Abstract— From its origins in 2003 as a grant funded project, Sakai has become a successful open source community, with over three hundred adoptions worldwide, and a growing ecosystem of community and commercial support. Over the same period, economic, policy and technology landscape changes, have dramatically modified the context against which an open source community rooted in Higher Education operates.

The Sakai community is dealing with these challenges of this changed context on multiple levels:

The development of an innovative software environment, the Sakai Open Academic Environment, embodying an application of the experience of social networking to the online support of academic practice, and applying lessons of web-scale software development to that environment. Driven by community requirements, the project is providing a bridging layer from the established Sakai Collaboration and Learning Environment to the Open Academic Environment, thus allowing institutions to plan environmental transitions, or extend institutional capacity in support of online learning into social space.

The transformation of the Sakai Foundation, which is the organisational locus of Sakai community organisation, to sustainably support multiple software projects. This is taking place both internally, and by building new relationships with other open source communities.

I. INTRODUCTION

From its origins in 2003 as a grant funded project, Sakai has become a successful open source project, with over three hundred adoptions worldwide, and a growing ecosystem of community and commercial support. Over the same period, the landscape of online learning and academic collaboration has changed. Online learning has grown considerably in scale. According to Sloan-C, one in four college students in the US took at least one online course in 2008, a 17% increase on the previous year. Over the same period, there has been a dramatic transformation of the nature of the web, with an increased focus on social interaction, and the popularization of those technologies that have been labeled "Web 2.0".

Higher Education itself has seen dramatic changes, with reductions in funding in many national systems, and increased complexity from a range of key policy and economic drivers. These include the growth of remote and multi-campus institutions, moves to more flexible and internationally interoperable course and accreditation provision, the development of approaches to lifelong learning, and a significant and growing emphasis on interdisciplinary research.

These factors raise a number of challenges for an open source community rooted in sustaining innovation in the service of Higher Education. The Sakai Community is approaching these challenges in the following ways:

- The development of a new environment to support online academic collaboration, applying the lessons of social networking to this domain, and drawing on technology approaches which are designed to operate at web scale.
- Placing the Sakai community of educators at the heart of the design and development process.
- Transforming the locus of Sakai community organisation, the Sakai Foundation, to better support multiple, rather than single, software “products”, and growing the Foundation by joining with other communities working in this space.

II. OPEN ACADEMIC ENVIRONMENT – BACKGROUND AND DESIGN CRITERIA

The Sakai community formed around the recognition that an environment to support academic practice and collaboration should not place artificial barriers between the component parts of that practice; learning, teaching and research. Thus, the existing Sakai online environment is termed a 'Collaboration and Learning Environment’ (CLE), rather than a Learning Management System (LMS), Virtual Learning Environment (VLE), or Virtual Research Environment (VRE). Whilst the current Sakai environment is widely deployed as an LMS, and contains a toolset appropriate to that deployment, the environment has other features, such as support for project activity and JSR168 Portlets, which are more commonly found in Virtual Research Environments and portal frameworks. The current widespread use of Sakai for the support of learning should not obscure this broader use. Institutions using Sakai for purposes of research collaboration include a cluster of Australian universities; Melbourne, Monash, and the Australian
National University, together with a number of universities in the United Kingdom, including Cambridge, Lancaster, Bath and Newcastle.

In the eight years since the initial design of the Sakai CLE much has changed. Policy and economic imperatives have driven changing patterns of student recruitment in many countries, significantly increasing the scale of online or blended learning, the range of types of students participating in online courses, and their geographical distribution. The same period has seen much early experimentation with online and distributed research collaboration in Virtual Research Environments, although little consensus has emerged on their general characteristics beyond that elaborated by one of the coiners of the term. Above all, the nature of the web has also been transformed by the considerable growth of social networking software, and what some have termed “Web 2.0” during the same period.

III. THE SAKAI OPEN ACADEMIC ENVIRONMENT DESIGN GOALS

The key design goals of the new Sakai environment, The Open Academic Environment (OAE), reflect these environmental changes, and the experience of the community itself. Several broad considerations inform the design goals for the new environment. These include:

A fundamental premise of the OAE design process is that education and research are inherently collaborative endeavors that should lend themselves naturally to the social web. Education and research are not, however, a perfect fit for today’s consumer web social tools. Educational institutions have obligations to protect privacy; simply suggesting the use of Facebook or similar tools, is, as a consequence, potentially fraught with legal and ethical issues. Similarly, scholars are not so much concerned with discovering “friends”, as establishing and building relationships with collaborators in the same or related disciplines, or parallel areas of interdisciplinary interest. The project to build the Sakai OAE has therefore set out to establish the use of social networking-like capabilities for academic purposes, and in an academic context.

The current conventional Learning Management System tends to be constructed around the centrality of the course site or virtual classroom. In contrast to the constraints of these “virtual classroom walls”, Sakai OAE sets out to build around the centrality of individuals collaborating in a group, rather than the centrality of a site or course.

