

This work is licensed under the Creative Commons Attribution-ShareAlike License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-sa/2.0/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA.



Open source - opens learning

Why open source makes sense for education

Summer 2004

the r-smart group
4343 E. Camelback Rd.
Suite 210
Phoenix, AZ 85018

☎ 602.840.7300
☎ 602.840.7500

Chris Coppola
chris.coppola@rsmart.com

Ed Neelley
ed.neelley@rsmart.com

contents

Introduction-----	2
Open source plain and simple-----	2
Comparison to proprietary software -----	3
The open source movement in higher education ---	5
How could open source make life better?-----	11
Ok, it makes sense... what should I do?-----	13
References -----	14

www.rsmart.com

proprietary software license, any institution or company with the skills can use the software to solve their own needs or offer products and services of value to others. Businesses based on open source software typically add value by:

- Offering services such as implementation, training, and support;
- Packaging and integrating open source software to make its installation and use easier for a wider market;
- Creating complementary, add-on, or enhanced software for sale.

Open source affords institutions, as consumers of software, unparalleled control over the use of software to meet business demands and control over where they deploy their budget dollars. Taking into consideration its core competencies and available resources, an institution may use its own people and resources, hire external resources, or partner to share costs.

The principles of open source software—freedom to run the program for any purpose, to study and modify the program, and to freely redistribute copies and modifications—are simple, yet have powerful and far reaching implications.

Comparison to proprietary software

One of the great misconceptions about open source is that it is an alternative to commercial software. Rather, open source software is an alternative to proprietary software, but often acquired through or supported by a company—in other words commercial.

Fundamentally, the difference between open source and proprietary software has to do with control. Where the open source license imparts freedoms to use, modify, and redistribute the software, the proprietary license restricts use, modification, distribution, and more. Vendors of proprietary software restrict access to and use of the source code because the source is knowledge—and knowledge is power.

The open source license corrects the balance of power between producers and consumers of software. Access to the source code is about freedom and choice. After all, most of us aren't software engineers—we can't start adding features and fixing bugs just because we have access. Yet access to the source code is important to all of us because access is control. Red Hat CEO Bob Young asks the question, "Would you buy a car with the hood welded shut?" and after everyone answers "No." He follows up with "What do you know about modern internal-combustion engines?" The ability to open the hood, like access to the source code, gives the consumer control. The consumer chooses to have the car serviced at the dealer, if he's not satisfied with the work or the price, he can choose to take the car somewhere else.ⁱ

Historically, the business model for software has not given consumers the kind of choices that let market forces work to keep costs in check and innovation thriving. The model for software has been a for-fee license to use software, bundled with for-fee services. The open source model un-bundles the software and services, and creates distinct markets for each.ⁱⁱ Consumers have greater choice and market forces drive competition and control price and quality.

Open source clearly offers advantages for the consumer, but it also represents a significant competitive advantage to companies that adopt compatible strategies.ⁱⁱⁱ IBM, HP, Sun

Platform support	Broader platform and server support increases leveraged investments in existing institutional infrastructure.	Platform support limited to what the vendor offers. May not fit well with institutional infrastructure.
------------------	---	---

As you can see from the comparison, open source promises some impressive advantages over proprietary software. While open source has a rich history in education, a recent convergence of powerful drivers and enablers are precipitating a strong movement toward open source in higher education.

The open source movement in higher education

“Colleges are in search of a new business model for developing and licensing software, and open-source-code projects are leading the way.”

*Richard N. Katz
Vice President of Educause,
the higher education technology consortium*

Open source is changing the nature of the software business in many settings, but the movement is particularly impressive in education.

While open source has nearly a 20 year history of success producing leading software,^{iv} it has mostly been in the *infrastructure* domain—the protocol implementations, servers, development frameworks, and utilities that enable the email programs, browsers, and other applications we all depend on. Open source has not been a significant model for producing *application* software—until recently.


In the past few years colleges and universities have begun to produce enterprise open source applications like course management systems and electronic portfolios that compete directly with their proprietary counterparts. These e-learning applications are leading a movement in higher education from proprietary software toward open source.



A snapshot of the current proprietary software environment in education reveals some compelling drivers...


