users the freedom to cooperate with each other, to lead an upright life. These reasons apply to schools as they do to everyone."

But he points to "special reasons" for schools particularly to look at FOSS:

- Free software can save the school's money in a context where schools -- even in the affluent world -- are short of money.
- School should teach students ways

of life that will benefit society as a whole and promote "free software just as they promote recycling".

- Free software permits students to learn how software works, thus helping build good future coders.
- Proprietary software rejects their thirst for knowledge by keeping knowledge secret and "learning forbidden".
- The most fundamental mission of schools is to teach people to be good citizens and good neighbours -- to cooperate with others who need their help.
- Teaching the students to use free software, and to participate in the free software community, is a hands-on civics lesson.

Other arguments have also come up too.

For instance the view that FOSS is "stable, secure, feature rich, and easy to learn. It is also free."⁵ Or that proprietorial software "products are expensive, and require sacrifices in our school budgets to deploy."⁶

During a Free and Open Source Awareness Campaign⁷ in Schools held in Nepal from November 2006-March 2007, some of the reasons it gives for advocating FOSS in schools included:

- Free software provides the users freedom to control their own computers. With proprietary software, the computer does what the software owner wants it to do, not what you want it to do.
- Free software also gives users the freedom to cooperate with each other.
- Free software saves money. Even schools in the richest countries can benefit from the use of free software, because unlike its counterpart, the proprietary software, free software allows

1 http://en.wikipedia.org/wiki/Richard_Stallman

2 http://en.wikipedia.org/wiki/Free_software_movement

3 *ibid.*

4 <http://www.gnu.org/philosophy/schools.html>

5 <http://badcomputer.org/writing/plea>

6 *ibid.*

7 http://foss-nepal.googlegroups.com/web/Foss_campaign_Report_ACEN_IOEFOSS.pdf

the schools to copy and redistribute the software without any licensing issue.

- This can help the schools to copy original copy of software for all the computers and distribute it to the students.
- Free software permits students to learn how software works. For the students to write software well and become good programmers, they need to study a lot of code and understand the basics and methodologies employed in programming, by leading programmers.
- Students need to read and understand real programs that people use. They need to read the source code of the programs that they use every day.
- These studies help them understand coding and ethics of programming in a much better way, so that later on, when they write code, they have a better foresight and can produce better and more efficient code.
- The freedom provided by FOSS provides the students that extra knowledge and edge that needed to become good programmers.
- Proprietary software doesn't quench the thirst of knowledge of students, by saying that the knowledge that you need is secret and learning is forbidden. It keeps the general people in ignorance about how the software works and what exactly the software does in the background.
- Free software encourages students to read the code source and understand as much as they want. The use of free software produces good programmers in advance.
- On a deeper look, students go to school to learn useful skills and gain the knowledge needed to become good citizens. Schools teach them how to become a good human, good neighbour and how to excel in life so that the community as a whole benefits from their skills. This, in the world of software, means teaching the student to share, co-operate and help each other with software

and knowledge that they have. Of course, the school must practice what it preaches: all the software installed by the school should be available for students to copy, take home, and redistribute further.

- Moreover in the Nepalese context, schools rarely use proprietary software which have a proper license.
- Teaching the students to use free software, and to participate in the free software community, is a hands-on civics lesson. It also gives students a role model for public service.
- Another important reason for using free software -- right from the school level -- is that it helps students to get familiar with free software. So later in life when they graduate and go into professional life, they will in turn use free software. This will help our society (and keep it) from being dominated by mega giant-corporations.

There are also other recognised benefits for using FOSS, over proprietorial software, in schools.

An article titled 'Why should open source software be used in schools?'¹ argues that it "is indeed a strange world when educators need to be convinced that sharing information, as opposed to concealing information, is a good thing."

It points out that the advances in all of the arts and sciences, indeed the sum total of human knowledge, is the result of the open sharing of ideas, theories, studies and research. "Yet throughout many school systems, the software in use on computers is closed and locked, making educators partners in the censorship of the foundational information of this new age...."

Besides large licence cost savings (60%, according to some figures) other benefits "stem directly from the model of communities operating around a

1 <http://edge-op.org/grouch/schools.html>

software 'commons' that is central to Open Source."

In addition, FOSS also has other advantages for students:

- Wide choice and easy availability of tools.
- No blocks due to price-barriers or permission-barriers.
- Students are encouraged to study software at a deeper level.
- Adequate availability of affordable software encourages creativity.

Most Free Software and Open Source software packages can be freely downloaded over the internet, or are often available for purchase, at a reasonable price, on a CD.¹ Some of these are also made available with FOSS magazines. In South Asia, India has a regularly-published FOSS magazine?²

As argued via an article³ on school-library.net: "One of the things that I, personally, enjoy most about the OSS community is the spirit of sharing and community based support. It is my belief that this community exemplifies the spirit of unity-in-diversity that we try so hard to inculcate in our charges."

Comments the website ofset.org: "Because the liberty and the equality of access to the IT are important in our society, OFSET is actively promoting and developing free software

1 See <http://linuxdvdsale.tripod.com> This 'online store' is run from Goa, India and is run by a member and volunteer of the local FOSS circuit.

2 [Linux For You](http://www.linuxforu.com/issue/latest.php) magazine is priced at Rs 125, and includes software updates by CD or DVD with each issue.

3 <http://baldwinets.tripod.com/linux.html>

4 <http://www.ofset.org/about>

for schools."Projects undertaking the deployment of FOSS in schools have their own criteria over what they find acceptable and what they don't.

OFSET lays down two rules in its development process. Only free software development tools can be used to develop further software. It says: "By doing so we ensure basically two kinds of freedom: everyone can freely access the development tools to participate in the development; and the developed software are not tied to any proprietary tools."

FOSS is also seen to have a potential to reduce the "digital divide through (its) low-cost and freedom to pass on." Ethical values, it is argued, are also "ingrained through sharing and mutual support, not secrets and self-protection."⁵

In other countries too, the push for FOSS in schools has been taken up.

In UK, the benefits of deploying FOSS in schools was seen to lead to "substantial cost savings with no recurring license fees, smaller carbon footprint, increased flexibility, access to high-quality free applications at little or no cost, and an opportunity to play an active role in worldwide software development communities".

It has also been pointed out that software upgrades are tied closely to hardware power. Becta has reported that 96% of school computers are not powerful enough to run the top Windows Vista release and 55% cannot run any version of Vista.⁶

There are other benefits too for promoting FOSS in schools.

One perspective argues: "If a student messes up their desktop beyond repair, run the script to reset it to the default, of one user or the entire batch. Then, tools like squidGuard

5 <http://elgg.net/stevelee/weblog/139997.html>

6 <http://www.openschoolsalliance.org/>

perform very well and make it easy to protect children from harmful content on the net."¹

Rather than seeing benefits in terms of cost-savings alone, these are also viewed in terms of "capabilities gained".

"[GNU]Linux can do a lot with only a little hardware," it has been argued. Old hardware goes into creating GNU/Linux servers. The cost of security declines. There is a lower virus vulnerability. Upgrade or recurring licensing costs are done away with (the usable lifetime of a commercial software product is rarely longer than four years).²

While implementing FOSS in schools, perspectives from South Korea have argued that their initiatives were meant to "help the country develop more of its own software". This step was also being taken because of "security issues and budgetary concerns." Another reason was to build up local support.³

OTHER SPINOFFS FOR EDUCATION

Robert Fidrich⁴ writing in to the APCForum⁵ from Hungary (17 Aug 2007) highlighted the role of an 'Learning the Open Source Way' project⁶.

He said the project's objective is to develop a toolkit aimed at "students and educators who are interested in the open source approach and what it can tell us about learning."

1 http://networking.earthweb.com/netos/article/0,,12083_1143791,00.html

2 <http://staff.harrisonburg.k12.va.us/~rlineweaver/>

3_"Korea brings homegrown open source to schools"
http://news.com.com/Korea+brings+homegrown+open+source+to+schools/2100-7344_3-5755892.html

4 fidusz@zpk.hu

5 <http://lists.apc.org/mailman/listinfo/apc.forum> Archives open to list-members.

6 <https://launchpad.net/flosscom>

The toolkit is also aimed at assisting "others who want to create or adapt their educational courses using the principles found in FOSS communities. It is aimed at providing information about learning in an open source manner."

This project was initiated as part of the EU-funded FLOSSCom project and the "Virtual and On-campus Summer University"⁸ has been carried out in collaboration with Ubuntu Education.

The FLOSSCom project focuses on identifying the factors that contribute to successful knowledge construction in informal learning communities, such as the FOSS communities, and intends to analyze the effectiveness of FOSS-like learning communities in a formal educational setting.

TOOLS, IN THEIR ABUNDANCE

In a cybercafe that is part of a prominent Indian chain, it is commonplace to find it difficult to find tools that allow even simple operations like cropping a photo, or resizing it. Or accessing a spreadsheet. This is because of "anti-piracy" regulations in force and "virus" fears from the world of proprietary software. But such an approach results in significantly reducing the ability of a computer user to gain productivity from this useful tool called the computer.

FOSS, in contrast, offers a wider range of "freedoms".⁹ It is seen, by the Free Software Foundation (FSF), to be "technically or pedagogically superior to proprietary alternatives" apart from being able to promote the values of "freedom and cooperation".

Free Software gives you access to the tools **the user** needs. In their

7 <http://www.flosscom.net/>

8 http://www.flosscom.net/index.php?option=com_docman&task=cat_view&gid=28&Itemid=116

7 <https://lists.ubuntu.com/mailman/listinfo/ubuntu-education>

9 http://en.wikipedia.org/wiki/The_Free_Software_Definition

abundance.

For instance, the Debian 'distro'¹ (or distribution, i.e. a set of FOSS programs) comes with over over 1873² different software packages.

Edubuntu³ is doing a very impressive job of collating educational software and putting them all in one place.

Edubuntu is a member of the Ubuntu family of GNU/Linux distributions which is designed for use in classrooms. Wikipedia points out that Edubuntu has been developed in collaboration with teachers and technologists in multiple nations.

Adds the Wikipedia: "Edubuntu is built on top of the Ubuntu base, and incorporates the LTSP thin client architecture, as well as education-specific applications, aimed at the 6-18 years age group."

So are other Free Software projects like DebianEdu.⁴

DebianEdu describes itself as "a project about utilizing Debian to make the best distribution for educational purposes".

Skolelinux⁵ is the name of the custom Debian distribution which is produced by the DebianEdu project. It is also named Debian-Edu.

Skolelinux is a free software project founded in Norway, now supporting all languages present in Debian. Skolelinux offers four different installation profiles on one compact disk that will easily install a pre-configured educational network, including a main server, workstations and a thin client server. Its goals include to⁶:

- Enable teachers to provide high quality IT teaching to their students.

1 <http://www.debian.org/>

2 <http://www.debian.org/distrib/packages>

3 <http://edubuntu.org/>

4 <http://wiki.debian.org/DebianEdu>

5 <http://www.skolelinux.org/>

6 <http://en.wikipedia.org/wiki/Skolelinux>

- Create a GNU/Linux distribution tailored for schools -- based on their needs and resources.
- Simplify maintenance of computer facilities.
- Provide a thin client-solution, which eases maintenance, reduces costs and allows use of old hardware.
- Cut costs by using open source software and re-using old hardware.
- Identify and facilitate suitable programs for use in the schools.

Debian Jr.⁷ calls itself "Debian for children from 1 to 99 (years of age)". Its goal is to "make Debian an OS (operating system) that children from all ages will want to use", with a focus initially on eight-year-olds, and then spreading its focus from the 7-12 range.

Above all, this set of software tools can be replicated and shared in a very unrestricted manner. "Just copy it and pass it on."

OFSET⁸, or the Organisation for Free Software in Education and Teaching, is an organization whose goal is to promote the development of Free Software for the educational system and teaching. By law rooted in France, it sees itself as a multi-cultural entity with founding members all over the world, run with the Net as its main medium of communication amongst its administration council.

OFSET, the France-headquartered group, has tools which could be used in a wide range of contexts. Some were specifically for the world of education -- like Dr. Geo⁹ and GCompris¹⁰.

Others, although nonspecific to education, are integrated into this

7 <http://www.debian.org/devel/debian-jr/>

8 <http://ofset.org/>

9 <http://www.ofset.org/drgeo>

10 <http://www.gcompris.net/>

field -- such as Yacas¹ computer algebra system, 'starchart' frontend Gsta², the event-driven digital circuit simulator TkGate³, Open Office⁴, among others.

