

The Open Agenda and Organisational Alignment

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ABSTRACT

This paper discusses the broad context of what we describe as the 'open agenda' – the aggregate effect of trends within the education and training sector toward a growing advocacy and adoption of 'openness'; as in open source software, open standards, open content licensing and open access to such content. The discussion on these topics is illustrated with a case-study of organisational alignment and development, providing an historical snapshot of the changes that have taken place as a direct result of this open agenda. The primary conclusion drawn is that this agenda is likely to continue its influence upon the structure and character of such organisations.

Keywords

open standards, open source, open access, collaboration, interoperability, edna

INTRODUCTION

The concept of something being *open* is a concept with wide usage and versatility. It is commonly used as a noun, verb, or adjective. In the Australian Macquarie Dictionary there are well over 80 entries for it, including definitions such as 'not shut', 'to disclose', 'an unobstructed space', 'to render accessible to knowledge', 'to cut or break into', 'to begin', 'to uncover' ... etc. [1]

The problem with such semantic versatility is that achieving a common understanding for the term, either within a community of practice or beyond it, is not a simple matter. Establishing a clear context for usage is therefore very important. For example, in the field of electronics an 'open circuit' indicates a break or discontinuity in an electrical circuit; a person described as an 'open book' is typically easy to read; in the context of social discourse an 'open discussion' indicates inclusiveness, commitment to enquiry, and absence of authority; and, in the context of government 'openness' indicates accessibility to information.

This paper explores the influence of what we call the 'open agenda' upon organisational structure and readiness, highlighting a case-study of a non-profit government agency and one of the services it has developed since its inception (edna). Inclusive within this open agenda are the following trends:

- Development and adoption of *Open Source* software;

- *Open Licensing* of content, enabling a shared knowledge commons through initiatives such as the Creative Commons;
- *Open Access* to open licensed content;
- Emergence of *Open Courseware*, most notably by prominent institutions such as the Massachusetts Institute of Technology (MIT); and
- Preference for the development and adoption of *Open Standards* in the development of e-infrastructure for learning, education, training, and research.

There are of course many other relevant usages of the concept of openness to describe something. The *open architecture* of the Internet itself is of course also worth reflecting upon. Likewise, the continued evolution of *Open Universities* in the delivery of educational opportunities to all who seek them demonstrates another important usage of the concept – but this is not of direct concern for this paper. It is sufficient to suggest here, however, that the open agenda is one that will in all likelihood continue to shape the general character of Web-based innovations.

1. THE WEB REVOLUTION IN EDUCATION

1.1 Online and Collaborating

There have been thousands upon thousands of commentaries and papers about the impact of the Web upon the delivery and access to education and training. Anyone who has used the Web will have experienced its benefit in information seeking and discovery. For over a decade there have been hundreds of conferences dedicated to the topic. For the last five years there have emerged even more powerful forms of knowledge sharing – enabled by content syndication technologies such as Really Simple Syndication (RSS) and blogs. And even more recently the intrinsic networking capability of the Web has spawned the next wave of content sharing and social connectivity through technologies such as wikis and applications such as *MySpace*, *Facebook*, *Flickr*, and *de.licio.us*.

If, however, there is one key phrase that sums up the impact of the Web upon education it would be *online and collaborating*.

1.2 Networks, Networks, Networks

Networks are not new to human societies; they have supported many diverse communities for millennia. However, the global reach that has been enabled since the development of twentieth century technologies

such as radio, television, telecommunications and the Internet is relatively new. These developments have profoundly influenced the organising, disseminating, and connecting capacities upon information, economics, and people. In short, these technologies have helped facilitate many new kinds of networks. Developments such as Web 2.0 applications that support social interaction should therefore come as no surprise. Well over a decade ago Badaracco argued:

“Most important, in an age of rapidly proliferating knowledge, the central domain is a social network that absorbs, creates, transforms, buys, sells, and communicates knowledge ... embedded in a dense web of social, economic, contractual, and administrative relationships.” [2]

Five years ago Zhuge observed:

“Networks pervade nature, society, and virtual worlds, giving structure and function to a variety of resources and behaviors ... The future interconnection environment ... will evolve under principles of openness, incremental development, economy, ecology, competition and cooperation, dynamic scalability, integrity, and simplicity.” [3]

More recently, Overholt notes the impact of applications such as *Facebook*:

“The increasing power and breadth of employees’ personal networks to disperse information about work experiences will force companies to rethink how they organize teams and departments.” [4]

Of course, *Facebook* is just one application among many and networking is now being experienced by many people through diverse and virtual communities.

