Open Source Software in Schools

Achieving practical benefits in ICT and Education

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Open Source Consortium

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Free and Open Source Software offers clear benefits for education :
cutting costs, delivering sustainability and promoting social inclusion and participative learning.
Low cost, simple changes will allow schools to choose the software that's right for them,
proprietary or open source, on a level playing field.

What is Free and Open Source Software?

The vast majority of computer software used in schools today is proprietary software. Schools buy a licence to use an application in certain ways (for example, on a specific computer). Open Source is a different way of creating computer software. You can legally use it without paying a licence fee. You can install applications on as many computers as you like and give (or sell) them to other people, completely legally. You can modify the software yourself to fix problems or add new features (or find a programmer to do it for you) , which is neither technically possible nor legal with proprietary software".

Around the world, Free and Open Source Software is taking hold. Nearly every large company is using it (some, such as Google and Amazon, are built on it). Virtually all major software companies have an Open Source strategy and many, including IBM, Novell and Oracle, are both using and making money from it. Governments in countries as diverse as Germany, Spain, Brazil and China are major users of Open Source and a host of new companies in the UK and abroad are building successful and profitable businesses around it.

Using Open Source Software

A piece of Open Source Software is either an operating system or an application. For example, Windows and Mac OS X are proprietary operating systems; Linux is an open source operating system. Microsoft Word and Internet Explorer are proprietary applications, OpenOffice.org Writer and Firefox are open source applications. Writer and Firefox provide comparable functionality with Microsoft Word and Internet Explorer, respectively.

You can have a mixture of Open Source and non-Open Source applications on a computer, and you can swap documents with other people who aren't using OSS. For example, the office suite OpenOffice.org will run on your Windows PC or Mac and will read and write both Microsoft Office and Open Document format files. You can happily use OpenOffice.org and send files to your friends and colleagues with Microsoft Office. You can even have OpenOffice.org and MS Office on your PC at the same time and use whichever you prefer.

What Open Source Software exists

Tens of thousands of Open Source applications exist today. These include the normally invisible applications that hold the Internet together, web applications such as Apache (the web server on which over two thirds of the world's websites run), Virtual Learning Environments such as Moodle (which has 100,000 users in 150 countries), email servers, operating systems and desktop applications such as Firefox (a web browser), OpenOffice.org (an office suite), Thunderbird (an email client), The Gimp (a photo-manipulation package), Blender (a 3D graphics package) and many, many more.

One of the great things about Open Source is that, if an application doesn't do quite what is needed, getting it modified is normally relatively easy and cheap (certainly in comparison to procuring a new proprietary application).

How schools can benefit from Open Source Software

Participative technological learning

The "Learning Through Participation" paradigm is inherent to the Open Source development method - Open Source communities already support personalised learning; it's nothing new to those that take part, young or old. Students can participate in creating, enhancing and promoting software (for example graphics design, programming, writing documentation and marketing). Open Source communities are typically international and frequently include both commercial and volunteer members, so the opportunities offered to students are immense: to participate in an international community working towards a common goal and be part of a team that creates something genuinely valuable and useful.

The definition of a good citizen in an Open Source Community is someone that gives as well as takes from the community. The benefit to the community is summed up by the phrase "Give a brick, get a house". Open Source communities are examples of international, participative, social enterprise in action enabled by the Internet.

Open standards enabling integration

The e-strategy "Harnessing Technology: Transforming learning and children's services" calls for an integrated on-line information service for all citizens and integrated on-line personal support for children and learners.

Integration can be achieved in two ways. One is a software monoculture where everyone is forced to use particular software because it is the combination that works together. That route ties citizens and government into particular vendors, offering poor value for money.

The other is to promote, perhaps even enforce, open standards. Active support for fully open standards improves the chances that the fundamental infrastructure is freely accessible by anyone from anywhere. Active support for Open Source and open standards enhance each other, enabling basic access without having to pay for software licences; allowing more of the financially disenfranchised to participate and is therefore fundamentally important to sustained social inclusion.

Wider support options

Open Source Software offers a range of support options from which schools can pick or mix-and-match to meet their needs and budgets.

- Companies across the UK offer commercial support, with many supporting schools today.
- Money saved on software licences can instead be spent on technicians, with schools employing more (or higher paid) technical staff.
- Strong international communities, typically including the software authors, can provide effective support, especially when combined with a competent technician within the school.

Unlike proprietary software, schools are not forced down any one route, nor are they locked into the choice they make first.

Environmental sustainability

The manufacture of a typical PC and monitor uses around 240kg of fossil fuels, 22kg of chemicals and 1500kg of water. Most modern PCs have a life of around six years, but most organisations aim to replace them every three years. Why? One reason is that new software needs faster computers to run on. We could probably continue using older software, but it isn't supported any more (so no security patches) and might lack some useful features.

