

The Open Movement: What Libraries Can Do

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Abstract

Open approaches have moved beyond open access, open source software, and open courseware to developments with open infrastructure and open processes. Open initiatives are gaining momentum as a result of both bottom-up grassroots activism and top-down policy agenda. In a few instances, they have already reached a tipping point; but in many cases they are being pursued separately by specialist groups, suffering from fragmentation, and not always having their expected outcomes or impact. Our study of open initiatives uses a simple overarching definition of open resources, and introduces a convenient framework enabling shared understanding of three different types of openness – open content, open process, and open infrastructure – illustrated by a dozen examples of open domains relevant to libraries and information services. We explain the common attributes, existing synergies, mutual benefits, and natural limits of open approaches that need to be taken into account when developing and implementing policies and strategies to advance openness in organizations. We argue that librarians and other information specialists can make important contributions in promoting a holistic open culture in education, workplaces, communities, and society; and we identify a continuum of nine potential roles as recommended operational, tactical, and strategic interventions for information professionals, individually and collectively. Practitioners can use the models and tools presented to gain a fuller understanding of the concept of openness and its implications for libraries and their parent institutions; and, more significantly, to review, evaluate, and determine their own current and future roles as advocates, collaborators, and leaders of the open movement.

The Open Movement

Open has been asserted as “the default *modus operandi* for research and higher education” (e-Infranet, 2013), and now extends beyond familiar concepts, such as open access, open source software, and open courseware, to many other examples, including open linked data, open peer review, and open textbooks. Libraries and librarians are getting involved across the whole spectrum of open activities. Notable examples include discussions around support for text and data mining (Orcutt, 2014), and a surge of interest in massive open online courses (MOOCs), evidenced by recent literature, including an environmental scan from ACRL, and a case study of the copyright and permission service at Duke University (Fowler & Smith, 2013; Kazakoff-Lane, 2014; Kaushik, 2015).

Partnership approaches are the dominant model here, with initiatives such as the Global Open Knowledgebase (GOKb) developing open linked data for electronic resource management and scholarly communication using a community-managed approach (Hanson, Song & Wilson, 2015), and the Open Library of Humanities, which is also based on library partner contributions, with libraries funding infrastructure development – rather than purchasing individual journals – in a groundbreaking project enabling humanists to experiment with new models of open access publishing (Eve & Edwards, 2015). Public libraries are also engaging with open agenda, for example by hosting open data hackathons and exploring other ways of working with the open data community, while also strengthening links with local government (Carruthers, 2014).

Definitions of Openness

Table 1 presents sample definitions of open concepts found in the literature and reported in our prior work (Corrall & Pinfield, 2014).

<i>Concept</i>	<i>Definition</i>	<i>Source</i>
Open access	"...free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited."	BOAI (2002)
Open bibliography	"systematic efforts to create and maintain stores of Openly accessible, machine-readable bibliographic data"	Jones et al. (2011)
Open content	"...a collective name for creative work published under a non-restrictive licence that explicitly permits the work to be copied and – depending on the particular licence chosen – to also be adapted and distributed."	Keller & Mossink (2008, p. 13)
Open courseware (OCW)	"free and open digital publication of high quality college and university-level educational materials. ...organized as courses, and often include course planning materials and evaluation tools as well as thematic content. ...openly licensed, accessible to anyone, anytime via the internet."	OCW Consortium [n.d.]
Open data	"Data that meets the criteria of intelligent openness. Data must be accessible, usable, assessable and intelligible."	Royal Society (2012, p. 12)
Open development	"the community-led development model found within many successful free and open source software projects."	Anderson (2009)
Open educational practices (OEP)	"...collaborative practice in which resources are shared by making them openly available, and pedagogical practices are employed which rely on social interaction, knowledge creation, peer-learning, and shared learning practices."	Ehlers (2011, p. 6)