1.3 Open Source

Open source is commonly the term that describes software that enables public inspection and distribution of its source code under certain conditions. Open source software (OSS) is typically developed by a community of practice for mutual benefit. As is discussed in the case-study below, OSS has provided a lot of appeal to stakeholders within educational settings and can be seen as a major driver of e-infrastructure that supports learning, education, training, administration and research. The Sakai project is a good example of a range of higher education institutions collaborating with commercial vendors to produce OSS tools that enable the deployment of collaborative learning environments. Its marketing strap line, *Free to Use, Free to Develop, Freedom for Education*, clearly makes the point. [5]

More broadly however, and following the discussion on networks above, open source is also now being applied in other contexts. As Goetz has argued:

“Software is just the beginning ... open source is doing for mass innovation what the assembly line did for mass production. Get ready for the era when collaboration replaces the corporation.” [6]

An interesting example is the transformation of the international Knowledge Management consultancy originally established as the Cynefin Centre in 2002 but now known as Cognitive Edge. [7]

1.4 Open Standards

The Web revolution in education has also been influenced by a number of communities of practice that operate within the standards and interoperability specifications development space. Some organisations are very formally constituted with representative memberships, e.g., the International Organisation for Standardization (ISO); others have lower barriers to participation (e.g., the Dublin Core Metadata Initiative which does not require membership fees or formal representation to participate). Other examples include the World Wide Web Consortium (W3C), the IMS Global Learning Consortium (IMS), the Institute of Electrical and Electronics Engineers Learning Technology Standards Committee (IEEE LTSC), and the Advanced Distributed Learning (ADL) initiative.

Open Standards are typically characterised by three key features or goals of development – openness, consensus, and due process. These goals are actively pursued by ‘standards development organisations’ (organisations that focus on developing pragmatic specifications that then become candidate international standards, such as the W3C and IMS) as well as ‘standards setting organisations’ (organisations that establish formally accredited standards, such as ISO and the IEEE). However, the formal standards bodies have depended for many years upon the sale of standards to offset the costs of maintaining their organisational infrastructure and do not typically provide *open access* to their standards (i.e. access without payment). Therefore, in this sense of openness, ISO and IEEE standards are not perceived as completely open by some stakeholders. This is of course debatable, because within their respective charters there are requirements and processes that are aimed at ensuring that consensus is achieved. And while industry consortia such as IMS produce publicly accessible specifications there are conditions of use that apply as a result of intellectual property policies. Moreover, in the case of IMS and many other industry-based consortia membership fees apply so there appears to be *degrees* of openness.

The Schools Interoperability Framework (SIF) is another example from the K-12 sector. The specification itself is open and freely available from the Schools Interoperability Framework Association (SIFA). While anyone can download the specification, SIFA is a membership based organisation consisting of vendors, schools, school districts, government agencies etc with an interest in interoperability in this area. One of the strengths of SIF is its governance arrangements whereby all members have the opportunity to contribute its development as peers. Development and governance of the specification is

funded by membership dues and also software conformance testing against the specification.

While a number of standards/specifications, such as SIF, are open in that they are freely available for anyone to download, confusion can arise from the expectation from some areas that 'open' implies 'free'. Using SIF as an example, the specification itself is 'freely' available however software programs that are SIF compliant are generally only available on a commercial basis.