- Tight budgets have focused attention on software acquisition costs^v, and total cost of ownership
- Growing resentment of vendor power, particularly in the wake of price increases and licensing changes that many institutions felt powerless to reject^v
- Lack of innovation. Learning technology has not lived up to its potential to improve learning

... and some enablers of a more effective model:

- Collaboration technology has made large-scale collaborative work across institutional, geographic, and cultural boundaries more effective
- Software design patterns, development technologies, and standards have evolved in a way that facilitates modular, interoperable software components

<p>Partially funded by the Mellon foundation</p>	<p>campus Web presence. Customization allows each user to define a unique and personal view of the campus Web. Community tools, such as chat, forums, survey, and so on, build relationships among campus constituencies.</p> <p>uPortal is a product of the JA-SIG collaboration which is governed by a Steering Committee of between 4 and 7 members. Currently, the Steering Committee includes Princeton University, the University of British Columbia, Boston College, the University of Delaware, and Sun Microsystems.</p>
<p>Shibboleth shibboleth.internet2.edu</p>	<p>Shibboleth, a project of Internet2/MACE, is developing architectures, policy structures, practical technologies, and an open source implementation to support inter-institutional sharing of web resources subject to access controls. In addition, Shibboleth will develop a policy framework that will allow inter-operation within the higher education community.</p> <p>The Shibboleth system provides a standards-based link between existing campus authentication systems and resource providers of all kinds. For example, when a student requests access to a protected video clip, her home organization (origin site) requests her to authenticate (if she has not done so already) and then passes on the information that she is enrolled in Biology 562 to the site housing the video. The provider (target site) uses the fact that she is enrolled in this course to determine her eligibility to access the video.</p>
<p>Globus www.globus.org</p>	<p>The Globus Alliance is developing fundamental technologies needed to build computational grids. Grids are persistent environments that enable software applications to integrate instruments, displays, computational and information resources that are managed by diverse organizations in widespread locations.</p> <p>The Globus Toolkit is an open source software toolkit used for building grids. It is being developed by the Globus Alliance and many others all over the world. A growing number of projects and companies are using the Globus Toolkit to unlock the potential of grids for their cause.</p> <p>The core Globus alliance team are: Argonne National Laboratory, University of Chicago, University of Southern California Information Sciences Institute, University of Edinburgh, Swedish Royal Institute of Technology, and the High Performance Computing Laboratory Northern Illinois University.</p>
 <p>www.theospi.org</p> <p>Partially funded by the Mellon foundation</p>	<p>The Open Source Portfolio Initiative (OSPI) is a collaborative, open-source, software development project based on the University of Minnesota Enterprise System's electronic portfolio software. The University of Minnesota (U of MN), University of Delaware, and the r-smart group, founded this collaborative to open the evolution of the U of MN ePortfolio to diverse input, rapid development, and widespread use.</p>

 <p>LionShare</p> <p>lionshare.its.psu.edu</p> <p>Partially funded by the Mellon foundation</p>	<p>The LionShare P2P project is an innovative effort to facilitate legitimate file-sharing among individuals and educational institutions around the world. By using Peer to Peer (P2P) technology and incorporating features such as authentication, directory servers, and owner controlled sharing of files, LionShare promises secure file-sharing capabilities for the easy exchange of image collections, video archives, large data collections, and other types of academic information. In addition to authenticated file-sharing capabilities, the developing LionShare technology will also provide users with resources for organizing, storing, and retrieving digital files.</p> <p>The LionShare project began as an experimental software development project at Penn State University to assist faculty with digital file management. The project has now grown to be a collaborative effort between Penn State University, Massachusetts Institute of Technology Open Knowledge Initiative, researchers at Simon Fraser University, and the Internet2 P2P Working Group. A generous grant from the Andrew W. Mellon Foundation will be used to fund the first two years of the project.</p>
<p>PKI</p> <p>www.dartmouth.edu/~pkilab</p> <p>Partially funded by the Mellon foundation</p>	<p>Dartmouth College with support from the Mellon Foundation is working to develop use of Public Key Infrastructure in Academic Computing. There are many potential applications for PKI in an academic setting. There are also many obstacles to be overcome in order to provide PKI based services broadly in the standard network computing environment. This project proposes to address these issues with a dual approach. A deployment track, lead by Computing Services, is working to simplify the use of current X.509 PKI technology and to develop usable applications of it that address current security concerns. A design track, lead by Computer Science is examining limitations of the technology and working to develop solutions to the problems uncovered. The design track plans to implement a more secure infrastructure by incorporating secure co-processing technology in the services. Alternate formulations of PKI technology are also being examined.</p> <p>The project aims to develop inter-institutional applications and has been working with a group of Internet2 institutions, along with the University of Wisconsin and the University of California - San Diego. The Dartmouth PKI Lab web site is used to disseminate general information about PKI systems and share the results of our development work.</p>
 <p>Haystack</p> <p>haystack.lcs.mit.edu</p>	<p>Haystack is a tool designed by MIT to let every individual manage all of their information in the way that makes the most sense to them. By removing the arbitrary barriers created by applications only handling certain information "types", and recording only a fixed set of relationships defined by the developer, we aim to let users define whichever arrangements of, connections between, and views of information they find most effective. Such personalization of information management will</p>