Open educational resources (OER)	"...teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions."	UNESCO (2012, p. 1)
Open innovation (OI)	"the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. ...assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market"	Chesbrough (2006, p. 1)
Open literature review	"...uses a social networking space to aggregate and collectively discuss an evolving body of literature around a set of core research questions."	Conole & Alevizou (2010, p. 6)
Open notebook science	"a form of Open Science where the laboratory notebook is made public in as close to real time as possible"	Bradley, Owens, & Williams (2008)
Open peer review	"the opposite of double blind, in which authors' and reviewers' identities are both known to each other (and sometimes publicly disclosed), but... also used to describe other approaches, such as where the reviewers remain anonymous but their reports are published."	Ware (2011, p. 25)
Open science	"making methodologies, data and results available on the Internet, through transparent working practices"	Lyon (2009, p. 6)
Open source	"...the practice that gives free access in production and development to the source material for an end product; in most cases, one is dealing with software."	Keller & Mossink (2008, p. 9)
Open source software	"The essence of open source is not the software. It is the <i>process</i> by which software is created. Think of the software itself as an artifact of the production process. And artifacts are often not the appropriate focus of a broader explanation."	Weber (2004, p. 56)
Open standards	"Open standards are developed in a transparent and collaborative process, are available for free or at a nominal cost and can be implemented royalty free – in particular regarding software interoperability standards – or at reasonable cost."	Undheim & Friedrich, (2008, p. 2)
Open systems	"...conform to internationally agreed standards defining computing environments that allow users to develop, run and interconnect applications and the hardware they run on, from whatever source, without significant conversion costs"	Bryant (1995, p. 32)

Table 1: Sample definitions of open concepts

Interpretations of "open" vary for different stakeholder and practitioner groups, especially in the commercial arena (e.g., open standards) and for emergent areas (e.g., open peer review). In some cases, concepts and terms used for one area of practice have been adopted and adapted for another domain. Thus Suber (2012, pp. 65, 66) uses terminology from open source software to define two "sub-species" of open access:

“Gratis OA is free of charge... Users must still seek permission to exceed fair use. Gratis OA removes price barriers but not permission barriers.”

“Libre OA is free of charge and also free of some copyright and licensing restrictions ... Libre OA removes price barriers and at least some permission barriers.”

In other cases, practitioners have developed their own specific frameworks and meanings for concepts and terms that have more general application, such as the “4 Rs” framework for open educational resources (Wiley, 2010, p. 6):

- Reuse: the right to reuse the content in its unaltered/verbatim form (e.g., make a backup copy of the content)
- Revise: the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
- Remix: the right to combine the original or revised content with other content to create something new (e.g., incorporate the content into a mashup)
- Redistribute: the right to share copies of the original content, the revisions, or the remixes with others (e.g., give a copy of the content to a friend).

Open approaches are continuing to evolve in a complex, pluralist knowledge economy, using multiple definitions. The open access movement is among the more mature examples, where research shows OA has reached a tipping point globally, i.e., the stage where a majority of articles are freely available. Studies by Science-Metrix for the European Commission revealed all 34 European countries examined “have tipped towards a majority of papers in OA” and in four countries the aggregate availability for the 2008-2013 period was above 70%; while in North America, the US (67.9%) and Canada (64.4%) have definitely passed the tipping point (Archambault, Caruso & Nicol, 2014, p. 20). The complexity of the OA landscape is illustrated by the plethora of interpretations in that field alone. As Archambault et al. (2014, p. 4) observe,

“Access - can be open (free), restricted or paid; with unrestricted or restricted usage rights; quality controlled or not; pre-print (pre-refereeing), post-print (post-refereeing), or published version (with final copy editing and page layout); immediate or delayed; permanent or transient.”