A Spanish volunteer from Catalonia, Sergio Toledo⁵, working for the Goa Schools Computers Project (later under the aegis of the Knowledge Initiatives Trust), put together an interesting collection of software suitable for use in schools in Goa, India. It is available online.⁶

The KDE Education Project⁷ says it is "developing high-quality educational software for the K Desktop Environment. Our primary focus is on schoolchildren aged 3 to 18, and the specialized user interface needs of young users. However, we also have programs to aid teachers in planning lessons, and others that are of interest to university students and anyone else

Ultimately, we know that free software is a culture, and therefore should obviously be closer to cultural institutions like schools and colleges. Without tapping that, we'll be missing the boat. We would like to get linked up with anybody who wants to use free software for e-governance and e-education, and of course, our priority is schools and the media. -- **G Nagarjuna**, Free Software Foundation of India. In "The What, Why and When of Free Software in India", Linux Journal, 2005-11-18.

with a desire to learn."

1 <http://yacas.sourceforge.net/>
2 <http://ricardo.ecn.wfu.edu/~cottrell/gstar/>
3 <http://www.tkgate.org/>
4 <http://www.openoffice.org/>
5 Email: jejoindia@ahoo.es
6 <http://wikiwikiweb.de/FlossInSchools>
7 <http://edu.kde.org/>

More about the KDE's Education Project is available online.⁸ Categories listed on its website include software dealing with:

- Languages
- Mathematics
- Miscellaneous
- Science
- Teaching Tools
- Early Development

Some of its tools include the Kanagram⁸ anagram game; the classical hangman game KHangMan¹⁰; the program to help revise Latin called KLatin¹¹; Klettres¹² that aims to learn the alphabet and then read some syllables in different languages; Kverbos¹³ to study Spanish verb forms; KVocTrain¹⁴ vocabulary trainer; and Parley¹⁵, a vocabulary trainer too.

FOR PRIMARY SCHOOL

The FOSS world comes up with regular surprises in terms of suitable tools it offers for various forms of work. While this list is indicative of some of the solutions offered, it cannot claim to be comprehensive or complete.

Among the programs listed are:

KDE's EDUCATION PROJECT: Some of the tools available as part of KDE's education project are:

Some of its tools include the Kanagram⁸ anagram game; the classical hangman

8 <http://edu.kde.org/presentation/index.php>
9 <http://edu.kde.org/kanagram/index.php>
10 <http://edu.kde.org/khangman/index.php>
11 <http://edu.kde.org/klatin/index.php>
12 <http://edu.kde.org/klettres/index.php>
13 <http://edu.kde.org/kverbos/index.php>
14 <http://edu.kde.org/kvotrains/index.php>
15 <http://edu.kde.org/kvotrains/index.php>
16 <http://edu.kde.org/kanagram/index.php>

game KHangMan¹; the program to help revise Latin called Klatin²; Klettres³ that aims to learn the alphabet and then read some syllables in different languages; Kverbos⁴ to study Spanish verb forms; KVocTrain⁵ vocabulary trainer; and Parley⁶, a vocabulary trainer too.

GCOMPRIS: GCompris⁷ is an educational software suite comprising of numerous activities for children aged 2 to 10.

It includes more than 40 activities. Some of the activities are game orientated, but nonetheless still educational.

GCompris is board-based and currently includes several boards. It offers activities dedicated to little kids like learning the mouse and keyboard.

It also teaches letters, numbers, words, basic algebra training, reading time on an analog clock, vector drawing, and much more. Includes computer discover, algebra, science (the canal lock, the water scycle, the submarine, electric simulation), geography, games (chess, memory, sudoku), reading practice, others (learn to tell the time, puzzle of famous paintings, vector drawing, cartoon making).

Currently GCompris offers in excess of 100 activities and more are being developed. For children aged 2 to 10.

While the potential of such tools still remain to be tapped in South Asia, some institutions have reported their interest in the same.

Step One Foundation, Kolkata, India said it "plans to use Gcompris at their learning centre for autistic children".

One letter at the site of GCompris⁸ says: "We have recently downloaded

1 <http://edu.kde.org/khangman/index.php>

2 <http://edu.kde.org/klatin/index.php>

3 <http://edu.kde.org/klettres/index.php>

4 <http://edu.kde.org/kverbos/index.php>

5 <http://edu.kde.org/kvoctrain/index.php>

6 <http://edu.kde.org/kvoctrain/index.php>

7 <http://gcompris.net/>

8 <http://gcompris.net/-Schools-using-it->

windows version of the software. We are planning to use it at our center for autistic children. We are hopeful that it will be an excellent and effective learning tool for our children. We want to congratulate the developers for the wonderful work they have done for kids worldwide. We shall report our experience after running the program for sometime."

Efforts have been on to localise Gcompris into some South Asian languages. Nepali has touched 100% localisation.⁹ Marathi and Hindi are 96% complete, with Tamil rating at 95%. Gujarati is 37% complete, Punjabi ranks at 9% complete, with Malayalam at 2% only.¹⁰

Gcompris is available for GNU/Linux, Mac OS X, Microsoft Windows and other systems. To promote the use of GNU/Linux, the Windows version has a **limited number of activities**; it is possible to access all the activities for a fee.¹¹

GCompris¹² is an educational software suite. Some of the activities are game orientated, but nonetheless still educational.

Currently GCompris offers in excess of 100 activities and more are being developed. For children aged 2 to 10.

GCompris includes software on:

- Computer discovery: keyboard, mouse, different mouse gestures
- Algebra: table memory, enumeration, double entry table, mirror images
- Science: the canal lock, the water cycle, the submarine, electric simulations
- Geography: place the country on the map
- Games: chess, memory, connect 4, sudoku
- Reading: reading practice
- Other: learn to tell time, puzzle of famous paintings, vector drawing,

9 <http://l10n.gnome.org/POT/gcompris.HEAD/gcompris.HEAD.ne.po>

10 *ibid*

11 <http://en.wikipedia.org/wiki/GCompris>

12 <http://gcompris.net/>

cartoon making

There are other varied software too.

CHILDSPLAY: childisplay¹ is a suite of educational games for young children, like gcompris, but without the overkill of c/c++ and the gnome environ.

Also the use of the SDL libraries makes smooth animation and the playing of sound very easy.

Childsplay uses a plugin system for the games, so you might want to check the Childsplay plugins page. (There are two built-in games: memory and a typing game.) Childsplay and the games are GNU-GPL licensed and are tested on GNU/Linux, FreeBSD and the Windows platforms (98/ME/2K/XP).

TUXPAINTING: Tux Paint² is a free, award winning drawing program for children ages 3 to 12. It combines an easy-to-use interface, fun sound effects, and an encouraging cartoon mascot who helps guide children as they use the program.

JILetters³ assists young children with learning the Western alphabet through visual and auditory means. It uses a phonic representation of each letter and cursive script to present the letters of the alphabet. It lets children memorise letters from visual cues.

FOR MIDDLE SCHOOL

SQUEAK: Squeak⁴ is smalltalk-80 implementation which has quite a bunch of learning applications listed on its site.

Self-description: "Squeak is a modern, open source full-featured implementation of the powerful Smalltalk programming language and environment. Squeak is highly-portable - even its virtual machine is written entirely in Smalltalk making it easy to debug, analyze, and change. Squeak is

1 <http://childsplay.sourceforge.net/>

2 <http://www.tuxpaint.org/>

3 <http://jiletters.sf.net>

4 <http://www.squeak.org>

5 <http://squeakland.org/>

the vehicle for a wide range of projects from multimedia applications, educational platforms to commercial web application development."

ALICE: Alice⁶ from Carnegie Mellon is a great software for learning programming in 3D. Alice is an innovative 3D programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web. Alice is a teaching tool for introductory computing. It uses 3D graphics and a drag-and-drop interface to facilitate a more engaging, less frustrating first programming experience. Alice can be tested too⁷. It is available for download⁸ on all three platforms: GNU/Linux, Windows and Mac.

Another project⁹ of interest is for learning to program. Incidentally, the initiator of Alice, Prof Randy Pausch has an inspiring speech at CMU, as part of the University Lecture Series called Journeys.¹⁰

ANAGRAMA: Anagrama¹¹ is about jumbled words.

MULTIPLICATION STATION: Multiplication Station 0.4.0¹² teaches children to add, subtract and multiply ... The built-in countdown timer discourages laziness. The high-score display encourages friendly competition among students.

TUXMATH: Tux, of Math Command ("TuxMath¹³," for short) is an educational arcade game starring Tux, the Linux mascot! Based on the classic arcade game "Missile Command," Tux must defend his cities. In this case, though, he must do it by solving math problems.

6 <http://www.alice.org/>

7 <http://www.aliceprogramming.net/>

8 http://www.alice.org/index.php?page=downloads/download_alice

9 <http://www.aliceprogramming.net/>

10 <http://cmu.edu/uls/journeys/>

11 <http://www.coralquest.com/anagramama/>

12 <http://www.asymptopia.org/>

13 <http://www.newbreedsoftware.com/tuxmath/>

TUXTYPING: Tux Typing⁴ is an educational typing tutor for children. It features several different types of gameplay, at a variety of difficulty levels.

FOR SECONDARY SCHOOL

Like at the other levels of education, FOSS also offers options at secondary schooling level. The challenge however remains to find the right tools among the many available, and also to fit these in aptly to the requirements of the South Asian syllabi.

In some cases, the FOSS tools are already making their impact felt.

Freeduc² CD is also being used and appreciated in India, along with other software programs.

Freeduc's site explains: "Until now – and probably for a while in most heads – the GNU/Linux system at school has been perceived as a good replacement of other proprietary servers. However the server is probably the least important things in term of freedom in a school network. It doesn't allow a teacher to share a workstation software with students. Supporting GNU/Linux in the workstation side can grant higher freedom and liberty between users in a school.. Therefore, OFSET has setup Freeduc, a tool to help to list, to evaluate and to package only free –non GPL exclusive - edu soft."

There is a wide variety of educational software listed as available on this "live" CD, for varying levels of students (including seniors).

BKchem⁴, the chemical drawing program written in Python. Platform-independent.

CHEMTOOL⁵, a GTK+-based 2D chemical structure editor for X11. It draws organic molecules easily and store them

as a X bitmap file. Allows one to export drawings in XFig format for further annotation, or as Postscript files (using xfig's companion program transfig). The distribution includes a set of sample molecular structure drawings.

E-CELL SYSTEM⁶ is an object-oriented software suite for modelling, simulation, and analysis of large scale complex systems such as biological cells. It allows many components, driven by multiple algorithms with different timescales, to coexist. The core library is written in C++ with a Python binding, and frontend software uses Python.

GENCHEMLAB⁷ is an OpenGL-based application intended to simulate several common general chemistry laboratory exercises. It is meant to be used to help students prepare for actual lab experience. Supported experiments include titration, calorimetry, freezing point depression, vapour pressure, electrochemistry, and spectrophotometry

EARTH3D⁸ visualizes the earth in realtime in a 3D view. You can rotate and zoom the view until countries, cities and even single houses become visible (in areas where the necessary map resolution is available), and fly around. You can also embed external data like current earthquake positions or cloud data. Additional data layers can be added to the view, e.g. country flags and names.

XRMAP⁹ interactively displays portions of the Earth, using the huge CIA world vector map. It is based on an earlier console utility 'rmap' by Reza Naima (<http://www.reza.net/rmap/>). It shows political boundaries, major and minor rivers, glaciers, lakes, canals, etc. The map is accurate to a very large zoom factor (possibly exceeding 100). Spherical, rectangular, Mercator and Miller projections are implemented, and all features can be set interactively from the GUI.

14 <http://tuxtype.sourceforge.net/>

2 <http://www.ofset.org/freeduc-cd>

3 <http://www.ofset.org/uploadfiles/138/download/packages.txt>

4 <http://www.zirael.org/bkchem/>

5 [http://ruby.chemie.uni-](http://ruby.chemie.uni-freiburg.de/~martin/chemtool/)

[freiburg.de/~martin/chemtool/](http://ruby.chemie.uni-freiburg.de/~martin/chemtool/)

6 <http://ecell.sf.net/>

7 <http://genchemlab.sourceforge.net/>

8 <http://www.earth3d.org>

9 http://frmas.free.fr/li_1.htm

CALCOO¹ is a scientific calculator designed to provide maximum usability. Its features bitmapped button labels and display digits to improve readability, no double-function buttons, undo/redo buttons, copy/paste interaction with the X clipboard, both RPN and algebraic modes, two memory registers with displays, displays for Y, Z, and T registers, and tick marks to separate thousands.