	software bridge for connecting to FEDORA-based digital repositories. Using VUE's concept mapping interface, faculty and students design customized semantic networks of digital resources drawing from digital libraries, local files and the Web. The resulting content maps can then be viewed and exchanged online. This project is supported by the Andrew W. Mellon Foundation.
 <p>Partially funded by the Mellon foundation</p>	<p>The Open Knowledge Initiative™ started at MIT in 2001 with funding from the Andrew W. Mellon Foundation. It is a collaboration among leading universities and specification and standards organizations to support innovative learning technology in higher education.</p> <p>The result of this collaboration is an open and extensible architecture that specifies how the components of an educational software environment communicate with each other and with other enterprise systems. O.K.I. provides a modular development platform for building both traditional and innovative applications while leveraging existing and future infrastructure technologies.</p> <p>O.K.I. is designed for broad adoption in the higher education domain. It provides a stable, scalable base that supports the flexibility needed by higher education and commercial developers of educational software.</p>

How could open source make life better?

“...if an institution acquires a commercial, proprietary LMS, and then finds that the system is deficient in some way, they often must wait until the vendor decides it is financially viable to develop the enhancement—an event that may never occur.”^{vi}

*Ira Fuchs
Vice President for Research in Information Technology
Andrew W. Mellon Foundation*

Imagine...

... the Freedom to choose...

- Institutions are discovering the freedom to choose where to spend their technology dollars. Open source software is not free, but allows different kinds of budget decisions than proprietary software. With an open source application, license fees and maintenance fees are generally low or non-existent. The institution can now

... Innovation in teaching and learning technology...

- The spirit of open source is formed around diversity of input, recombination of ideas, creativity, and collaboration. These are essential ingredients for innovation and clear advantages to the open source philosophy.
- The open source community evolves projects quickly and organically. Open source projects are living systems that promote rapid development and constant improvement of concepts.

Ok, it makes sense... what should I do?

The open source story makes a compelling argument for adoption and personal action. In today's education environment, leaders must be innovative to not only elevate the stature of their institution, but to simply survive. And open source innovation represents the leading edge of a revolution that will literally change the landscape of technology in education for years to come. And the change is upon us. The question is: Do you want to benefit now or later?

The first step in getting involved is to make open source part of your vocabulary. Build up your understanding of open source and the landscape in education, and as you do:

- Discuss the potential and the challenges of open source with your colleagues.
- Find ways to contribute to an open source project. There is much more to open source than writing code and each of us has talents that can contribute to the movement. You might be a developer, or a designer, or simply a user of the software. You might be a leader on campus that can encourage your colleagues to consider open source alternatives.
- Initiate a pilot program on your campus.

Second, you will find that after you get involved you will want to be an active part of the community—a community of like minded individuals with a stake in the outcome. Developers and users support each other across institutional, political, and geographic boundaries. Users not only use the software, they contribute to the design.

"If we don't change the direction we're going, we're likely to
end up where we are headed."

Chinese proverb

The demands on higher education require a fundamental change in direction—and technology can facilitate that change. But the present technology for teaching and learning hasn't lived up to its potential. Open source will pave a new road—changing not only the destination, but the journey, which is the real reward.