They provide definitions for 10 categories of access, with sub-categories in several instances (not shown here):

- Open Access
- Ideal Open Access
- Restricted Access
- Paid Access
- Restricted Open Access

- Green Open Access
- Gold Open Access
- Robin Hood Open Access or Rogue Open Access
- Delayed Open Access
- Transient Open Access

However, despite the plurality, scholars and practitioners are increasingly identifying theoretical and practical links between open research and open education (Conole & Alevizou, 2010; Esposito, 2013), and also wider connections to open source, open government, open economy, and open society (Peters, 2010; Willinsky, 2005). Others have used Boyer's (1990; 1996) model of scholarship as discovery, integration, application, teaching, and engagement to promote a holistic view of open/social scholarship in the digital world (Greenhow & Gleason, 2014; Scanlon, 2014). The European Network for Co-ordination of Policies and Programmes on e-Infrastructure (e-InfraNet) has made a seminal contribution here in a comprehensive report proclaiming "'Open' as the default *modus operandi* for research and higher education." The project provides a simple overarching definition of Open that can be used to promote a unified interpretation of the concept (e-InfraNet, 2013, p. 12):

"Open means ensuring that there is little or no barrier to access for anyone who can, or wants to, contribute to a particular development or use its output."

A Typology of Open

We suggest as an aid to understanding and planning, it is useful to think about openness in terms of three basic *types* of open, concerned with *content*, *process*, and *infrastructure*, with the following aims:

- **Open Content** – making content of various sorts freely accessible and available for reuse (e.g., publications, reports, presentations, theses, dissertations, datasets, metadata, learning objects, computer code)
- **Open Process** – carrying out academic or business processes in the public arena (e.g., product and service innovation, software development, scientific work, peer review, pedagogical practices)
- **Open Infrastructure** – creating an interoperable technical environment for education, research, and administration (e.g., standards, systems)

Each open type is represented by distinct open *domains* of activity, though some domains (e.g., open source software) relate to more than one type. Table 2 (taken from Corral & Pinfield, 2014, p. 298) presents our proposed typology.

Open Type	Open Domain
Open Content	Open access to research publications (OA)
	Open data
	Open educational resources, including open courseware and open textbooks
	Open bibliography/metadata
	Open source software
Open Process	Open development
	Open educational practices
	Open peer review
	Open research, including open literature review and open notebook science
	Open innovation
Open Infrastructure	Open standards
	Open systems

Table 2: A typology of open

As already indicated, although open activities have generally been pursued separately by diverse specialist communities, stakeholders are increasingly seeing connections and identifying important synergies among the different domains:

“As the availability of and access to content and infrastructural resources increases, the need for and use of ‘open processes’ becomes more evident. Where ‘open content’ is used and produced in ‘open processes’ within an open infrastructural setting, a culture of ‘openness’ gradually emerges” (e-Infranet, 2013, p. 13).

The notion of an open *culture* is an important additional dimension of the open landscape that needs to be considered and promoted to advance the open movement. Figure 1 (from Corral & Pinfield, 2014, p. 299) presents a high-level model of open adding culture to the mix.

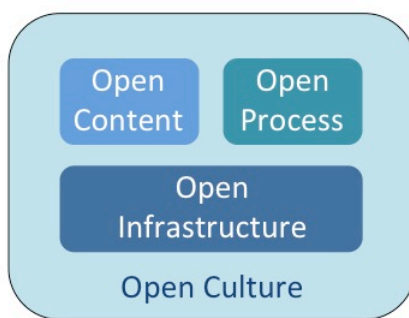


Figure 1. High-level open typology

In practice, the different open domains overlap and support each other, and in turn stimulate new forms of openness. Thus, open data from research builds on open access to publications, and both often use open source software to make content accessible, such as DSpace from the Massachusetts Institute of Technology (MIT) or EPrints from the University of Southampton (Lynch, 2003). Open educational resources similarly often use open source systems to manage

and provide access to course content, and resource sharing is encouraging faculty to share pedagogical practices and promote peer learning; for example, Abelson, Miyagaw and Yue (2012, p. 9) describe an initiative at MIT intended to:

“share not just the content that MIT uses in teaching – the original OCW model – but also explicit information on how we teach at MIT. This will potentially include pedagogical statements from and interviews with participating faculty, links to exemplary teaching practices, showcases of educational innovations, and other framing information that places the content shared in context of our teaching philosophies.”