DR. GENIUS² refers to the Geometric Exploration and Numeric Intuitive User System. It is a merge of two projects: Dr. Geo and the Genius calculator. The Genius Calculator is a multiple precision calculator with an interpreted language, GEL, plus a large mathematical library written in GEL. Dr. Geo is a vector drawing software with mathematical constraints- we call this "interactive geometry."

DRGEO³: Lets user draw geometric figures based on mathematical properties and move part of that figure with respect to its properties. Dr. Geo is an educational package designed to explore geometry interactively (as opposed to seeing figures drawn on a sheet of paper). The interface is simple but efficient for younger users, can handle different languages, and can be used by either geometry or computer science teachers.

KALCUL⁴: The player has 16 cards with numbers. An operation is displayed on a small screen at the right of the board. You have to click on the right answer on the board. The card with the answer disappears. KalcuI supports addition, subtraction, multiplication, and division. There are 3 levels: easy, medium and hard.

SPOTTER: Spotter⁵⁶ lets students check their answers to math and science

1 <http://calcoo.sourceforge.net/>

2 <http://drgenius.seul.org/>

3 <http://ofset.sourceforge.net/drgeo/>

4 <http://website.lineone.net/~a-m.mahfouf/kalcul.html>

5 <http://www.lightandmatter.com/spotter/spotter.html>

6 <http://linux.softpedia.com/get/Education/Spotter-10024.shtml>

questions. It handles symbolic as well as numerical answers. Its author says the idea for Spotter came from another free and open-source program, LON-CAPA. It tells whether the answer is correct, and can also help diagnose an incorrect answer; the instructor can also add hints. Spotter isn't limited to numerical problems. For instance, if the problem is to solve the equation $x - b - 7a = 0$ for x , the student can type in either $b + 7a$ or $7a + b$ as the answer, and the program will know it's correct. Spotter is set up as an interactive web page that you can access through any computer that has an internet connection and a web browser.

TUX MATH SCRABBLE: Tux Math Scrabble is a math version of the popular board game. It is highly entertaining as well as great educational value. The game challenges young people to construct compound equations and consider multiple abstract possibilities. There are three skill-levels for practice from basic addition and subtraction through to multiplication and division.

WIMS (WWW Interactive Mathematics Server)⁸ is a CGI Web application that hosts interactive mathematical activities such as exercises, computational math, and graphing tools. It features automatic score processing with strong anti-cheating mechanisms, virtual classes allowing teachers to guide/control student works, online exercise creation, animated graphics, a message board allowing inline mathematical formulas, and more. It can also be used for education within other disciplines.

VOCABUMONKEY: The Vocabumoney⁹ project aims to produce a highly accessible collection of software focused on math and language skills grounded in proven learning principles that cater to real learning needs.

BOOKCASE: bookcase¹⁰ is a KDE application for keeping track of your collection of books, bibliographies, music, movies, coins, stamps, trading

7 <http://www.asymptopia.org/>

8 <http://wims.unice.fr/>

9 <http://www.vocabumoney.org/>

10 <http://www.periapsis.org/bookcase/>

cards, comic books, wines, or any collectible.

KEDU project includes tools like kstars, kalzium, percentage. Details below.

KSTARS: KStars¹ is a Desktop Planetarium for KDE. It provides an accurate graphical representation of the night sky, from any location on Earth, at any date and time. The display includes 40,000 stars, 13,000 deep-sky objects, eight planets, and the Sun and Moon.

KALZIUM: Kalzium² is an application which shows information about the periodic system of the elements.

KPERCENTAGE: KPercentage³ is a small math application that will help pupils to improve their skills in calculating percentages.

CANORUS: Canorus⁴ is a free music score editor. It supports note writing, scripting support, import/export of various file formats, MIDI input and output and more. Canorus is still in early stage of development.

CELESTIA⁵: The free space simulation that lets you explore our universe in three dimensions. Unlike most planetarium software, Celestia doesn't confine you to the surface of the Earth. You can travel throughout the solar system, to any of over 100,000 stars, or even beyond the galaxy. All movement in Celestia is seamless; the exponential zoom feature lets you explore space across a huge range of scales, from galaxy clusters down to spacecraft only a few meters across. A 'point-and-goto' interface makes it simple to navigate through the universe to the object you want to visit.

CROSSWORD BUILDER: Asymptopia Crossword Builder⁶ is a JavaScript education application that runs in any modern browser. Through the GUI, you can automatically generate unlimited math

crosswords (add/sub/mult/div/alg/frac) or enter/paste your own lists of key:hint pairs. It is educational, and keeps kids busy.

NOTEEDIT: NoteEdit⁷ is a free music score editor for Linux. It supports an unlimited number and length of staves, polyphony, a MIDI playback of written notes, chord markings, lyrics, a number of import and export filters to many formats like MIDI, MusicXML, ABC Music, MUP, PMX, MusiXTeX and LilyPond and more.

STELLARIUM: Stellarium⁸ is a free open source planetarium for your computer. It shows a realistic sky in 3D, just like what you see with the naked eye, binoculars or a telescope. It is being used in planetarium projectors. Just set your coordinates and go.

TUXMATHSCRABBLE⁹: Challenges young people to construct compound equations and consider multiple abstract possibilities. There are four skill levels for practice, from basic addition and subtraction through multiplication and division. This software includes a data recorder interface for student performance assessment. The data is recorded in the same format as data from other applications built upon the common underlying framework. This enables comparison of common variables across multiple applications.

TUXWORDSMITH: TuxWordSmith¹⁰ is a foreign language learning game with support for over 30 languages. The game is similar to the familiar Scrabble, and looks suspiciously like TuxMathScrabble. You play in one language, and the definitions are shown in the other language you have configured.

OpenJUMP: OpenJUMP¹¹ is a free, Java based and open source Geographic Information System. Allows to make maps

1 <http://edu.kde.org/kstars/>

2 <http://edu.kde.org/kalzium/>

3 <http://edu.kde.org/kpercentage/>

4 <https://canorus.berlios.de/>

5 <http://www.shatters.net/celestia/>

6 <http://www.asymptopia.org/>

7 <http://noteedit.berlios.de/>

8 <http://www.stellarium.org/>

9 <http://www.newbreedsoftware.com/tuxmath/>

10 <http://www.asymptopia.org/>

11 <http://openjump.org/wiki/show/HomePage>

of your town and surrounding areas, specially if your budget rules commercial GIS software.

CHILDSPLAY: Childsplay¹ is a suite of educational games for young children, like gcompris. Childsplay uses a plugin system for the games, so you might want to check the Childsplay plugins page. (There are two built-in games: memory and a typing game.)

MULTIPLICATION STATION: Multiplication Station² 0.4.0 will teach your child to add, subtract and multiply ... The built-in countdown timer discourages laziness. The high-score display encourages friendly competition among students.

CANORUS: Canorus³ is a free music score editor. It supports note writing, scripting support, import/export of various file formats, MIDI input and output and more. Canorus is still in early stage of development.

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STELLARIUM: Stellarium⁷ is a free open source planetarium for your computer. It shows a realistic sky in 3D, just like what you see with the naked eye, binoculars or a telescope. It is being used in planetarium projectors. Just set your coordinates and go.

TUXMATH: "Tux, of Math Command" ("TuxMath,"⁸ for short) is an educational arcade game starring Tux, the Linux mascot! Based on the classic arcade game "Missile Command," Tux must defend his cities. In this case, though, he must do it by solving math problems.

TUXMATHSCRABBLE⁹: Challenges young people to construct compound equations and consider multiple abstract possibilities. There are four skill levels for practice, from basic addition and subtraction through multiplication and division. This software includes a data recorder interface for student performance assessment. The data is recorded in the same format as data from other applications built upon the common underlying framework. This enables comparison of common variables across multiple applications.

TUXPAINTING: Tux Paint¹⁰ is a free, award winning drawing program for children ages 3 to 12. It combines an easy-to-use interface, fun sound effects, and an encouraging cartoon mascot who helps guide children as they use the program.

1 <http://childsplay.sourceforge.net/>

2 <http://www.asymptopia.org/>

3 <https://canorus.berlios.de/>

4 <http://www.shatters.net/celestia/>

5 <http://www.asymptopia.org/>

6 <http://noteedit.berlios.de/>

7 <http://www.stellarium.org/>

8 <http://www.newbreedsoftware.com/tuxmath/>

9 <http://www.newbreedsoftware.com/tuxmath/>

10 <http://www.tuxpaint.org/>

TUXTYPING: "Tux Typing"¹ is an educational typing tutor for children. It features several different types of gameplay, at many difficulty levels.

TUXWORDSMITH: TuxWordSmith² is a foreign language learning game with support for over 30 languages. The game is similar to the familiar Scrabble, and looks suspiciously like TuxMathScrabble. You play in one language, and the definitions are shown in the other language you have configured.

OpenJUMP: OpenJUMP³ is a free, Java based and open source Geographic Information System. Allows to make maps of your town and surrounding areas, specially if your budget rules commercial GIS software.⁴

FOR TEACHERS

THE TEACHER'S CdToolbox: The teacher's CdToolbox⁵ is a CD-ROM/DVD-ROM with plenty of free softwares interesting for teachers and others.

The DVD-ROM is available for Windows and GNU/Linux. Such software can be installed and distributed freely and it's legal. The installation can be done through an easy to use interface.

CBT COMBO: Cbt Combo⁶ is a free educational program for teachers who use Linux. CBT means Computer Based Training. Combo is short for combination. CBT Combo is a combination authoring and playback program for courses of instruction. Author: drland@cbtcbt.com (David R. Land) Maintained-by: support@cbtcbt.com

Keduca⁷ is a test tool. Self-description: "You can download some ready-to-use tests via a wizard. The

1 <http://tuxtype.sourceforge.net/>

2 <http://www.asymptopia.org/>

3 <http://openjump.org/wiki/show/HomePage>

4 The above section draws from <http://www.schoolforge.net/education-software/educational> and from other similar projects.

5 <http://gbr.cdprof.com/>

6 <http://www.cbtcbt.com>

7 <http://edu.kde.org/keduca/>

teacher creates a test, and then the student can take the test."

SCHOOL ADMINISTRATION TOOLS, etc

Open Admin⁸ for Schools: This schools administration program is FLOSS and is licened under the GNU General Public License.

It is entirely web-based, and can run from a server or single computer. According to its promoters, the software can track or create

- demographics to store student and family information
- attendance of students
- a simple discipline module to track student discipline events and outcomes
- a report card system, with per-subject objectives, integrated attendance reporting, etc
- an online gradebook to allow teachers to enter marks and assessments online from school or home
- a transcript system to print student transcripts
- a fees system (along with lunch program) to allow charging of student fees, printing of invoices, payments, invoices and export summary transactions to external accounting programs
- allow parents to view attendance, gradebook (where allowed), and report card marks
- an IEP (Special Needs) Site that is integrated at the division level that allows special needs teachers to tailor individual student programs that can be viewed from each school's teacher site
- export/import modules to allow students to easily transfer schools within divisions without re-entry of demographic information
- an online daybook to allow teachers to plan and view their lessons or days -- the last being

8 <http://richtech.ca/openadmin/>

still in rudimentary form.

There are other useful tools too.

- School Admin Project¹ is a Web-based application to provide an interface to a school's registration process. It also allows parents to log in so that they can see the performance and other details of their children online. Attendance of children and teachers can also be viewed online so that management can keep vigil on what is actually happening in the schools.

OpenKiosk² is an open-source multi-platform kiosk system. OpenKiosk is ideally suited for use in locations where a controlled computing environment is paramount such as public access systems, libraries, school computer laboratories. OpenKiosk is authored by Abdiel Janulgue of Iligan City in the Philippines.

Site@School³ is a Content Management System (CMS) to manage and maintain the website of a primary school. Licensed under the GPL, it allows one to:

- Manage a website without technical knowledge.
- Create personal webpages for pupils and teachers
- Allow teachers to check the pupils' pages before publication
- Build an intranet for teachers, that is not accessible to the public
- Send out e-mail alerts to admins if pages are updated or created
- Get access to a comprehensive manual with over 300 screenshots
- Offer an extensive number of available modules
- And the possibilities of creating your own template.

