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open-source software in school libraries

I do not see how we can afford to purchase, support, and maintain our technology program. I would like to be optimistic, but look at what is happening to budgets everywhere. We were hoping for an increase in per-student dollars this year, but instead, they have eliminated the software funding entirely. Grants and initiatives have helped our schools get where we are today, but I do not think that we can sustain the program we have built.

Does this scenario sound at all familiar? How much are you spending on computer software? Many schools are examining the fees that they spend yearly to purchase commercial software. Most are finding that they are spending a huge amount of money every year on proprietary software and operating system upgrades. Some are limiting the purchase of specialty software and confining licensing to a core software group. Ever-present budget concerns are leading administrators and decision-makers to look for ways to lessen software costs while at the same time attempting to meet varied classroom and curricular demands.

The purchase of proprietary software provides a license to use but does not allow you to adapt the source code to meet varied needs. The end-user license agreement also narrowly defines how the software is to be used and allows for stiff penalties to be assessed for violations. In addition, you can use the program on only a specific number of computers.

With constantly shrinking budgets and the many restrictions of proprietary software, many teacher-librarians are looking for alternatives, namely, open-source software.

WHAT IS OPEN-SOURCE SOFTWARE?

Open-source software is developed and improved by its own community of programmer users. But in direct contrast to commercial software programmers, these developers are not competing for market share, nor are they interested in restricting their product's use. They are willing to share the results of their efforts with any interested persons. The source code for these programs is openly shared; no single person or company holds exclusive rights to open-source software programs. Learn more at the Open Source Initiative (www.opensource.org), the nonprofit corporation that promotes open-source software.

This free and cooperative approach has evolved into the open-source software movement. With open-source software, a general public license is often used to license the program. There is no worry about software audits, visits from the Business Software Alliance (www.bsa.org/), or fines for a misplaced certificate of authenticity (Surran, 2003).

With the general public license of open-source software, users are granted the freedom to

- run the program for any purposes,
- examine the program to see how it works,

- modify the program to improve or fit their needs, and
- release and distribute the program (including their modifications, if they wish; Wikipedia, 2006).

Open-source software is gaining acceptance around the world. According to Goldsborough (2005), there are nearly 100,000 open-source software programs available. Millions of people use the best-known open-source software product, the Linux operating system (www.linux.org), an alternative to Microsoft Windows and Mac OSX. According to Netcraft's Web server survey (2006), almost 70% of web sites are now running open-source Apache server software rather than Microsoft, Sun, or others.

WHAT ARE THE ADVANTAGES OF OPEN- SOURCE SOFTWARE?

A primary draw of open-source software is the fact that it is free. Because it costs nothing to download and use, it is immediately available. Although most educators do not change the software's coding, users have full access to source code, allowing them to adapt the program to meet local needs. For example, Moodle is an open-source software course management system that can easily be customized to contain your school's logo and colors.

Open-source software

- is free, allowing money to be used elsewhere;
- can legally be copied and shared with anyone;
- provides alternatives and flexibility to user organizations;
- is constantly being modified and improved;
- has strong technical support;
- is less vulnerable to security threats; and
- has open code so that anyone can examine and see how it works.

WHAT ARE THE CHALLENGES OF OPEN- SOURCE SOFTWARE?

In addition to advantages, challenges are also found with using open-source soft-

ware. Although most open-source software runs on both Microsoft Windows and Mac OSX, some open-source software runs only on the Linux operating environment. Other issues include the fact that

- programs may not be available to meet specialized needs;
- programs may not be as completely "packaged" as proprietary alternatives;
- open-source software may require more learn time;
- open-source software may require more skill to deploy and maintain;
- open-source software may not be compatible with some preexisting software packages; and
- most open-source developers provide only limited free support and require fees for technical support.

As you might expect, many proprietary software developers are not advocates of open-source software. Critics of open-source products contend that the software is lower quality than that of its commercial counterparts. However, just the opposite may be true. Many open-source packages are equal or superior to their costly competitors. Generally, the programs are more stable than proprietary software because any interested programmer can read, modify, and distribute the source code. There are many more eyes to see program bugs and to provide fixes.

HOW ARE SCHOOLS USING OPEN-SOURCE SOFTWARE?

Open-source software is rapidly emerging as a cost-saving means of providing high-quality technology tools for teachers and students. Schools are introducing and using open-source software in three ways: running the school's servers and furnishing schoolwide network services; providing operating systems for classroom and administrative computers; and supplying applications software in the classroom and for administrative functions (British Educational Communications and Technology Agency, 2005).

The U.K. government's school computing agency, British Educational Communications and Technology Agency (2005), reported on a study conducted in a small number of primary and secondary schools. The study found that when the schools adopted open source operating systems in their office oper-

ations, they experienced a potential budget savings of 20% to 50%, with increased reliability and performance and lowered support costs. To successfully migrate and adopt open-source software, the study advocated careful planning and support led by someone who champions the change.

But instead of totally switching to an entirely different operating system, some schools are selectively moving to a few open source programs. This partial open source commitment occurs largely in two patterns: one, through adopting some open-source software programs that run on their existing operating systems; two, through committing a number of their computers to using the Linux systems and software. Many schools are looking at their software service agreements. Instead of switching all computing to open source programs, they are choosing key areas and operations where they can give their budgets some needed wiggle room. Schools that are currently paying significant licensing fees for commercial software stand to gain the most from adopting open source programs.

WHAT OPEN-SOURCE SOFTWARE IS USEFUL IN TEACHING AND LEARNING?

It is likely that you are already using open-source software. If not, here are a few of the most common applications.