Such relationships and dependencies are a key feature of the evolving landscape, which mean that policy interventions in one area can have beneficial effects in other domains, as depicted in Figure 2 (Corrall & Pinfield, 2014, p. 301).

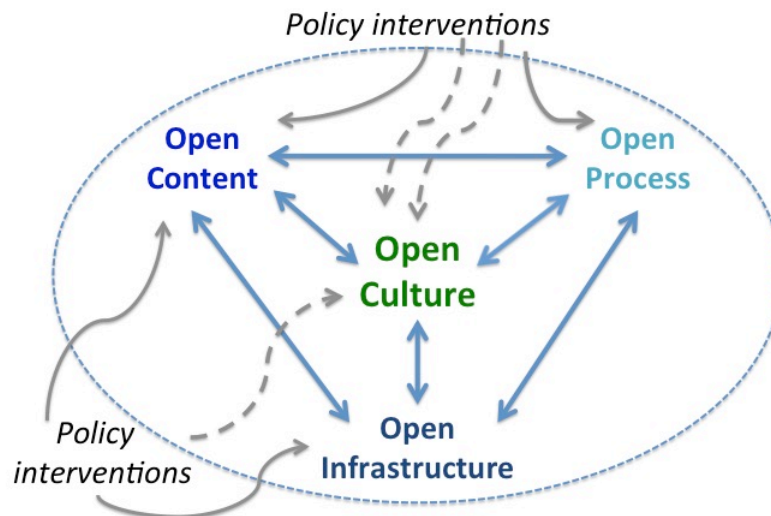


Figure 2: Evolving model of open

The Case for Coordination and Integration

A decade ago, Willinsky (2005) advanced a threefold argument for the “unacknowledged convergence” between open access and open source software. First, the different open domains have a shared “commitment to the unrestricted exchange of information and ideas,” evidenced in their shared associations with transparency, public good, and public accountability (resonating with the interests of policy makers). Secondly, they are governed by common “economic principles,” based on the efficacy of free knowledge resources, an economy of recognition, and the existence of “free-or-subscribe” models. Thirdly, they have shared characteristics derived from their commitment and principles. We argue that the *de facto* interconnectedness between open domains that continues to develop is a fourth commonality (Corrall & Pinfield, 2014).

In addition, open initiatives share several common attributes: they are generally driven by the impulse of intellectual curiosity; they support an economy of reputation building; and are facilitated by motivation for “competitive sharing.” They also offer significant common *benefits* for institutions and individuals, such as visibility and impact, reuse, innovation and agility, cost effectiveness, quality enhancement, and reputation and trust (e-Infranet, 2013; Read, 2011). The potential benefits of openness are important factors to consider when formulating policies or strategies within institutions. It is also important to acknowledge there are “natural” limits to openness, such as the exclusion of royalty-generating literature; restrictions on sharing personal data and commercial information; the existence of a strong mixed economy for software; and selectivity in sharing educational resources arising from concerns about quality, competitiveness, and other issues (Corrall & Pinfield, 2014).

Where Do We Go From Here?

The different open domains are at various stages of evolution and maturity. Open approaches continue to be promoted by diverse communities of practice, but often on parallel tracks, with little or no practical connection between them. Initiatives are being managed at multiple levels – institutional, consortial, national, and international – but with insufficient collaboration and coordination to realize their full potential. The open domains are predicated on shared values, they have common goals, and face similar practical issues (e.g., intellectual property rights, business models, sustainability). Librarians and other information specialists are already doing great work in many areas: they have a long history of involvement in open access, they are engaging with the challenges of open data, and doing pioneering work on open textbooks (Clobridge, 2015; Corrall, Kennan & Afzal, 2013; Pinfield, 2015).