Other school administration tools listed on Freshmeat⁴ are SchoolTool⁵, MainBrain School⁶, and open BIBLIO⁷ (a

- 1 <http://freshmeat.net/projects/school/>
- 2 <http://openkiosk.sf.net/>
- 3 <http://siteatschool.sourceforge.net/>
- 4 <http://freshmeat.net/>
- 5 <http://freshmeat.net/projects/schooltool/>
- 6 <http://freshmeat.net/projects/mainbrain/>
- 7 <http://freshmeat.net/projects/openbiblio/>

school library administration tool).

MainBrain School is a Web-based information portal for schools which allows parents to log in to view their students' assignments, grades, attendance, class Web sites, school calendars, and updates; it can also alert parents of potential problems before they become real issues. It helps schools use the Internet to improve parent-teacher communication.

SchoolTool⁸ is a project to develop a common global school administration infrastructure that is freely available under an Open Source licence. According to its site, the vision is to create a platform that is equally compelling for schools and colleges in First and Third World countries, that supports best practices in school administration, and that is readily customized to comply with local regulatory requirements.

Other possible tools include the web-based school admin project Open Administration for Schools⁹, software to keep track of school grades OpenGrade¹⁰, web-based tools to help IT management in schools School Tools for Online Resource Management¹¹, Tablix¹² for timetabling problems, an OS for schools called Karoshi¹³, the web-based school calendaring system Kronophobia¹⁴, and the classroom information assistant ClaSS¹⁵.

Other projects that could be useful in schools include FET¹⁶ that creates automatic schedules for school timetables, the AbulEdu¹⁷ distribution for primary schools, the web portal for a high-school alumni site SchoolAlumni Portal¹⁸, phpAlum to keep track of your high school alumni¹⁹, a school intranet

- 8 <http://freshmeat.net/projects/schooltool/>
- 9 <http://freshmeat.net/projects/openadmin/>
- 10 <http://freshmeat.net/projects/opengrade/>
- 11 <http://freshmeat.net/projects/schooltools/>
- 12 <http://freshmeat.net/projects/tablix/>
- 13 <http://freshmeat.net/projects/karoshi/>
- 14 <http://freshmeat.net/projects/kronophobia/>
- 15 <http://freshmeat.net/projects/class/>

- 16 <http://freshmeat.net/projects/fet/>
- 17 <http://freshmeat.net/projects/abuledu/>
- 18 <http://freshmeat.net/projects/alumniportal/>
- 19 <http://freshmeat.net/projects/phpalum/>

management system IntraSchool¹, the point-of-sale system for school cafeterias², the school administration software MainBrain School³, the school timetable editor intime⁴, a tool to arrange the schedule of a school assigna⁵, software to deal with the electronic delivery of software Middle School Homework Page⁶, the system for entering and sending school progress reports for teachers and parents⁷, the time-tabling engine for schools Simsttab⁸, and the school information system IGOSsimpl⁹ among others.

INDIAN INITIATIVES AND PROJECTS

In some areas of India, diverse projects have been attempted, both large and small. Below are some links.

KERALA: For an account of the IT@School Project in Kerala see the Swatantryam blog.¹⁰

It describes how Free Software became part of IT education in schools in the South Indian state. Blogger Sasi Kumar says the Department of Education, Government of Kerala, started a project called IT@School for taking IT-enabled education to the high schools in the state. It constituted a committee headed by Prof. U.R. Rao, former Chairman of the Indian Space Research Organisation, to make recommendations on the direction the project should take. The committee recommended the project aim to empower teachers and to use technology for improving curriculum transaction in the classes. Most teachers and students were found to possess few IT skills, so IT education at the high-school level was decided

- 1 <http://freshmeat.net/projects/intraschool/>
- 2 <http://freshmeat.net/projects/pscafepos/>
- 3 <http://freshmeat.net/projects/mainbrain/>
- 4 <http://freshmeat.net/projects/intime/>
- 5 <http://freshmeat.net/projects/assigna/>
- 6 <http://freshmeat.net/projects/mshwpage/>
- 7 <http://freshmeat.net/projects/prm/>
- 8 <http://freshmeat.net/projects/simsttab/>
- 9 <http://freshmeat.net/projects/igossimpel/>
- 10 <http://swatantryam.blogspot.com/2007/08/story-of-free-software-in-kerala-india.html>

on, starting with the eighth standard in 2002, after conducting IT training for a large number of teachers.

Teacher-trainings were done with help from Intel Teach To the Future Programme, using course material wholly based on Microsoft programme. Similar was the textbook for IT prepared by Kerala's State Council for Educational Research and Training (SCERT).

Writes Sasi: "The Free Software community in the state found this very offensive, since it ignored the existence of Free Software and promoted the products of one company ignoring even other proprietary software. The community responded by talking to people, sending letters, writing in the media and so on. The Free Software User Group in Kochi prepared a memorandum and sent it to several people involved in the matter, including the Directors of the IT@School project and SCERT, the Director of Public Instruction, the Principal Secretary, Education Department, and the Secretary, IT Department."

Campaigners argued that IT@School was promoting the software of one company at the cost of software produced by everyone else. The government would have to pay a huge sum for licensing software for schools, and even if given free, this could be a marketing ploy to create a pool of persons familiar with their software packages and thus forming an assured customer base -- either as users or as potential skilled employee -- the FOSS campaigners argued.

They also raised concerns about a 'vendor lock-in'. They pointed out that "several software packages, both applications as well as operating systems, which conform to industry-wide standards, adopted and maintained by independent vendors, and with less restrictive licences, are available."

The Kerala School Teachers Association backed the Free Software enthusiasts' demand. Some officials supported this too. Meanwhile, some schools, especially in northern Kerala, where there were teachers who knew how to install and use GNU/Linux, installed it

and started IT classes using it.

Kerala's campaigners faced of students studying the many distros of GNU/Linux. Says Sasi: "Even preparing the textbook became difficult, since the screenshots, and sometimes even the procedures for using the software, could be different for different distributions. To solve this problem, the Free Software Foundation of India suggested developing a custom distribution for IT@School, and eventually created the distribution with funding from the Kerala State IT Mission."

Another problem that the IT@School project faced was that of providing support to the schools where GNU/Linux was being used. A number of agencies, including Free Software User Groups, responded and about twenty of them were short listed.

A final solution to the problem came when SPACE¹ (Society for Promotion of Alternative Computing and Employment, a non-government organisation or NGO in Kerala, supporting FOSS) decided to offer support to IT@School, both in terms of updating the distribution used in schools and in providing support to the teacher community.

The website of SPACE allows teachers to post questions there², to which experts respond, and also a page listing the Frequently Asked Questions and the answers to them. A Resource Centre has been established in Kochi for conducting teacher training with technical assistance from SPACE.

In 2005, the Government of Kerala announced that the schools in Kerala will completely switch to Free Software in stages. Supplements to the textbooks were created to enable students to study using GNU/Linux, which also introduced some software that a child new to computers could use to learn the skills needed to use a mouse and a keyboard.

Sasi comments: "Tuxpaint, a simple

1 <http://www.space-kerala.org/>

2 http://support.space-kerala.org/wiki/index.php/Help_Desk

painting software, which a child could use even if (s)he was unfamiliar with the intricacies of saving or retrieving a file, and Gcompris, a set of games that helped the child to learn how to use the mouse and keyboard, became very popular with children. The textbooks for all the three classes in high school are now being revised to contain Free Software exclusively. Kerala is poised to become the first state in the country to use exclusively Free Software in its schools. It is also poised to become possible the first state to introduce IT enabled education in high schools in a big way."

In September 2007, mainstream media reported the growth of FOSS usage in schools in Kerala.³

It noted that in "the largest such simultaneous deployment of 'free-and-open' software in India, over 15 lakh (1.5 million) Kerala school children ... start taking their quarterly practical tests in Information Technology on personal computers using a special [GNU] Linux version." The IT@School project of the State Education Department has developed an operating system based on the Linux version Ubuntu. Called IT@School GNU Linux Version 3.0, it was distributed to 2,832 high schools -- over a thousand of them government schools, the rest aided and unaided ones, the Hindu reported. Between September 7 and 22, 2007, children of Classes 8, 9 and 10 were scheduled to use some 30,000 PCs to do their quarterly practical examinations in IT. In Class VIII, for example, the examination will test skills in the use of the mouse; the 'Tux' paint software for drawing; word processing and spreadsheets. A trained cadre of over 70,000 teachers will help them, it was reported.

IN NORTH KERALA: See "Issues in IT education and Free Software advantage" which highlights the advantages of FOSS

3 See "IT practical tests on 'open' platform" by Anand Parthasarathy in The Hindu.

<http://www.hindu.com/2007/09/07/stories/2007090755131600.htm>

4 <http://archives.seul.org/schoolforge/discuss/Apr-2003/msg00131.html>

in education. Including social advantages, building local development and self-reliance, financial benefits, administrative advantages, and academic usefulness.

It also highlights some 'action points' needed to be undertaken to promote FOSS in schools. These include creating a OS-independent curricula, providing Free Software tools for IT education programmes, teacher training in FOSS, promoting education based on freely available standards (not on dependency on proprietorial platforms), and local language support for FOSS.

Also looked at are some case studies of FOSS in a few schools in Kerala (population 32 million, area 38.863 sq km).

It points to the case study of the Government Girls High Schools Challai, in Thiruvananthapuram, the capital of Kerala, whose students mostly come from low-income families. Faced with low resources and old PCs, the teacher got help from Free Software volunteers, and installed GNU/Linux there.

It has been pointed out that: "By switching over to GNU/Linux the school is getting the added advantage of running application with local language support. This is due to a project by Free Software Foundation of India to localise Free Software to Malayalam. Local language support is particularly important as the teaching medium for most of the schools in Kerala use the Malayalam medium."

In the Kannur region of northern Kerala, a member of Parliament used his Member of Parliament's fund to set up computer labs, and this was expected to take FOSS to some ten schools in that area.

IN KANNUR: Sujeevan Pullanhiotan said that LTSP based GNU/Linux system had successfully implemented in a number of government schools in Kanuur. These included schools at Chelora; Munderi; Valapatnam; Chala; Thottada; Technical Higher Secondary School, Thottada;

1 <http://archives.seul.org/schoolforge/discuss/Feb-2003/msg00152.html>

Chittariparamba; Kuthuparamba; Vengad; Chavasseri; Pinarayi; Kottayam; Manathana; Maaloor and Edakkad (with the last three being 'in progress' at the time this post was made).

Kannur district in Kerala²³ is another region noticed by SchoolForge for its interest in FOSS solutions in schools.

IN KARNATAKA: KK Subbu posted his experiences about deploying FOSS on a laptop in a rural school.

He wrote on his "enduringbits" blog in a post titled "Notebook computing and village public schools" (Dec 12, 2006): "What if rural primary school teachers are given computers for teaching their students? Will the computers just become another "status" toy to be used as passive multimedia players playing canned content? Will the schools become just another video game arcade? Will it truly empower them to create or adapt content to their local needs?"

He pointed out a year earlier, he had been involved in an experiment to equip public school teachers with FOSS tools so that they could produce their own quaterly assessment papers for primary grades one through seven. "This year, the experiment was expanded to include four more teachers from village public schools in Kanakapura. The experiment was a huge success and triggered a flood of requests from remote village public schools for inclusion in the program," he commented.

These schools took "hours of driving over rough roads" to access. During school hours, the teachers would be engaged full time with students leaving very little time to work on computers. After many field visits, debates and discussions, his team designed a system around notebook computers and FOSS (free and open source software). "Each notebook computer consumed less than 60W and could operate for more than an

2 <http://s2s2net.netfirms.com/project.html>

3 <http://www.schoolforge.net/search/node/India>

4 <http://enduringbits.blogspot.com/2006/12/notebook-computing-and-village-public.html>

hour on battery. They were also small in size and weighed less than 3kgs. The teachers could easily carry their computer home during evenings and weekends to learn and work in their free time. They could also bring the computer to Bangalore for service, support or training. FOSS gave us lot of flexibility in designing desktop sessions around tasks that were important for the teachers," Subbu reported.

But there were problem areas too.

"We were also nervous about the downsides. Notebook computers are delicate machines, not designed to withstand the heat, humidity and dust in villages. Would they survive handling by children? How will the trackpad react to sweaty fingers in hot climate? The display, at 14", was too small to present to the whole class. The teachers had no prior or very little exposure to computers and absolutely no exposure to technical english that passes for "online help". Without IT support and networking, how would they transfer files across notebook computers?" he reported.