Leaving aside the processes of standards development a simpler and more general way to describe open standards is to distinguish them from proprietary standards. In this sense open standards are platform independent, vendor neutral, extensible, reusable, publicly accessible, and not encumbered by royalties. These qualities have strong resonance for stakeholders within educational settings. [8]

1.5 Open Content – Access and Licensing

The development of open content – content that is publicly accessible and sharable – promises to build further capacity for many communities of practice worldwide (learners, educators, and researchers alike). Some of this content is published for free public access enabled through new licensing approaches such as those developed by the Creative Commons project. A prominent, well-known example is the Open Courseware initiative, whereby all MIT courseware materials are available for free public inspection and use. Another is *Connexions*, which aims to facilitate "authors, teachers, and learners to create, rip, mix, and burn textbooks, courses, and learning materials from a globally accessible, open-access repository." [9]

There are many other examples of such content now being developed and shared. Generally, those who support this trend seem to support the view that making such content freely available is for the greater benefit of humanity. As Benkler argues:

"Information, knowledge, and culture are central to human freedom and human development. How they are produced and exchanged in our society critically affects the way we see the state of the world as it is and might be ... For more than 150 years, modern complex democracies have depended in large measure on an industrial information economy for these basic functions. In the past decade and a half, we have begun to see a radical change ... The change brought about by the networked information environment is deep. It is structural. It goes to the very foundations of how liberal markets and liberal democracies have coevolved for almost two centuries." [10]

In Australia, *education.au limited* is currently assisting in the development of a Digital Exchange for the Carrick Institute where knowledge and resources associated with teaching can be discovered, shared, traded and reused. It will also be a place where ideas and knowledge are discussed and shared. From work already completed it is becoming clear that the service

will likely need to accommodate a balanced approach to both open access and tradable materials. However, at the time of writing this had not been finalised.

2. AN ORGANISATIONAL CASE-STUDY

2.1 A National, Collaborative Approach

In recognition of the opportunities and challenges presented by the Web, the Ministers of Education throughout Australia decided to establish an agency that could facilitate a focused and collaborative response for the benefit of all. For the Ministers at the time this meant a national response to e-infrastructure development within the education and training sector. Thus it was in March 1998 that *education.au limited* was officially established to broker a collaborative response to the opportunities and challenges presented.

Initially, the agency was a very small non-profit company focused on delivering on just one project: the development of Education Network Australia (then abbreviated as EdNA; now as edna). It now has a staff of over 80 and it manages both projects and services.

2.1.1 edna – Readiness and Transformation

edna (Education Network Australia) is a highly regarded national collaborative model of networking for the Australian education and training community. edna is a network of learning environments and a gateway to educational and training resources and services. This service was built on the principles of collaboration and distributed contribution and management of resources.

In its tenth year of operation, edna has embedded itself as a trusted, well-resourced information and knowledge base for educators and learners alike. Organised around Australian curriculum and competencies, it is a gateway to freely available, web-based teaching and learning materials and communication tools.

In many ways, edna provides an example of the transformation that *education.au limited* has undergone in its ten years. edna was one of the first database-driven educational websites in Australia, built around the concept of a browsable and searchable directory of online resources.[11, 12, 13, 14]

Resources were described using Dublin Core (DC) metadata. In time, EdNA Online developed its own set of metadata elements that extended the DC capability – the EdNA Metadata Standard [15]. The Standard was developed in consultation with all sectors of education and training, with the primary goal of providing a consistent, flexible and extensible structure for the description of online resources related to education and training, and secondly, to provide a platform for interoperability with the state and territory education systems. A distributed model of administration was enabled through a system of security groups, to allow maintenance of the database and other functions by information officers, appointed by each of the education and training sectors. The first

generation of edna had the following third party software components:

- Oracle relational database management system
- Verity search engine
- Harvesting robot (freeware)
- Majordomo open source mailing list software
- Noticeboard system based on the Network News Transport Protocol (NNTP)

These components were all integrated into a custom developed suite of applications which combined to form a large centralized access portal. Although many resources were harvested and contributed from education sectors around the country, control over content was highly centralized. However, it was also significant that a search API was developed in the first build of the system so that stakeholders such as state-based education departments could utilise the benefits of the resource database without having to go to the website itself [12].