Libraries are especially well placed to exploit the synergies and opportunities across the whole open arena, and have the capacity to make operational, tactical, and strategic interventions that will deliver real benefits to their communities and society. Many of the problems identified by others play to our strengths, for example:

“Repository development and implementation presents numerous challenges related to intellectual property rights, data curation, long-term preservation, infrastructure development and interoperability” (Archambault et al., 2014, p. 6).

There is also an urgent need for active monitoring of developments globally, which the profession has the expertise, networks, and structures to do. Archambault et al. (2014, p. 15) have issued an important warning:

“Many mandates being promulgated at the moment run the risk of favouring a shift from BEPA [Back End Paid Access] to FEPA [Front End Paid Access], from inaccessibility to inequality.”

<i>Types</i>	Open Content					Open Process				Open Infrastructure		
	Open Access	Open Data	Open Educational Resources	Open Bibliography/ Metadata	Open Source Software	Open Development	Open Educational Practices	Open Peer Review	Open Science/ Research	Open Innovation	Open Standards	Open Systems
<i>Roles</i>												
Use												
Educate												
Advocate												
Facilitate												
Mediate												
Collaborate												
Coordinate												
Integrate												
Lead												

Table 3: Potential roles in open domains

Table 3 shows potential roles for libraries in open domains. The matrix can be used as a tool to assess your current situation and set goals for moving forward by answering the following questions:

- How often are you *now* performing the suggested roles for the defined domains – Frequently? (F) Occasionally? (O) Rarely? (R) Never? (N)
- How often *will* you be performing the suggested roles for the defined domains next year – Frequently? (F) Occasionally? (O) Rarely? (R) Never? (N)

The key area where libraries could – and arguably should – make a substantial contribution is in policy and strategy development for their institutions and communities. Some libraries and information services have prior experience of institutional information strategies from the 1990s, from which lessons can be learned for the open era (Bernbom, 1997; Hughes, 1997; Michalko, 2000). We can also look to management science and other arenas for models and frameworks. Ackoff's (1970) classic concept of *interactive planning*, based on the principles of participation, continuity, and holism, would be a good fit for a concerted effort to develop a unified strategy. The three principles incorporate a stakeholder approach, real-time strategy-making, and middle-up-down planning, with the process conceived as:

- *Participative* – everyone who could be affected by the plans should be directly involved or represented in the planning process, to build understanding and help implementation;
- *Continuous* – plans should be continuously revised in light of their performance, unexpected developments, and the latest information, to anticipate and respond to changes in the environment; and
- *Holistic* – every part of a system and every level of it should be planned for simultaneously and interdependently, to co-ordinate and integrate multiple units and different levels.

Another model for consideration is Kipling's (1902) questions, also known as the 5W1H problem-solving method (or WWWHWaW0), which is used in journalism, engineering, and management, and similarly as an observational framework in social research (Patton, 2002). The six questions can be used to identify issues for consideration in policy development, e.g.,

- **Why?** (Rationale) – external drivers, institutional missions, individual incentives
- **What?** (Scope) – open types/domains, selection criteria, formats and standards
- **When?** (Timing) – deposit, release, embargoes (publishers, sponsors/funders)
- **Where?** (Venues) – institutional/community repositories, storage locus and access route
- **Who?** (Players) – stakeholder responsibilities, governance arrangements
- **How?** (Practicalities) – openness definitions, license conditions, operational procedures.

Libraries are uniquely positioned to collaborate with other stakeholders in coordinating efforts to move beyond atomistic policies and strategies towards the design and delivery of holistic integrated institution-wide endeavors to advance the open agenda. Policy and strategy lag behind thinking and practice, and libraries can take the lead in developing a coherent response.

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