Yet school teachers understood these risks as they had already used mobile phones. The small size of these computers compared to desktop made it a lot easier to protect them from the elements. "The Acer reseller, who gave us an excellent deal on Acer Aspire 3682 notebook model, threw in an optical mouse and a 1GB flash drive, for free. That gave us a fallback for trackpad and data transfer problems. We plan to supplement the notebook computers with one 19" LCD Monitor per school. LCD Monitors are portable and consume very low power. The monitors will be used for demos, lectures and presentations to a large classroom. Lack of prior computing exposure was turned into an advantage. We created logins around specific tasks and subjects. When the teachers logs into a specific task/subject, only the programs relevant to the task would appear on the menu (thanks to KDE's profile facility)."

In December 2006, they delivered the first batch of five notebook computers

to the teachers. "For the village schools, this was a defining moment. Long used to receiving out-dated hand-outs, they were now leading the technology edge. Men, women, youth and children from the whole village turned out in large numbers to celebrate it like a festival!

"While returning from Kanakapura, it struck me how truly global we have become. Here is a Indian village using a computer manufactured in Taiwan just a month ago, using an OS started by a Finn, using desktop software originated by Germans and a typesetting software designed by a teacher (of Dutch origin) augmented with Kannada types authored by a math professor in Mysore! This message has registered deeply in children's mind. Every child in the village wants to become a "graduate" now. The teachers were very excited with their first truly "personal computer". After using it for a few minutes came the famous first question: "How do I shut this computer down?"

IN GOA: The project got started in 1998 to improve availability of PC's for schools in the Goa state of India. It was initially promoted by a group of expat Goans, based largely in the US!

It was then estimated to cover less than 5% of schools in the area. GNU/Linux was deployed in schools, to face the situation of unaffordable proprietorial software, or the widespread practice of software 'piracy' deployed to meet requirements in most educational institutions.

Goa is a small state of 1.4 million inhabitants, and GNU/Linux was utilised on desktops for students for some months.

The problems this project ran into included teacher-resistance, and insufficient support services to back up the GNU/Linux deployment. On the positive side however, this project caught the attention of local authorities and, apparently, even proprietorial software distributors. The then chief minister of Goa met up for a dinner with Free Software

1 <http://www.goasudharop.org/gscp>

Foundation leader Richard M Stallman (RMS) during his visit to Goa, and was reportedly considering the use of FOSS on a scheme (Cyberage) meant to distribute almost-free computers to college students in Goa.

Plans were somehow changed, and parent-resistance was cited as a reason for opting for proprietorial software, which was however sold to the government at reduced rates. The lessons learnt from here include the challenges of support for FOSS-in-schools projects, and also the lobbying undertaken to influence State-schemes on computerisation.

BIJRA, WEST BENGAL: A project undertaken by the Dgplug (Durgapur LUG). Bijra High School, Bijra, is situated at the vicinity of Durgapur Steel Town Ship, and is "in a poor village Bijra inhabited by poor Muslims, SC/ST communities."

Nearby slum-dwellers in Mahuabagan, Hazra Para and William Carey send their children to this school, started in 1974, upgraded to high school in 1999, and having a strength of 485. Parents of most children are day labourers or housemaids. Their monthly income ranges from 1500-3000 and cannot afford computer fees. The school receives only Rs. 125 annually from all of its students.

To encourage computer literacy among its students, the school arranged a single computer and got a donation of two more. The two new PCs were P4s with 256 MB RAM and a 40GB HDD, running Fedora Core 5 and Fedora Core 6. According to information posted online: "Students are learning fast with the little resource available. As told by Kazi Nijamuddin, the Headmaster of the school, every class of around 40-50 students are divided into two parts. One by one all students do the practice in the computers."

This is the first school in the area to adopt FOSS. dgplug, the Durgapur LUG, provides support. Soumya Kanti Chakraborty, a final year CSE student

1 <http://wiki.dgplug.org/index.php/Bijra>

from Dr. B. C. Roy Engineering College (at the time information was collected) is in charge for the support of this school (from the very beginning), currently Subhodip and Ajitesh are also helping him in this project. They have sought help by way of financial sponsorship, and content creation for the project.

FOR AUTISTIC CHILDREN: In a workshop held in Bangalore recently, the focus was furthering the understanding of how computers and digital technologies can help children with autism -- and other disabilities -- to learn and communicate better.

Shared in the course of this programme were several other software tools such as a 3-D and role-play software developed by C-DAC, simple visual programming environments such as Scratch (recently released by MIT Media Lab), simple image and audio manipulation using everyday Windows software, and Edubuntu -- the free and open source GNU/Linux-based operating system designed specially for children that comes packaged with several child-friendly games and educational software.

FOSS IN SCHOOLS WIKI: On the internet, this site³ contains a wiki-based documentation page of FLOSS-in-schools initiatives in India.

SMALLER INITIATIVES: There have also been individuals taking an interest in promoting the field of FOSS in school computing. During the 2006 edition of the Bangalore-based free and open source community event, FOSS.in, K. K. Subramaniam presented a talk on FOSS tools in primary schools. It was aimed at encouraging "FOSS enthusiasts" in adopting such tools in their local communities, and presented experiences from deploying a FOSS desktop in a small public primary school in Bangalore.

2 <http://www.indiatogether.org/2007/jun/hlt-techtools.htm>

3 http://fci.wikia.com/wiki/FOSS_in_Schools

4 <https://foss.in/2006/cfp/speakers/talkdetailspub.php?talkid=183>

Subramaniam presented "the initial approach for FOSS deployment, the steps which worked and those that didn't in getting the teachers in the school to use FOSS desktop and tools like KDE, Kile and LaTeX to enhance the quality of teaching and integrate a PC into daily sessions in the school."

Subramaniam argued that most deployments of computers in primary schools in India "used canned 'games' software on PCs to teach students or expect teachers to use office automation software." But this, he argued, for already overburdened primary class teachers, resulted in computers becoming "just another distraction". Instead, what this experiment did was to offer a small public school in Bangalore to use a computer for any task of their choice. Teachers had no prior experience with computers or software and their medium of instruction was the regional Indian language of Kannada.

Two teachers in the school chose to automate preparation of term question papers in Kannada and English, as this was a recurring and time-consuming manual process. The desktop used KDE, Kile and LaTeX (with Kannada types and styles) but not localized in Kannada. Starting from the scratch, the teachers took over 100 hours to learn to use the tools and complete the first set of publication-ready term papers for classes I through IV. The second cycle took them less than 20 hours and they continue to improve on their time, Subramaniam reported.

"The FOSS desktop has empowered the teachers to generate their own content quickly and easily without compromising quality. The system has worked without a single crash or breakdown over eighteen months of use by curious young children," he reported back to the FOSS.in conference.

PHYSICS EXPERIMENTS: During the Freedom

1 KDE is a [free software](#) project working to build an easy-to-use desktop environment. Kile is a [TeX/LaTeX editor](#). LaTeX is a [document markup language](#) and [document preparation system](#).

in Technology and Software conference held in New Delhi in September 2007, two of the scheduled presentations focussed on FOSS in schools. These were: Ajith Kumar's Free Software in Science Experiments using Phoenix and Ajay Kumar's Free/Open Tools for Free/Open Educational Content. (The first talk was not presented.)

Ajay Kumar³ held a workshop, and created a "mind map" of the issues covered, and those wanted to be covered.

PHOENIX, or Physics with Homemade Equipment and Innovative Experiments, is a project started as a part of the program by Inter University Accelerator Centre, an Indian autonomous inter-university research facility of the University Grants Commission, New Delhi formerly known as the Nuclear Science Centre⁴ to improve the laboratory facilities at the universities.

It is a hardware and software framework that can be used for developing computer interfaced science experiments without getting into the details of electronics or computer programming. The objective is to make teachers and students familiar with computerized experimental systems and also to enable them to develop new experiments.

Different sensors elements can be interfaced and accessed by a few lines of Python code. Phoenix utilizes the power of personal computers for experiment control, data acquisition and its mathematical analysis. The instrument is designed using easily available components and the design is available for royalty free commercial production. Design supports hardware plug-in modules for future expansion. Phoenix is developed using Free Software tools.

The Phoenix Live CD⁵ contains all the required phoenix programs plus a collection of science and engineering software.

2 <http://www.freed.in>

3 ajay.gahlawat@gmail.com

4 <http://www.iuac.ernet.in/>

5 <http://www.nsc.res.in/~elab/phoenix/software/liveCD/index.html>

A PDF download¹ of the documentation, and quick-starter guide is available.

SCHOOL GIS²: This project is focused on the use of GIS for environmental education through the schools and other resources.

Schools have an important responsibility to introduce environmental education. GIS can be an important tool for visualising the environment in relevant layers.

More importantly it can be an active learning environment, where students and teachers can not only consume information but actually produce knowledge, feel proud and engage collaboratively across schools breaking the barriers of language.

The site is a Geographic Information System (GIS) which provides access to a wide range of information related to location. Unlike a fixed paper map, you can change the content of the maps presented on screen, by turning 'layers' on and off, you can change the scale of the map by 'zooming' in and importantly objects in the map are linked to further information, either held in databases or via hyperlinks to other websites.

You can search for streets, individual addresses, schools or parks, and view aerial images as well as access a wide range of local information, such as schools, theatres, hospitals, cinemas, art centres, sports facilities and activities for children and young people.

For example, students can add the information (graphically and also textually) and analyse the collated data, co-relate different layers etc.

Take the example of bio-diversity monitoring and data collection, students can start with A3 size maps of all the gardens, waterbodies and riversides. Mark the species, data regarding every plant and thus prepare the ground for planning future planting

1 http://www.nsc.res.in/~elab/phoenix/docs/phm_book.pdf

2 <http://www.indictrans.in/schoolgis>

efforts etc.

Similarly, students can help community be better aware and prepared for disaster management.

Benefits of using GIS in schools include:

- Learning by doing. Visualisation. Knowledge production.
- Create animations.
- Update websites.
- Data collection (like maps, info. etc)
- Understand decision making and administration.
- Fun and flexibility.
- Very engaging for pupils.
- An opportunity to add more creativity to teaching.
- Can create educational exercises (in the fields of geography, demography, history).
- Effective application to support ICT in Geography.

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SAMPLE CBSE LESSONS³: Given are few examples of sample CBSE lessons on Word Processor prepared on OpenOffice (Ver.

3 <http://www.indictrans.in/cbselessons>

1.1). This acts as an option to teaching proprietorial software.

TUTORIAL ON GIMP¹: This is a nice text book chapter from Kerala, available for free download. Check it out:

Free as in Education: Significance of FLOSS for the Developing Countries

A study looking at Free/Libre and Open Source Software in the planet's largest continent. Written around November 2002 and May 2003.

Online versions of the Free as in Education report and regional reports from OneWorld Finland special section of FLOSS are available. See the main overall report² and regional reports on Asia³, Africa⁴ and Latin America⁵. AN INTERESTING EXAMPLE FROM PANCHGANI: A school in Pachgani⁶, Maharashtra in western India has shifted "completely on FLOSS" and Sudhanwa Jogalekar said volunteers had gone there to train their teachers.

Says the school on its site⁷ "New Era High School continues with its Open Source Technologies in an advanced user level and the ICT team is still exploring maximum possibilities in Open Source for the future.... We mostly use Mandriva 2007 and Fedora Core 7 Linux Operating systems on all our computers....

"As education moves increasingly from the realm of books and papers to instructional technology, our teachers incorporate technology into the classrooms, with a focus on developing students thinking skills. Students are given projects which improves their technical skills to understand the usage of technologies as tools for

- 1 <http://mission.akshaya.net/dpi/>
- 2 <http://oneworld.net/filemanager/download/1255/>
- 3 <http://oneworld.net/filemanager/download/1253/>
- 4 <http://oneworld.net/filemanager/download/1252/>
- 5 <http://oneworld.net/filemanager/download/1254/>
- 6 <http://www.nehsindia.org/>
- 7 <http://www.nehsindia.org/beyondbooks/computer/computer.php3>

gathering, assessing and sharing information. We have Advanced Computer Classes where our students are trained in video editing, hardware, Pixel editing in GIMP and web designing.....

"The primary curriculum consist of Introduction to computers, Keyboard and Mouse skills. Ktouch, Kpaint, Abhiword & Openoffice writer & KDE desktop on Fedora Core 5. The secondary curriculum consist of basic and advanced concepts Hardware, Software and OpenOffice 2.2 (Writer, Calc, database, Presentation, etc). The students are also taught the latest trend in Internet and cyber ethics."