The advent of RSS helped consolidate and develop this capability based upon distributed architecture. There was a recognition of the benefits for users not to have to visit the 'edna shop-front' to access resources they needed, but that those resources could and should be syndicated to a place of convenience for users such as their own portals or personal web-pages. At this time the edna browse API was also made publicly available so that users could incorporate the searching and browsing of edna into their portals/websites directly. News and information feeds from edna were made available via RSS. This new architecture heralded the 'opening up' of edna.

Another significant change at this time was the move away from an external software development company that provided a custom built monolithic application to a suite of best practice smaller application components. For the first time, open source software components were considered for critical parts of the infrastructure. One of the initial drivers for this consideration was the high cost of maintenance of the legacy system and commercial software licences (this driver has long since been replaced by other more significant benefits that open source provides).

The use of discrete, best practice functional components integrated into a larger 'platform' was a major architectural change. The availability of open standards, specifications and open source were significant enablers supporting this change. Interestingly, the model deployed aligns very well with the e-Framework initiative spearheaded by JISC in the UK and DEST in Australia [8]. The scope of edna functions/services were identified and documented individually along with the overall technical architecture that would be used to integrate those services.

The shift towards open source was made easier (from a risk perspective) by the availability of a 'community source' content management system (Jahia) [16]. Utilising community source software allowed the flexibility of open source and the support of a commercial support agreement if required. License costs could also be paid for in two ways: for those that wanted to contribute code, fees could be waived while for those who simply wanted to consume and not contribute, a license fee would be charged. The edna team chose to contribute code to the software and thus began its foray into open source as a contributor.

Success with community source eased concerns about the reliability and performance of open source software and helped justify the transition from the Oracle DBMS to PostgreSQL, an open source DBMS. The importance of this decision for the edna team cannot be underestimated as the Edna database was the most important component of the edna system.

The changes in the edna architecture also marked a significant change in the philosophies of the edna project team. The structure of the technical team had changed from that of outsourcing to an internal development team. This enabled edna to consume software as well as produce it. As producers, it also gave the team the opportunity to contribute software back to the education (and broader) community. A new sense of openness had emerged.

The other major transition in edna was the emergence of social networking tools. edna has always had an online community capability however the last two years has seen a major increase in the number of communities that it supports. The online community space was re-launched as *edna Groups* and deployed using an open source Course Management System (CMS) that had strong support for collaborative workspaces and also developed in Australia – the software used was Moodle,[17]. There are now almost 1,100 communities of interest active in edna Groups.

Another aspect of 'openness' is encountered occasionally within edna Groups. The service is provided for the education and training community with a view to primarily supporting Australian education and training communities of interest. A lack of such a service in other parts of the world has led to a number of international groups being established within the service. edna groups offers both 'public' and 'closed' groups. The openness of the service has been questioned on occasion by users who believe (in a very 'tribal' fashion!) that there should be no closed groups and that all groups should be 'open' to all users. While some online communities are excellent candidates for such openness, other group owners express a desire to limit the users in their groups to specific individuals. For example, some groups have been established as a 'safe area' for users to acquaint themselves with the technology, others support specific classes/courses/events that in themselves are not open to all. There are many other valid reasons

(for example, privacy) offered as to why a group owner or group would not want access for all to their group. This can be lost on users who are members of the broader (edna Groups) community.

2.1.2 A Web of Portals

The services that edna now provides are categorized into three areas. These are 'find, join, and connect'.

'Find' supports the following services:

- Search: The search services make extensive use of open standards and specifications. Two search engines are used: Verity (commercial) and Lucene (open source). Additionally, edna performs federated search across a number of other repositories. The edna federated search was developed by education.au and released as open source under the GPL open source licence. To perform federated search, the interface to repositories in the federation must be known. A number of specifications are supported including Z39.50, SRW/SRU, SQI, OAI/PMH along with a number of REST and web service APIs. The edna search API is available as either REST or web service and results are exposed as XML/RSS documents.
- Browse: The edna repository can also be browsed by category. The browse structure is available via XML/RSS.
- Calendar and Events: edna maintains a comprehensive calendar of events relevant to the education and training community which is available via RSS. Individual events can also be downloaded to calendaring programs such as Outlook using the Ical format.