The typical Learning Management Systems builds on the extension of the course or classroom into virtual space by replicating a typical lecture and tutorial model. This tends towards a very hierarchical perspective of content within such an environment. Sakai OAE inverts this approach by assuming by default that every participant is an author, collaborating to create content, rather than viewing the educator as the principle or only content creator.

The rejection of a “walled garden” approach in an online environment speaks to a requirement that the environment more easily allows content to flow between that environment and the open web. Sakai OAE therefore seeks to be selectively and securely permeable, allowing content and activities from the outside world in, as well as from inside the system out to the rest of the web.

Sakai OAE Design Goals
Sakai OAE is a scholarly space for research, teaching and learning. Designed by educators for educators, the Sakai OAE’s design goals are:

- A user-friendly experience informed by the needs of learners, teachers and researchers.
- Powerful capabilities for content authoring, sharing, and reuse.
- Group collaboration and social networking within an academic context and around learning, teaching and research interests.
- Learner, group and activity focused. Not site centric.
- Ability to create and deliver cohesive learning experiences and portfolio processes, and promote student engagement.
- Highly configurable and scalable at both small and enterprise levels.
- Ease of software development and flexibility for integration.
- Agile Sakai code base built atop other reliable open source projects.
- Open source license. Open educational resources.
- Interoperability with other systems.

The core functionality of the Sakai OAE have been broadly defined and mapped by the Sakai teaching and learning community in a series of teaching and learning lenses

IV. TECHNOLOGY PERSPECTIVES

The underlying technology approach of the project is to attempt to re-use components from open source communities outwith education, or which span education and other sectors. This represents an attempt, which has yet to be fully validated, to focus software developers employed by Higher Education institutions squarely on academic requirements, rather than on the unnecessary wheel-re-invention of general features. Such component re-use includes the Apache Felix implementation of OSGi, and Apache Shindig implementation of the OpenSocial Specification. Apache JackRabbit was examined
V. TRANSITION BETWEEN ENVIRONMENTS

Transition between Learning Management Systems, or even versions of the same system, is time consuming and potentially disruptive to the core activity of an academic institution, affecting, as it does, significant numbers of both academic staff and students. It is not untypical for such transitions to take twelve to twenty-four months or more. As has been noted, the Sakai OAE is, in many respects, a radical departure from the conventional LMS, thus compounding the issues surrounding transition for institution and users.

The Sakai Community has evolved an approach to this problem space that rests on enabling an institution to run both Sakai CLE and Sakai OAE side by side, with a significant measure of user-facing integration. This approach is termed Sakai OAE “Hybrid Mode”. Hybrid Mode uses the IMS Global Basic Learning Tools Interoperability (LTI) Specification to surface Sakai CLE worksets and tools in meaningful ways, determined by the institution or user, within the Sakai OAE, which is designed to be more composable, and to facilitate a greater degree of personalization. By these means, an institution may choose to extend its online capability by combining previous course or site-centered approaches with those based around the newer paradigms outlined above. An institution can therefore chart a forward course between environments with a minimum of disruption, and under its own direction at a pace determined by its own strategic imperatives.

VI. COMMUNITY, GOVERNANCE, FOUNDATION

The development of the Open Academic Environment is driving significant change within the Sakai Community. The Sakai OAE Project, established in July 2010, is a collaboration between Cambridge University in the UK, and Charles Sturt University in Australia, together with New York University, the University of Michigan, the University of California at Berkeley, Indiana University, Georgia Tech and the American Academy of Religion. The project conducts its work in the open, publishes software under an OSI-approved open source license, the Educational Community License under the guidance of the Sakai Licensing Working Group.

The project to create the Open Academic Environment is initially a managed project, with direct financial and human resource contributed from the participating institutions to the project via the Sakai Foundation. Financial resource has been used to hire contributors in a number of scarce areas, including User Experience design. Project structure and practice is modeled on an application of agile techniques to highly distributed international teams. Teams are organised across institutions, a break with the former practice of the Sakai community, which has tended towards institutional “ownership” of specific tools or tool clusters. At each point, from design to realization, a User Reference Group (URG) validates the approach taken. The URG is made up of practicing academics and learning technologists from investing institutions.

Sakai Open Academic Environment Managed Project governance is constituted with a Steering Group comprising representatives of investing institutions, which is jointly chaired by an institutional representative and the Sakai Foundation Executive Director.

The Sakai Community is moving from the support of one software environment to two environments, at very different stages of a product lifecycle. This movement is generating further consideration of the role of the Sakai Foundation itself. There is a tendency to move the Foundation back from direct involvement in specific projects, and refocus it as a community facilitator, providing human and technical infrastructure, licensing and legal expertise, and brokerage in enabling community-driven projects. The latter concern is of particular significance for a community with a resource pool that is growing, but not growing in proportion to the work it seeks to undertake.

The latter consideration has sparked an extended conversation with another organisation supporting a number of Higher Education focused software projects and products, the Jasig. Both organisations have charted a course towards organisational fusion, and have begun to map a common value proposition for a common foundation nurturing software development projects supporting the academic mission. The new organisation that results from the joining of the Sakai Foundation and Jasig has the potential to be a significant factor in both innovation, and software sustainability in the service of education.

REFERENCES

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