COURSE MANAGEMENT

If you would like to create online book clubs or promote collaborative writing projects, consider Moodle (<http://moodle.org/>), a popular course management system designed to help educators create effective online learning communities. Like Blackboard, it contains options for threaded discussions, forums, wikis, and many other collaborative tools.

GRAPHICS

Tux Paint (www.newbreedsoftware.com/tuxpaint/) is an easy-to-use draw program designed for young children (ages 3 and up). Software such as Blender (www.blender3d.com/cms/Home.2.0.html), for modeling and animation; Qcad (www.ribbonsoft.com/qcad.html), for computer aided 2-D drafting; the GIMP

(www.gimp.org/), for image manipulation; and ImageMagick (www.imagemagick.org/script/index.php), for creating images from scratch may be able to replace expensive imaging software.

MIND MAPPING

For brainstorming to project planning, commercial tools such as Inspiration are often used. However, alternatives are available in the open source community, such as FreeMind (http://freemind.sourceforge.net/wiki/index.php/Main_Page) and IHMC Cmap Tools (<http://cmap.ihmc.us/>).

MULTIMEDIA

Even free, Audacity (<http://audacity.sourceforge.net/>) is one of the best audio-editing programs available and is widely used by student and teacher developers to record and play sounds, import and export computer files, and more. Consider Dynebolic (www.dynebolic.org/) and Jahshaka (www.jahshaka.org/) as high-end multimedia tools for sound and video recording, editing, encoding, and streaming.

PRODUCTIVITY TOOLS

Microsoft Office is something that you will find on most school computers. However, as the cost per computer rises, consider OpenOffice Suite (www.openoffice.org/) as an alternative. This multiplatform, multilingual tool includes software for word processing, spreadsheets, graphics, and multimedia presentation.

RESERVATION SYSTEM

If you deal with reservations, consider the Online Resource Scheduler (<http://ors.sourceforge.net/>). The software is installed on your web server and can be used throughout the school.

UTILITIES

Ad-Aware (www.lavasoftusa.com/software/adaware/) detects and removes spy/malware, which is placed on a computer to mine data, track usage, and sometimes enact malicious content.

WEB AUTHORING

Although you may currently be using FrontPage or Dreamweaver, open source alternatives are also available, such as Nvu ("new view"; www.nvu.com/). In addition, consider JEdit (www.jedit.org/) as a text editor and MySQL (<http://dev.mysql.com/>) for database applications. To clean up your HTML, use Tidy (<http://tidy.sourceforge.net/>).

WEB BROWSER

Firefox (www.mozilla.com/firefox/) is a relatively fast and intuitive web browser that is an alternative to Internet Explorer, Netscape, and similar programs.

WEB SERVER

Apache web server software (www.apache.org/) is a great choice for your school's web server.

WIKI

Wikipedia (www.wikipedia.org/) is the public encyclopedia that has been the subject of some controversy and scrutiny but nonetheless continues to gain in use as a handy and relatively reliable desktop reference tool. By its very nature, Wikipedia is self-correcting. That is, when content is identified as being false, correct versions are submitted. In addition, when a topic is controversial or contested, Wikipedia provides direct links to opposing viewpoints and arguments.

Finally, many schools in the United States and other countries (United Kingdom, Canada, Australia) are looking at a total changeover to the Linux operating system and are divorcing themselves from a dependence on proprietary software. Given the choice of having a laptop with open-source software or no laptop at all, which do you think a child would pick?

WHAT IS THE IMPACT ON THE SCHOOL LIBRARY?

Open access to ideas and information is a core philosophy of progressive school library programs. Yet throughout many schools, reliance on proprietary software restricts users to the conditions of an end-user license agreement, so most of the soft-

ware is closed and locked. As a result, many teacher-librarians have started advocating the use of open-source software as a means to stretch their budgets, as well as to increase access to technology for all.

John McDonald, a teacher-librarian and open source advocate at Connerville Middle School, IN, states that "open-source software functions as an equalizer in many regards because it allows us to focus on effective integration of technology as the need arises instead of worrying about where the funding will come from" (personal e-mail to Larry Johnson, January 29, 2006). He finds that open-source software is an "almost-at-hand resource" for meeting unexpected technology needs. When a student or teacher project has the need for image manipulation, sound editing, or other tasks that cannot be handled with existing packages, they look to open source solutions as a way to try out new ideas without investing in expensive software. For example, say that your poetry club would like to begin a weekly podcast sharing their original poems. At one after-school meeting—and at no cost—students can download and use Audacity to record their poems to an MP3 file that can be uploaded to the school web site.

To plan, facilitate, and implement a successful migration to open-source software in your school, follow these seven steps:

1. Carefully evaluate each piece of software. Explore why and how it will be used, as well as its benefits.
2. Identify the strengths and weaknesses, including the cost benefits connected to existing resources.
3. Select a few software packages, and design tutorials, training materials, and other resources to support the software's use.
4. Begin on a small scale, working with teachers who are likely to embrace change.
5. Help users identify relevant projects where the software can be integrated.
6. Inform decision makers of the software and the benefits that it provided to the trial group.
7. Remember that instruction and support are an ongoing process, not a one-time event.

RESOURCES

For more information and ideas about open-source software, here are resources to explore and learn more:

K-12 Linux Project, Portland, OR (www.k12linux.org/)

Making Decisions About Open-Source Software for K-12, from the Northwest Educational Technology Consortium and Northwest Regional Educational Laboratory (www.netc.org/openoptions/)

Schoolforge (www.schoolforge.net/)

Schoolforge News-Journal (<http://opensourcechools.org/>)

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