Sustainable Communities for Software: Variations on a Theme

There is more than a verbal tie between the words common, community, and communication. What they must have in common in order to form a community or society are aims, beliefs, aspirations, knowledge—a common understanding—like-mindedness as the sociologists say. In this quote, John Dewey delivers an early rendition of the knowledge management concept and provides insight to those interested in building and achieving sustainability through community-source investments. It is this “like-mindedness” that has spawned the development, in the higher education domain, of several nonprofit entities with the sole mission of building community and leveraging software development among colleges and universities.

From the gradual dominance of Linux (http://www.linuxfoundation.org) and Apache (http://www.apache.org) as an operational web platform to the later ascension of Moodle (http://www.moodle.org) and Sakai (http://www .sakaiproject.org) as viable open- and community-source alternatives to learning management systems, open-source software has risen in importance within the higher education community. Yet in the realm of higher education computing, support for open- and community-source software remains fragmented, a result of the disparate and fragmented support for academic computing applications overall.

Two years ago, in his EDUCAUSE Review article “Open Source 2012,” Brad Wheeler outlined four areas of growth within higher education for sustaining communities: Teaching and Research, Administrative Systems, Infrastructure, and Scholarly Repositories/Libraries. Currently, each area has a well-defined nonprofit sustaining community that leverages software development. In the Scholarly Repositories/Libraries area, consolidation is occurring with the merger of DSpace and Fedora into DuraSpace (http://www.duraspace.org); and in the Infrastructure area, Jasig is developing projects in authentication/authorization (CAS) and calendaring (Bedework), among others. However, true academic software applications that fall in functionality somewhere between digital library applications and teaching and learning applications could benefit from an organization that acts as a clearinghouse for academic software development communities. It is unclear whether the Sakai Foundation, the Jasig community, or DuraSpace will play an aggregator role for the Teaching and Research area of academic software that falls outside the purview of course management systems and similar types of infrastructure. Every academic software development group knows that building its own independent nonprofit sustaining community is a losing proposition, both because of administrative costs and because of the fracture that would result in the small group of like-minded institutions already supporting those applications in the higher education community.

The real issue is that there has just not been enough interest in working together as an academic community to drive joint development in academic-specific open-source software tools as a whole. This is in direct contrast to a group like OpenAFS, which supports a common infrastructure—that of a shared file-system—via a consortium of programmers from the commercial sector, as well as higher education. The OpenAFS community has hundreds of contributors because there is a viable interest in the community to support a common infrastructure. Of course, this is also true of an academic system like Sakai, but this idea quickly evaporates as we look at other academic software tools that have been written for individual needs or as specific infrastructure for individual institutions.

In an open letter to the OpenAFS software development community, the OpenAFS Council of Elders stated:

The OpenAFS community has matured. Several of the organizations that founded OpenAFS have left us but have been replaced by hundreds of others. Since the creation of the OpenAFS repository there have been 9450 commits from 270 contributors. The number of commits has almost doubled on an annual basis during that time period. Traffic on the opensafs- provided general mailing list has on average tripled from under a hundred messages per month to close to 300. At the same time, traffic on the developer list has done almost exactly the reverse as many of the early smaller issues have been resolved. A core of around 30 contributors to the developer list and an average of 75 unique posters...
academic tool functionality, one sustainable community federation seems to be all the market should or can bear.

Why my interest in these seemingly stand-alone academic software applications? I am at an institution (Indiana University) that has an excellent track record for supporting community-source applications, and I am in charge of a dynamic digital library program (http://www.dlib.indiana.edu/) that has developed a mature digital library software platform for the delivery and pedagogical use of digital music score and audio content. This platform, known as Variations (http://variations.sourceforge.net), has been released as open-source software in the hope of locating and building a development community that will show its appreciation by providing support and sustainability for the software.4

Variations has been supported at Indiana University since 1996, but its current development has been supported by leveraged institutional resources at Indiana University and by grant funding from the National Science Foundation and the Institute for Museum and Library Services. While current funding has shown that the Variations platform can and should be supported by institutions that need an open and extensible digital music library platform, it also makes clear that overall development of the product should be driven by the wider community of users and that this growth should be supported by a nonprofit sustaining community.

However, as noted above, sustainability is no easy task. Although most other music schools are interested in having access to their collections through a system such as Variations, many are not in a situation that can provide the needed IT support for such a system. One way to reach such institutions would be for Variations to expand to serve a broader function, such as an institutional means of accessing all audio content, not just music. But before institutions can embrace Variations as an enterprise platform, either for music or all audio content, many will want to see a leveraged investment in a federated, community-driven foundation that will provide support for the product. For this to happen in an affordable manner, Variations would greatly benefit from joining an existing like-minded development foundation or from constructing a service model that will provide hosted services for like-minded institutions. If that occurs, Variations will be able to achieve long-term sustainability.

To drive the development of an incubator and custodian for academic community-sourced software, commitment and motivation need to be established among colleges and universities to support software products that are cost-effective investments in each other's software development programs (e.g., a multi-institutional research center that supports open-source academic software tool development for the entire community), rather than continuing to make individual investments in vendor-driven solutions. The support for community-driven software development in higher education is at a relatively young, fragile stage and needs to be embraced by a wider variety of institutions. Small investments that are spread over many institutions have proven to be successful (e.g., uPortal, Sakai, Moodle, CAS, HathiTrust, Kuali Financial System). The dividends on these investments far outweigh the dividends received from investing in similar academic vendor-based software; the return on the former includes expanded institutional knowledge of the software and community-driven improvements to the code base.

In short, the answer to the question of what academic open-software tools need in a sustainable federated community was answered by Dewey almost one hundred years ago. Community-driven software development needs a nonprofit sustaining community that can represent a diverse group of academic software tools through “a common understanding,” or “like-mindedness,” and through leveraged investment in the academic community.

Notes
4. See the Variations3 project website: <http://www.dlib.indiana.edu/projects/variations3>.

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