OPEN SOURCE COURSEWARE ANIMATION REPOSITORY, OSCAR⁸: Another interesting effort by Dr Sridhar Iyer of IIT-B is an opensource animation project with a repository for schools and could be extended to college level too. It is Java-based, and its utility lies in its design to be collaborative.

Self-description and appeal. Its site says: "The main goal of Project OSCAR (Open Source Courseware Animations Repository) is to create a repository of web-based, interactive animations for teaching various concepts and technologies. The current goal of project OSCAR is to develop animations for Classes VIII, IX and X. You can participate in this endeavour by registering as a Developer with Project OSCAR. This can also help in enhancing your technical knowledge."

Resource currently available link to biology, mathematics, mechanism simulation, networking, physics and chemistry.

OTHER INITIATIVES: PRAJNA⁹ FROM BANGALORE: Prem Kumar Aparanji of Bangalore has been involved with using FOSS for nearly 9-10 years now, and recently launched Pragnya.

Says he: "The very first hurdle for me is to figure out the voice of the customer, the schools and the children. If anybody has experience of helping

- 8 <http://oscar.iitb.ac.in>
- 9 <http://scorpfromhell.blogspot.com/2007/08/praja-cognizant-floss-corps.html>

out schools and colleges, pls do let me know about it. He has garnered support from "many members from within Cognizant as well as a couple more from college students who will be joining us." He said he got good support from the Kolkata and Bangalore user-groups.

INDIANISATION OF SOFTWARE

For software to be widely utilised in India, it obviously needs to be workable in Indian languages. The same applies for other regions of South Asia.

Currently, the Indian language-enabled software includes OpenOffice.org, Yudit with the Gargi font, GIS (see osgeo.org) which all are tools from the Free/Libre and Open Source world.

Apart from these, another tool of Indianised software is indictrans.in (for applications of FOSS), and GIS for Indian data localised applications¹

Says FOSS campaigner and engineering educator Jitendra Sha², who is based in Maharashtra: "I have been recently trying to canvass for FOSS in education with the government authorities. I do find a positive response."

He suggests the need for more information about FOSS in schools, with better annotation, in a tabulated form, mentioning limitations and perhaps other details may be even more useful."

See the [Indictrans website](http://indictrans.in)³ for links to some work undertaken. Efforts of localisation of software is to be found here:

- Open Office in Marathi/Hindi⁴
- Yudit ... in Indian languages⁵

1 See <http://www.indictrans.in>

2 jituviju@gmail.com, via a personal email communication.

3 <http://www.indictrans.in/>

4 <http://www.youtube.com/watch?v=QotezW4-AZU>

5 <http://www.youtube.com/watch?v=N-tqz6yCSFY>

- Opensource GIS application for Pimpri Chinchwad municipal corporation - PCMGISDA⁶
- Drgeo software ... localised in India⁷ This is an intuitive geometry learning environment where not only can a student create constructins but even create small programs (macros) to explore deeper intuitions in geometry. Created by www.OFSET.org , [indictrans](http://indictrans.in) has localised the same in Hindi, Marathi and Gujarati

- blender3d: this is a powerful 3-d animation package capable of making animation movies of professional calibre. This has been localised partially as proof of concept.

- Bio workbench⁸: A bunch of FOSS programs supported by US Government funding for bio and chemistry modelling and exploration. see

Other local-language tools available include drgeo in Marathi, Gujarati and Hindi on [indictrans](http://indictrans.in); Blender in Marathi; localised maps for Maharashtra with schoolGIS for search of schools, school report cards, for rural info system; bio workbench⁹

Educational links on [Indictrans](http://indictrans.in) are also available to applications¹⁰, articles¹¹, CBSE lessons¹² and environment¹³.

NETLOGO and geogebra are not FOSS, but their applications are. Gargi font is the first FOSS opentype Devanagari free font supported by HBCSE (Homi Bhabha Centre for Science Education) and

6 <http://www.youtube.com/watch?v=-9oKhJl0-TU>

7 <http://www.youtube.com/watch?v=S-J5NFuiG8E>

8 <http://www.vigyaancd.org>

9 <http://www.vigyaancd.org>

10 <http://www.indictrans.in/eduapplications>

11 <http://www.indictrans.in/articles>

12 <http://www.indictrans.in/cbselessons>

13 <http://www.indictrans.in/environment>

maintained by indictrans.in GIS: see osgeo.org , for software all FOSSGIS in general and see www.indictrans.in for applications of FOSSGIS for Indian data

INDIAN DISTRO, SUITABLE FOR SCHOOLS TOO: A committee of experts decided to have an Indian distribution of GNU/Linux so that the language used for the desktop environment and some of the applications can be in the Indian language. This, it was felt, would enable the mainly non-English literate users in the country to be exposed to ICT and to use the computer more effectively. Such attempts, once implemented, could also have implications to large number of non-English language schools.¹

STUDENTS' PARTICIPATION

The potential of FOSS and schools is also showing up in another area -- with young students themselves getting involved with FOSS, sometimes as contributors too.

School and higher-secondary students have also been attending national-level conferences, like FOSS.in, and making a contribution to the growth of FOSS in the region. Teenager Sarath Lakshman (15) from Kerala has been credited with from developing SLYNUX², which has been described as "a highly user-friendly GNU/Linux operating system designed for beginners."

In the Foss.In 2005 annual event held in Bangalore, one of the paper presenters was the then 14-year-old Arjun Asthana.

Arjun Asthana⁴, now 16, is studying Navy Children School, New Delhi, studying in the non-medical sciences stream and was, at the time of writing, in twelfth class and preparing hard for his board exams.

Arjun's first presentation to ILUG-D

- 1 <http://bosslinux.in/> and through the irc channel #BOSS-nrcfoss at Freenode
- 2 http://www.cxotoday.com/cxo/jsp/article.jsp?article_id=3903&cat_id=913
- 3 <http://www.slynux.org/>
- 4 Eail: arjun@openlx.com

was when he was 12 years old and he gave a talk on bash shell and scripting. At Foss.In 2005 he had given a talk on how to make your own live CD distro and he was 14 years old. He has also helped his uncle, Sudhir Gandotra of OpenLX⁶ and Kalculate⁷ fame, to package the distro and accounting package in a installable live CD.

For the upcoming (at the time of writing, October 2007) FOSS.in⁸ conference in December 2007 in Bangalore, Vivek Khurana⁹ proposed a BoF (birds of the feather) session for FOSS developers "from schools and colleges i.e those who are pursuing some degree as well as working for FOSS."

Said Vivek in a posting to the FOSS.in list: "You could be coding, testing, bug fixing, managing release or whatever.... Come and talk about your project and your contribution. As I am not a student, I am not eligible for the BoF, so I request some student developer to take the role of organizing the BoF. Why I am proposing this BoF? Because I know for sure that these lazy school kids wont move by a millimeter unless someone kicks them in right place."

NEPAL, B'DESH, LANKA, PAKISTAN

Initiatives have come in from other regions of South Asia too. Some links are given below.

LOCAL LANGUAGE AND LTSP IN NEPAL SCHOOLS: NepaLinux is an initiative to create a localised GNU/Linux distribution in the Nepali language.

It started off as an attempt to find make-shift solutions for just electronically cataloguing books in the Nepali language (which has 17 million native speakers, and an estimated 40 million worldwide). But as fonts were hard to come by, and there were difficulties in sorting text (or using

- 5 <http://www.linux.com/articles/44020>
- 6 <http://www.openlx.com/>
- 7 <http://kalculate.com/>
- 8 <http://foss.in>
- 9 hiddenharmony@gmail.com

find-and-replace commands), someone saw opportunities grow out of these challenges.

Over time, this grew into campaigns for font standardisation, a Unicode initiative in Nepal ... and now it has sprouted into a Nepali GNU/Linux (free software/open source) distribution.

NepaLinux's Bal Krishna Bal has said in an interview¹ that NepaLinux is a fully-localized GNU/Linux distribution in Nepali.

He said: "We now collaborate with people or groups outside of the team on various fronts. For instance, a group of volunteers had implemented and setup in a school the LTSP (Linux Terminal Server Project, is an add-on package that allows many people to simultaneously use the same computer, by having applications run on a server with multiple terminals, or thin clients, handling input and output). This is based on Fedora. We have now enabled the LTSP setup in NepaLinux, based on feedback."

Said he: "We have already provided the LTSP setup (including the hardware) to three schools in remote locations. With help of the Nepal Telecom Authority, we will provide similar support in 25 more schools by next year."

Said Bal: "Users would use whatever they think will serve them best. We just have to make sure that the solution that we provide is as good (both technically as well as aesthetically) as any other."²

AWARENESS IN NEPALI SCHOOLS: From November 28, 2006 to March 27, 2007, a Free and Open Source Awareness Campaign in Schools was held in Nepal.

The project was taken up by the National Information Technology Centre (NITC), the Ministry of Environment, Science and Technology (MOEST), and the Nepal Government at Singh Durbar in

¹ <http://www.apc.org/english/news/index.shtm?x=5241651>

² (Based on an interview by FN, published earlier on apc.org)

Kathmandu³. It was executed by the Association of Computer Engineers Nepal (AECN) www.acen.org.np of Kathmandu. See its report at <http://fossinnepalschools.notlong.com>

Other reports come in from different, if smaller, initiatives in Nepal. Recently GNU/Linux was installed in the Brihaspati School⁴.

HIRING SQUEAK HACKERS: In November 2007, Bryan Berry⁵ wrote via the FOSSNepal list, to say programmers were wanted to "develop children's learning activities for the One Laptop Per Child XO using Squeak Smalltalk and Etoys." More details on the blog⁶ and by running their demonstration.⁷

You can learn more about our development team members here⁸

TELECENTRES IN THE MADRASA: In Bangladesh, the school based telecenter project of RI SOL has launched internet-enabled telecenters in two madrasas (Islamic religious schools), in Khulna and Dhaka.

See Khulna Alia Madrasa Advocates for an Inclusive Information Society on World Information Society Day Link to the news story and photos of the celebration⁹ Source: Nazrul Islam¹⁰

TELECENTRES ON FOSS: Russel John¹¹ who worked for Relief International Schools Online (RI-SOL Bangladesh) in 2005-2006, and says: "In those two years we've used FOSS on all the Windows systems on our

³ <http://www.nitc.gov.np>

⁴ http://wiki.fossnepal.org/index.php?title=Install_Fest_40_Brihaspati_Vidya_Sadan%2C_Naxal

⁵ Brian Berry bryan.berry@gmail.com wrote in as external relations manager of Open Learning Exchange of Nepal

<http://nepal.ole.org>

⁶ <http://nepal.ole.org/home/?q=blog/feed>

⁷ <http://nepal.ole.org/home/?q=node/73>

⁸ <http://nepal.ole.org/home/?q=node/71>

⁹ <http://www.connect-bangladesh.org/content/view/418/101/>

¹⁰ nazrul07@gmail.com

¹¹ russell@ekushey.com, personal correspondence Oct 24, 2007.

telecenters. Five of the telecenters ran exclusively on Linux (Fedora, Mandriva and Ubuntu), and we also organised several week long training programs on Linux for school teachers and trainers as well."

Says John: "The reason we couldn't migrate to Linux on all the centers (which was in fact very painful for me) was because the grant that we got from US State Department had a contribution from Microsoft and they required us to use Windows on a certain percentage of the computers."

See the comment by Jack Welch, of RI-SOL ¹

SRI LANKA: In Sri Lanka, reports from the region suggest they currently do not have widescale projects of the nature cited elsewhere in this paper, "although we have several small successful/unsuccessful initiatives," according to Dr Shahani Markus Weerawarana². Dr Weerawarana, who is chief technology officer of the ICT Agency of Sri Lanka said the ICT Agency is "currently in the process of collaborating with the Ministry of Education and I am actively seeking to [inform] the policy makers on what is happening around the world regarding FOSS in schools."

IN PAKISTAN, SOME INITIATIVES: Sufyan Kakakhel³ points to work being done by the OLPC (One Laptop Per Child) initiative. Says he:

- OLPC Inc. (One Laptop Per Child project of the MIT) has the office of Director Education for Asia Region in Islamabad. The OLPC Inc. is in contact with the Ministry of IT and hope to launch the Linux-based laptop in a pilot project shortly.

¹ <http://www.iosn.net/south-asia/countries/bangladesh/testimonials/jackwelch/>

² Email correspondence, dated October 28, 2007, from [Shahani Markus Weerawarana](mailto:shahani.markus.weerawarana@gmail.com) <shahani.w@gmail.com>

³ sufyan.kakakhel@gmail.com, personal mail, October 18, 2007.