The 'Join' services include:

- edna Groups: The online community functionality is based on the Moodle open source course management system.
- Email lists: edna lists use the Lyris commercial email list server at this time. The edna project team makes pragmatic decisions on the best fit for purpose for all of its components and will use open source or commercial software, whichever it deems most appropriate at the time. The team also develops components if there are no suitable options available otherwise.
- Personalised services: edna services can be personalized to meet individual needs.
- edna Sandpit: The Sandpit offers users a chance to see what software/services the edna team is evaluating for future use or is developing at the moment. In this area there are open source applications such as Elgg, LAMS etc.

The 'Connect' services include:

- Latest education news.
- Ability to generate your own RSS feeds.

- Education RSS feeds.
- Podcasts.

The 'Connect' services make extensive use of RSS.

2.1.3 Interoperability at Scale

education.au limited has long been associated with providing access to quality resources for the education and training community. However, finding and evaluating new high quality resources and maintaining the existing collections is not sustainable for a company of its size. For some time it has been forging relationships with similar organisations opening up access to other collections that also offer value to the education community. As a consequence, it now provides federated search solutions to a number of federations beyond the core edna collections. These include:

- Learning Object Resources Network (LORN), a federation for the Australian vocational education and training (VET) community.
- Ministry of Education (New Zealand) services.
- Global Learning Object Brokerage and Exchange (GLOBE), an initiative between like minded organisations in Japan, United States of America, Canada, Europe and Australia.

Using these federations it is possible to access many high quality repositories. In order to achieve this, a willingness to share and open up access is essential. Wherever possible, open standards and specifications have been utilized.

Two of the federations that *education.au limited* is involved in are treating the issue of scalability very seriously and in these federations there is a move towards a harvested model for federated search in preference to performing real-time distributed search. The architectural model for these federations is analogous to that of CORDRA (Content Object Repository Discovery Registration/Resolution Architecture [18] from ADL (the Advanced Distributed Learning initiative) [19]. The federations use OAI/PMH to harvest metadata from individual repositories [20]. The GLOBE federation is actually a federation of federations. Each of the individual federations may use a combination of harvesting and distributed search to achieve its results.

education.au limited has recently submitted a use-case to the IMS Global Learning Consortium for consideration in its LODE (Learning Object Discovery and Exchange) working group and is keen to follow up in this area. This special interest group is interested in what standards/specifications different communities are using in relation to the discovery and use of digital assets held in education related repositories.

2.1.4 Openness is Good for Business

As the edna project transformed over time, the organisation at a broader level has also evolved in a similar manner. There has been a conscious effort to

be open and publish in all areas of its work. If software is developed that potentially has benefit to the education sector, every effort is made to ensure that it is available as open source. As the company grows it seeks to publish what it learns in blogs, papers, podcasts etc. Rather than losing a 'competitive edge' over others, being open about what it learns has had the effect that more enquiries and requests from stakeholders and potential customers is taking place.

Commentators in other jurisdictions have recently put the argument that so-called 'Web 2.0' technologies have provided a disruptive influence upon policy development for organisations such as JISC (Joint Information Systems Committee) and CETIS (Centre for Educational Technology Interoperability Standards) [21]. While this may well be true it is also true that no technology is intrinsically disruptive. Disruptions occur when organisations or communities are not adequately prepared or configured to deal with them. This is not to say that *education.au limited* is a model in terms of organisational readiness, but it is important to make a distinction here. The organisation itself was founded on collaboration which still lies at the core of all its activities. Harnessing the power of open source, social networking services, and self publishing can be seen as key enablers for operating at a level that was probably only foreseen by the most visionary of its founders. This has been and remains an important challenge, particularly where organisational hierarchies need to become supple and flexible – but this is also entirely consistent with the principles upon which the agency was founded.

5. CONCLUSION

The primary conclusion from the foregoing discussion is that the open agenda is likely to continue its influence upon the structure and character of many organisations in the education and training sector, not only *education.au limited*. Alignment is not an easy task, however, given that organisational hierarchies are being tempered by the agile and responsive character of networks and networked knowledge. This aligns closely with the conclusion drawn by Kelly et al in arguing that there is a clear need in the education and training sector for better clarity on the "process for adopting open approaches". [21]

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