Open Source Software doesn't force people to upgrade and, because profits are not generated from software licensing, has enabled the creation of modern, supported software than runs on older and slower computers.

Bridging the digital divide

The licensing model of Open Source Software allows software to be installed on any number of computers, and encourages software that runs on older, slower computers.

- Schools can provide software for students to install legally at home.
- For students without computers at home, schools have the option to provide older, perhaps refurbished, computers.
- With FAST (the Federation Against Software Theft) stating that schools will be targeted to ensure licence compliance, Open Source makes compliance much simpler.

Preparing students for work

No one knows which software applications students will be using when they enter employment. Even if the applications are the same as today, they will look very different (just as the new Microsoft Word 12 looks very different from Word 95). With Open Source Software, students need not be trained in using an application from one vendor (any vendor can build a business around any Open Source application, as IBM has done with Linux and Apache).

Where beneficial, students can easily be taught how to perform the same function in more than one application, without excessive cost.

Example Teachers might choose to have students perform the same task in two different word processor applications to enhance teaching the principles behind word processing, rather than the mechanics of using a particular version of a particular piece of word processing software; giving students the skills to work with whatever application they might come across when they do start work.

It assists the teaching that there is more than one way of performing any given task; that different software applications may be appropriate in different circumstances and can even encourage students to consider as-yet-undeveloped alternatives. What better preparation could there be for the users and creators of tomorrow's software and the builders of tomorrow's successful companies?

Saving money by avoiding lock-in

Open standards permit software written by different groups to work together correctly. For example, a website designed to comply with the relevant standards can be viewed perfectly on any compliant web browser. Outside computer software, the imperial and metric systems are examples of open standards, that allow us to use products from different manufacturers, knowing they fit together correctly.

Proprietary and open source applications can, and frequently do, adhere to open standards, but this is not always the case. Many educational applications run only on Microsoft Windows, locking schools in to one platform. Other applications used closed standards to save files or communicate, making it difficult or expensive for competitors to create software that works with them. The effect is to drive up prices and skew the market.

Example A school purchases a closed specification application for £100 per computer. Later, the school needs a second piece of software which has to exchange data with that application. There are two choices, one costing £1,000 and the other costing £10,000. Both are functionally similar and would do the job, but only the more expensive option can talk to the £100 application. That low cost application is now installed on hundreds of PCs, with thousands of files stored in its closed format and replacing it would cost far more than £9,000, so the school is locked in and paying dearly for it. The company selling the second application can charge as much as it likes; as long as the cost of migrating away from the £100 application is higher, it still makes sense for the school to buy it.

Practical proposals for exploiting Open Source Software

Learn more about Open Source Software in practice

Develop strategies to try out Open Source without undue cost or posing any risk to existing systems (organisations such as the Open Source Consortium and SchoolForge UK can assist with this).

For example :

- Install the Firefox web browser and OpenOffice.org office suite alongside Internet Explorer and Microsoft Office. They won't interfere with each other, and they provide an easy way to try out the Open Source alternatives.
- Set up a school cyber-café using thin clients connecting to a Linux server : lower cost, cheaper and easier to manage and gives staff and students the opportunity to try Open Source applications in a ring-fenced environment.

Get educational benefits from Open Source

Projects involving Open Source Software can provide practical educational outcomes, for example to fulfil "Enterprise and Work-Related Learning" activities. One route is for students to help with testing, marketing, improving and documenting open source software, engaging in collaborative projects with students in other schools and software creators around the world.

Invest in the development of Open Source Software

Most UK schools have requirements to develop or enhance their IT systems to meet particular needs. Very few schools possess the in-house expertise or financial resources to meet these requirements themselves, and they rely instead upon the proprietary software vendors to understand and meet these needs (or not).

Open Source Software provides a proven framework for collaborative effort, which could enable several schools to work together to meet a common IT requirement. An example might be to provide special features for monitoring pupils' behaviour, to meet the requirements of HM Young Offender institutions.

The Open Source Software solution would be for a group of schools to hire a programmer to develop an existing Open Source Software project, or else produce new software to meet a jointly developed specification.

Demand open standards

Many UK schools are "locked in" to a single software supplier, with an ongoing and expensive cycle of hardware and software upgrades. The only practical way to break this cycle is to insist wherever possible on software that supports open standards, thereby ensuring interoperation with other manufacturers' products that support the same standards.

Examples of open standards are:

- ISO23600 - OpenDocument Format for storing various types of office files (word processing, spreadsheets, presentations, etc.)
- PDF - Portable Document Format - designed for storing print documents
- W3C - Standards for publishing web pages. Many educational web sites can only be viewed in Microsoft's Internet Explorer, so they can't be used on Macintosh or Linux workstations.

For more information, contact the Open Source Consortium, www.opensourceconsortium.org.