OLPC Pakistan⁴ is a not-for-profit that has as its mission "to create an environment for OLPC, take necessary steps to ensure every child in Pakistan get the laptops and develop the local activities for [OLPC](#) laptops that could revolutionize how we educate the children." It adds: "Our goal is to provide every children of Pakistan with new opportunities to explore, experiment, and express themselves."

The One Laptop Per Child association (OLPC)⁵ is a non-profit, created by faculty members of the [MIT Media Lab](#), set up to oversee The Children's Machine project and the construction of the [XO-1](#) "\$100 laptop". Both the project and the organization were announced at the [World Economic Forum](#) in [Davos, Switzerland](#) in January the 2005. According to the home page of the project's wiki at laptop.org, 'OLPC espouses five core principles: (1) child ownership; (2) low ages; (3) saturation; (4) connection; and (5) free and open source.'⁶

Dr. Habib Khan EdD Harvard Director of Education, of OLPC Inc. Central & South Asia at Islamabad has said that "OLPC is targeting kids (6-12 years) around the world so it comes in many different languages. The one we'll be using in Pakistan is bi-lingual, English and Urdu. Apparently the English version is quite comprehensive but we need to put in lots of efforts to make it usable by children with no English back ground. Focus on Urdu is our priority. Please keep in mind that OLPC is not replacement of the current school curriculum. It only supports the way children learn how to learn."

Pakistan sees as its tasks as being:

- To prepare OLPCs material in Urdu for use in Pakistani environment. This means we need to develop e-books, spoken books, e-toys, and educational materials for children.

⁴ <http://wiki.laptop.org/go/PAKISTAN>

⁵ See <http://www.laptop.org> and <http://wiki.laptop.org/go/Educators>

⁶ [http://en.wikipedia.org/wiki/\\$100_laptop](http://en.wikipedia.org/wiki/$100_laptop)

⁷ <http://wiki.laptop.org/go/PAKISTAN>

- Since the child will own OLPC and will carry it home -- it must have stuff of interest to the child parents. It may include but not limit it to family health hygiene, inoculations and its schedule; seasonal diseases like dengue fever and protective measures; bird flue; environment, energy, and clean water etc.
- The village folks may want information on plant protection, production crops rotation, plantation, water conservation, fertilizers, storage, and marketing.
- The community as a whole wants to learn about local government, democratic processes, elections at Union and Tehsil levels etc.
- Also we need to develop academic material to meet needs of our teachers for example: professional development of teachers using OLPC with emphasis on pedagogy and constructionists; How to teach Science, Math, English; and Role of teachers in OLPC laced teaching-learning environment.

Pakistan has sought help from those who "have the passion to work for the children of Pakistan, and have the guts to accept this challenge" and could work from any part of the globe, keeping in touch via the internet.

GLOBAL INITIATIVES

Increasingly, South Asia too is showing its eagerness to learn from, and link up with, other global initiatives. Some of these have already been mentioned above in the report.

SIMPLE END-USER LINUX, SEUL: The end goal of SEUL, or Simple End-User Linux, is to have a comprehensive suite of high-quality applications (productivity applications as well as leisure/programming applications) available under the GPL for the [GNU]Linux platform, as well as a broader base of educated users around

the world who understand why free software is better.

SEUL¹ is a volunteer project currently focusing on GNU/Linux in education, GNU/Linux in science, advocacy documents, managing and coordinating communications between projects, and hosting related development projects.

It offers a mix of games and other software. Some of its projects and links highlighted recently (early December 2007) include: tactical war-game Crimson Fields²; work to produce a GPL'd suite of electronic design automation gEDA³; a periodic table for GNU/Linux called Gperiodic⁴; real-time strategy game Invasion – Battle of Survival⁵; engineering tool of listings and news for free EDA software and circuits design Open Collector⁶; a set of Python modules designed for writing games called Pygame⁷; attempts to foster a "world community in which many free games can develop" called WorldForge⁸; and links to SchoolForge, an attempt to link up independent organisations that advocate, use and develop FOSS resources in primary and secondary education⁹.

SCHOOLFORGE: SchoolForge's⁹ mission is to unify independent organizations that advocate, use, and develop open resources for education. It says: "We advocate the use of open texts and lessons, open curricula, free software and open source in education."

K12 LINUX IN SCHOOLS PROJECT¹¹: K12LTSP is based on Fedora Linux and the Linux Terminal Server Project. It's easy to install and configure. It's distributed under the GNU General Public License.

1 <http://seul.org/>

2 <http://crimson.seul.org/>

3 <http://geda.seul.org/>

4 <http://gperiodic.seul.org/>

5 <http://bos.seul.org/>

6 <http://opencollector.org/>

7 <http://www.pygame.org/>

8 <http://www.worldforge.org/>

9 <http://schoolforge.net/>

10 <http://www.schoolforge.net/>

11 http://k12ltsp.org/mediawiki/index.php/Main_Page

LINUXFORKIDS: LinuxForKids¹ was created in the Summer of 1999 to promote the use of Linux as an educational and entertainment platform for children.

This project reviews available software titles they find or are submitted by readers.

LinuxForKids then rates them based on quality and appropriateness for children.

"We set our target audience to children under the age of 10, since we believed this was the audience for which the least efforts were being made. Right now, this web site is more intended for parents and teachers looking for software. We hope to be able to make it also a destination for children. We currently have seven categories (educational math, educational spelling, educational language, games arcade, games strategy, games arts and science)," says its site.

FREE TEXTBOOKS

While this is not directly related to the world of Free/Libre and Open Source Software (FOSS), sharable educational resources are both closely influenced by FOSS ideals and also move closely along parallel tracks.

As such, free and sharable online texts offer much potential for the countries of the South, including South Asia, and deserve a closer look.

There are growing examples of "free textbooks". BookPower.org is free only to 'developing' countries. It offers "affordable, current tertiary-level textbooks for students and professionals in low-income countries".

The California Open Source Textbook Project (COSTP)³ is at opensourcetext.org and describes itself as "a collaborative, public/private undertaking ... created to address the high cost, content range, and consistent shortages of K-12 textbooks

1 <http://www.linuxforkids.org/>

2 <http://bookpower.org/>

3 <http://opensourcetext.org/>

in California."

Another project is commontext.org ("temporarily inaccessible", as of December 2007).

There is also the Free High School Science Text⁴ at the University of Cape Town. FHSST calls itself "a project that aims to provide free science and mathematics textbooks for Grades 10 to 12 science learners in South Africa" It argues that science education "is about more than learning subjects like Physics, Chemistry and Mathematics... It is about learning to think and to solve problems. These are valuable skills that can be applied through all spheres of life. Teaching these skills to young people will equip them to make a positive contribution to the future of South Africa."

OPT is the Open Textbook Project⁵ It says: "The mission of the open textbook project is to develop openly copyrighted (copylefted) textbooks using the free software development model. The books, developed collaboratively, would be freely available to download, modify, print and distribute."

Libertas Academica⁶ OA textbooks is another option, as is MedRounds Publications⁷ Next/Text⁸ has as its sub-heading the text, "What happens when textbooks go digital?" The Potto Project⁹ was created Dr. Genick Bar-Meir and friends to build free textbooks and software for college students. The Potto Project is under the open content license.

Textbook Revolution¹⁰ is a portal and collection, and sometimes labelled as the "best single site". Its self-description is: "Textbook Revolution is the web's source for free educational materials. This is a student-run, volunteer-operated website started in response to the textbook industry's

4 <http://www.fhsst.org/>

5 <http://otp.inlimine.org/>

6 <http://la-press.com/texts.htm>

7 <http://www.medrounds.org>

8 <http://www.futureofthebook.org/next/text/>

9 <http://www.potto.org/>

10 <http://textbookrevolution.org/>

constant drive to maximize profits instead of educational value.”

Wikibooks¹⁰ is linked to the Wikipedia project. Of particular interest is the Wikibooks Junior project¹¹.

Wikibooks, online since mid-2003, describes itself as: “a collection of [open-content textbooks](#) that anyone, including you, can edit right now by clicking on the *edit this page* link that appears near the top of each Wikibooks module.”

Contributors maintain the property rights to their contributions, while the [GNU Free Documentation License](#) makes sure that the submitted version and its derivative works will always remain freely distributable and reproducible.”

India-based activist and journalist Achal Prabhala³, who has also headed the Southern African Access to Learning Materials project⁴ at the Consumer Institute South Africa, has himself been working on access to textbooks issues.

Studies he has been working on recently include one over barriers to access to learning materials in primary and secondary schools in selected “developing countries”, with a focus on copyright law. Yet another was on the feasibility of an ‘open textbook policy’ for primary and secondary education textbooks, to be adopted by the South African government.

Campaigner Prabhala says⁵: “I’m not aware of any initiatives that create or distribute open access textbooks in India. One important example is the Free High School Science Texts project in South Africa⁶.” Prabhala says that while it would “be great” to have such initiatives in India, the context here is that India already has cost-

10 http://en.wikibooks.org/wiki/Wikibooks_portal

11 <http://en.wikibooks.org/wiki/Wikijunior>

3 Achal Prabhala a_prabhala@yahoo.co.uk

4 http://www.soros.org/initiatives/information/events/learningmaterials_20050124

5 Personal, email correspondence.

6 <http://www.fhsst.org/>

effective textbooks at the primary and secondary school level in general.

“This is in part because government mandated curricula (state syllabi and CBSE⁷ or the Central Board of Secondary Education) do have a role in regulating the price of their learning materials. But also, importantly, all textbooks funded by the state (centre or regional) are technically open access⁸,” Prabhala argues.

He notes that the Karnataka textbooks are online and freely downloadable or republishable because the Azim Premji Foundation⁹ is working with the state education department.

(There have also been other reports¹⁰ about downloadable textbooks.)

“So while in theory all government textbooks are open access (though not necessarily licensed that way with initiatives like the Creative Commons¹¹ or the like, they just state it) -- not all States, nor the Centre, have all their books up online,” Prabhala notes.

Technically, this also means that multiple publishers, could in theory, put out their own versions of the books, at different prices, with different embellishments such as diagrams. “But I am fairly certain that since the procurement process is complex and bureaucratic, this not the case in real life,” adds Prabhala in an email interview.

GLOBAL: EDUCATION, FREE CONTENT

Other initiatives are also getting noticed here. For instance:

CURRIKI: Curriki¹² is an online

7 <http://www.cbse.nic.in/>

8 NCERT books download:

<http://www.ncert.nic.in/textbooks/testing/Index.htm>

Kerala textbook download:

<http://mission.akshaya.net/dpi/>

9 <http://www.azimpremjifoundation.org/>

10 <http://www.hindu.com/edu/2006/05/29/stories/2006052900180400.htm>

11 <http://creativecommons.org/>

12 <http://www.curriki.org>

environment created to support the "development and free distribution of world-class educational materials to anyone who needs them."

Its name is a play on the combination of 'curriculum' and 'wiki' which is the technology the project is using to make education universally accessible.

Curriki's mission is to improve education around the world by empowering teachers, students and parents with user-created, open source curricula, and it's all free. Say its promoters: "We believe that access to knowledge and learning tools is a basic right of every child. Our goal is to make curricula and learning resources available to everyone."

LIBRE.ORG: From South Africa comes the Libre.org¹ initiative. It is a documentation center about Free Knowledge, Free Software and Free Standards. In particular, see its Libre Communities². It says: "*Libre Knowledge* is knowledge released in such a way that users are free to read, listen to, watch, or otherwise experience it; to learn from or with it; to copy, adapt and use it for any purpose; and to share derived works similarly (as free knowledge) for the benefit of the community. "

"Say 'Libre' for Knowledge and Learning Resources"³ is a response to discussions among members of the Open Educational Resources (OER) movement about whether to describe learning resources as "free", "libre" or "open".

This essay clarifies the position of the "libre" camp and outlines the rationale for referring to knowledge and learning resources as "libre" or "free" rather than "open".

FREE AS IN EDUCATION: Free as in Education: Significance of FLOSS for the Developing Countries A study looking at Free/Libre and Open Source Software in the planet's largest

1 <http://www.libre.org/>

2 <http://communities.libre.org/>

3 <http://communities.libre.org/philosophy/saylibre>

continent. Written around November 2002 and May 2003. See the main overall report⁴ and regional reports on Asia⁵, Africa⁶ and Latin America⁷.

LMS, CALLED AVOIR: There is an Open Source Learning Management System developed by AVOIR⁸ for universities, but it could also be used by schools.

AVOIR is an initiative of the University of Western Cape, now further jointly extended by 13 other universities in the Third World. Recently, the Shuttleworth Foundation in South Africa has launched an initiative using FOSS for collaborative teaching content

FLOSS4EDU, FROM AFRICA: The FLOSS4Edu project looks at challenges such as:

- The absence of Free content in African Schools
- The lack of skills and knowledge to use FLOSS technologies and
- Difficulties in accessing FLOSS resources, given the high cost of bandwidth and shortage of FLOSS distribution channels.

FLOSS4Edu says it "is particularly interested in the power of social software for education in Africa and how wiki technologies can contribute to the development of free content by Africans for Africa." It seeks to create the "largest community of educational practitioners in Africa participating in the development of Open Educational Resources (OER's). It also seeks to have an inclusive process of involving everyone willing to participate in content development including teachers, students, professionals, experts and all."

4 <http://oneworld.net/filemanager/download/1255/>

5 <http://oneworld.net/filemanager/download/1253/>

6 <http://oneworld.net/filemanager/download/1252/>

7 <http://oneworld.net/filemanager/download/1254/>

8 <http://avoir.uwc.ac.za>

9 <http://www.shuttleworthfoundation.org/newsletters/TSF10.htm>

FSF-LISTED INITIATIVES: Free Software Foundation lists¹ some "groups and projects that are working with Free Software and Education." It promotes awareness of this link through education@gnu.org and lists:

Free Learning Resources is about bringing the principles of free software to educational materials and otherwise general knowledge.

- Debian Jr., promotes the creation of a distribution of free software appropriate for kids.
- DebianEdu, a related project, to create a distribution suitable for installation in school networks. It is now integrating Skolelinux, so may become the Free Software in Education group's preferred distribution.
- Gleducar², a GNU at education Argentinian project.
- OFSET, The Organization for Free Software in Education and Teaching, promotes the use of free software in education. Take a look at [Freeduc-cd](#), a live-cd for education setup by Ofset.

COLLABORATION IN THE CLASSROOM:

Education, collaboration and co-operation marry and merge in the Argentinian classroom, through an innovative volunteer-driven project called GLEducar³.

GLEducar takes ICTs (information and communication technologies) to school. But its goal is more than just placing computers in the classroom. This project wants to change the way educational content is produced, built and shared. No less. And of course it's all put together using Free Software, or Software Libre, as it is called in Latin America.

GLEducar harnesses teachers, students and mentors. It promotes what it calls

1 <http://www.gnu.org/education/education.html>

2 <http://www.apc.org/english/news/index.shtml?x=5245948>

3 http://wiki.gleducar.org.ar/wiki/Comisi%C3%B3n_Directiva_de_Gleducar

C3 (Construccion Cooperativa de Conocimiento, or Co-operative Knowledge Construction). It works through the internet, by developing content, and deploying educational software.

Fundamental parts of the project are 'GLEducar-School' and 'GLEducar-Web'. Its five "fundamental pillars" are

- building knowledge cooperatively
- recycling and optimising the use of hardware
- using free and legally-sharable software
- deploying computer science to serve curricular spaces
- and continuous upgradation and skill improvement.

Gleducar Civil Association secretary Daniel Osvaldo Cardaci⁴ says: "The main challenge is scale. We have been very successful in our localized work, but it is very difficult for a small organization like ours to achieve an impact at a national level in such a huge country like Argentina [2.7 million sq km, population 40 million]."

Another challenge Cardaci spoke about is what he called "the fact that our educational system is very vulnerable to lobbying by multinational corporations. This means that any work the teachers do in C3, they must do *despite* the fact that the education authorities just fall short of actively discouraging it."

This project has no permanent staff, all of the work is on a volunteer basis. Replicating the project "is not just possible, it's encouraged". Says Cardaci: "We want to reach many schools in an intensive way, through which we can work with authorities, teachers and students to lay the foundation for change in such a way that C3 becomes the natural way of doing things. Once we have helped a school do this, they are asked to pay their way forward, replicating the experience together with another school in their area."

SLEC, COLOMBIA: Software Libre y

4 Daniel@gleducar.org.ar

Educacion en Colombia (SLEC, Free Software and Education in Colombia) aims at

- sharing experiences regarding the use of free software in educational institutions in Colombia
- promoting the use of free software in educational institutions of Colombia and
- promoting the utilization of GNU/Linux in educational institutions of Colombia.

INITIATIVES FROM CAMBODIA: While Cambodia lies beyond the South Asian region, the work undertaken there is of interest here because of the parallels in the challenges and the interesting approach this country of 14 million has taken. Perhaps, it also has lessons for South Asia too.

Links from Cambodia:

Open Institute
<http://www.open.org.kh>
Open Schools Program:
<http://www.open.org.kh/osp>
Khmeros:
<http://www.khmeros.info>.

Javier SOLA² of the Open Institute³ from Cambodia says their group has

centered most of the resources of KhmerOS⁴ on education.

Says Sola⁵: "We have signed a contract with the Ministry of Education to develop a Master Plan for ICT in Education, which will be all based on Open Source. Meanwhile we have been training the upper secondary school ICT teachers, as well as all the teacher trainers. The result is that now in October (2007) we start teaching FOSS tools on the Windows platform in all schools in Cambodia that have computers (we calculate about 30,000 students), as well as in all the teacher training centers (5,600 teachers). MS Office is no longer taught."

1 <http://archives.seul.org/seul/edu/Jul-2000/msg00076.html>

2 javier@khmeros.info

3 <http://www.open.org.kh>

4 <http://www.khmeros.info>

5 Personal email correspondence, October 4, 2007.

Initiatives have been taken on other fronts too. Sola adds: "We have prepared a specific textbook for ICT in schools (350 pages), and will print and distribute to all teacher trainees and the schools. We are teaching only localized versions of basic applications for the moment (OpenOffice, browsing, e-mail), but the plan that we are doing now is for improving quality of education using ICT, and involves use of multimedia and Open and Distance Learning (ODL)."

He says: "We have also localized Moodle, and we are developing ODL know-how. We already have supportive policy in place. I just finished a proposal to write the Master Plan. The proposal not only writes the document, but it is a very ambitious project to prepare everything that will be needed to put it in place. It has extensive research on curricula... and most important, on the technology that we will put in place, as this is the key for us."

In addition, he said, they can only use low-power-consumption computers.

"They use less than 15% electricity of a normal computer, are cheaper and easier to maintain. As [GNU]Linux will not increase substantially its resource consumption in the coming years, these machines, which will most probably not be prepared to run Vista, run quite well SuSE and other Linux distros, as well as XP. The obsolescence cycle will be very long if they run FOSS. What has made all this possible is the fact that FOSS is the only localized software, and we have put in place tools like spell-checkers for Khmer," added Sola.

Their site⁶ is "still being built when I have time".

AFRICA-A STUDY: Philipp Schmidt⁷ has done a study on FOSS (and proprietary software) in schools in South Africa, Uganda, and Namibia⁸.

6 <http://www.open.org.kh/en/osp>

7 phi.schmidt@gmail.com

8 Comparison Study of Free/Open Source and Proprietary Software in an African Context. Implementation and Policy-Making to Optimise Public-Access to ICTs, bridges.org

Said the study:

While the study was designed to produce results that would be as broadly applicable as possible to a wide array of countries and settings, practical limitations required a focus on a few representative countries: Namibia, South Africa, and Uganda were selected. These three countries offer a diverse environment in terms of awareness levels, the interest and involvement of the private sector and civil society, and the positions governments are taking.

Namibia has more FOSS computer labs in schools than any other African country, yet the Government is involved in a strategic public-private partnership with a multinational proprietary software vendor. The South Africa Government has developed one of the few official government policies regarding software choices and many Government officials have expressed their support for FOSS. At the same time, the President has accepted one of the most comprehensive proprietary software donations to schools in the world. In Uganda, the Government has not developed a clear position on the issue of software choices, but is conducting a teacher training programme that is based on proprietary software applications; there are some strong supporters of FOSS in academia and among smaller ICT businesses, but the industry as a whole is dominated by proprietary software companies.

The majority of the computer labs visited in this study have only the minimum infrastructure and equipment necessary to make the operation of computers possible. The size of labs varies widely depending on their economic

situation and the source of donations; some of the more affluent labs have 30 or 40 new computers, while poor labs may only have two or three PCs, which are often second-hand or refurbished. Most computer labs have at least a minimum level of security and furniture, because many donors require these kinds of basic provisions to be met before they will donate computers to a school. It is rare to find air conditioning or even fans being used to cool the labs, and sometimes a heavy price is paid for not sealing the room against heat and dust. In addition, poor electric and telecommunications infrastructure is a problem, especially outside of the main towns where frequent electricity failures and unreliable telephone lines are common.

CONCLUSIONS

In the text above, one is presented with more than just hints of the varied and many possibilities that FOSS opens up for schools in South Asia.

There is clearly a profusion of tools available, which needs to be adequately exploited. As of now, however, the lack of easy-to-access FOSS skills could cause a setback in the spread of Free/Libre and Open Source Software in South Asia. The lack of widespread awareness of these tools among educators, and importantly even those drafting the curricula, remains a matter for concern. Steps taken in this regard could go a long way in building a firm basis for the spread of FOSS, in schools and beyond.

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Software, schools can: * Save money on their classroom and back-office programs * Use programs that can be freely-copied and shared with students * Customize programs for specific needs * Provide teachers and students with an introduction to the world of collaborative software building This site was started after the significant positive response to Free and Open Source software by educators at the National Educational Computing Conference (NECC) held in July, 2006, in San Diego.
<http://www.k12opensource.com>

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- Games: Tux Games
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<http://www.linuxgames.com/>
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<http://www.freeciv.org/>; Warzone 2100
<http://wz2100.net/>; and first person shoot 'em ups like America's Army
<http://www.americasarmy.com/>; Saurbraten (Cube 2)
<http://sauerbraten.org/>; Nexuiz
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<http://www.linuxforkids.org/>
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<http://www.ofset.org/freeduc-cd/>
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- and find a place where to contribute or to find informations. Another aim is to be a central point for tools and initiatives around OpenOffice.org the product and the sources that can be shared by our international community and where students of any level can find a place to participate easily.
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 - The Family Guide to Digital Freedom. Explains what everybody should know about software and other digital technologies, and why they should care. The website associated to the book, <http://digifreedom.net>, is now open to visitors: besides sample chapters of the book it will also host related news, links to existing resources for new users of Free Software and a database of Digitally Free Schools. See <http://digifreedom.net/node/73>
 - The Linux for School project: Developing a custom distribution based on Debian for Norwegian, Danish and Swedish schools.
<http://www.skolelinux.org/>
 - The Offset Collaborative Portal
http://community.offset.org/index.php/Main_Page
 - "The penguin goes to school: Linux to debut in Goa classrooms".Infochangeindia.org

http://www.infochangeindia.org/ItandHistory.jsp?recordno=452§ion_idv=9

- The teacher's Cd Toolbox is a CD-ROM/DVD-ROM with plenty of free softwares interesting for teacher's ... and others. The DVD-ROM is available for Windows and Linux. Such software can be installed and distributed freely and it's legal. The installation can be done through an easy to use interface.
<http://gbr.cdprof.com/>
- Though not necessarily software-related, and global in perspective, the p2p Foundation website has some relevant and useful tools in its education category.
<http://www.p2pfoundation.net/Category:Education>
- TUX&GNU@school newsletter:
<http://www.unormal.org/alis/tagat-school1.en.html> (few more subsequent issues too)
- tuXlab: An Open Source School Computer Centre Programme. Another one of the Shuttleworth Foundation's numerous philanthropic programmes, the tuXlab project aims to address the issue of open source adoption right at the grass root level. Linux For You magazine, July 2006 issue.
- Using Linux With Kids, From 3 to 7, an introduction
http://www.fraw.org.uk/download/cltc/cltc_pb-02.html
- When Free Software ideas spreads to education... see the first link
<http://tech.groups.yahoo.com/group/ilug-goa/message/13234>
- When Schools Go Open. (Teachers of Kulachi Hansraj Model School, New Delhi, have been introduced to open source solutions by CII-Shiksha.) Linux For You, May 2007 issue. Page 46 onwards.

- "Why give precedence to free software at school?", by Jean Peyratout.
<http://www.fsfeurope.org/projects/education/argumentation.en.html>
- Why should open source software be used in schools? <http://edge-op.org/grouch/schools.html>

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