

Open Education Handbook

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0.1 About this book

“Open Education” is a topic which has become increasingly popular in a variety of contexts. This handbook has been written to provide a useful point of reference for readers with a range of different roles and interests who are interested in learning more about the concept of Open Education and to help them deal with a variety of practical situations.

As a “living” online document, we hope that it will continue to evolve, reflecting cutting edge research and innovation in this area and helping educational communities to come to an improved understanding of the value of open.

When the process of writing this book first started, the original intention was only to cover open data use in education. As the project progressed it was felt that a broader scope would enable readers to have a better understanding of the synergy and overlap between different aspects or facets of open education (such as open resources, open data, open practices and open culture).

We have been guided by the idea that the handbook will continue to grow and evolve through involvement with the learning communities it is intended to support. The latest version of this handbook includes:

- An overview of different elements of the open education ecosystem
- Information about useful tools and software
- Useful references
- A glossary of terms commonly used in open education
- Case studies and real-life examples
- Answers to frequently asked questions
- Discussion of key issues in open education

During the course of writing the handbook many organisations and individuals related to [The Open Education Working Group](#) have contributed. These are listed in the [acknowledgements](#) section.

This handbook is a deliverable of the [LinkedUp Project](#) (WP4: Dissemination and Community-building) with the work being led by [Open Knowledge](#).

0.2 Who is this book for?

Open Education is of interest to many and different sections of this handbook are likely appeal to different stakeholders, whether they are expert or beginner in this field. This handbook is aimed at a wide variety of users from all sectors of education as well as informal learning.

We understand the main audiences as including:

- Formal students
- Independent learners
- Lecturers/Tutors
- Teachers
- Researchers
- e-Learning specialists
- Producers of open educational resources (OER)
- Primary and secondary school professionals
- Educational technologists
- Software developers
- People interested in using open data
- Policymakers

Secondary audience(s) include:

- Administrators
- Support staff
- Education managers
- Publishers
- Parents/Guardians of learners
- Funders
- ‘Creatives’ interested in open licensing

0.3 How this book was written

The Open Education Handbook is a community project of the Open Education Working Group, initiated by the [LinkedUp Project](#) and contributed to other organisations (e.g., [Creative Commons](#) and [Mozilla](#)) and individuals.

The writing of this handbook was co-ordinated by [Open Knowledge](#), a worldwide network of people passionate about openness, using advocacy, technology and training to unlock information and enable people to work with it to create and share knowledge. Open Knowledge believes knowledge can empower everyone, enabling people to work together to tackle local and global challenges, understand our world, expose inefficiency and challenge inequality and hold governments and companies accountable.

The content of the Handbook has been crowdsourced and was drafted over a series of online and offline events. The initial outline was created by 17 open education experts at

a booksprint in London in September 2013, with refinement continuing online after the booksprint. A second booksprint took place in Berlin in November 2013, and further ideas were contributed to the book as a result of OPPI: Helsinki Learning Festival in April 2014. The latest draft was further reviewed at OKFestival in Berlin July 2014. Sections have also been formulated through collaborative efforts based on the 'Friday Chats' from the Open Education Working group mailing list. An editorial review of the handbook took place in September 2014.

We continue to be interested in contributions from experts and practitioners who can help us to further refine the information we have gathered, and encourage feedback.

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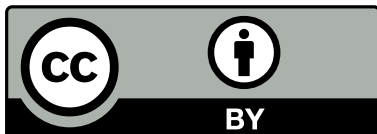
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0.5 Licence

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Chapter 1

Open Education

1.1 What is open education?

Precisely what 'open' means in open education has been the subject of some debate. Contemporary education as a whole may be broadly understood as incorporating a wide range of pedagogical and scholarly activities which can take place inside or outside formal institutions. Very broadly, these can include:

- **learning**, whether through instruction, guided activity or self-directed learning;
- **teaching** which can include mentoring and all non-instructivist activities around the deliberate nurturing of knowledge;
- **assessment** which may be any combination of summative, formative and/or diagnostic;
- **accreditation** which can include recognising learner or educator accomplishment;
- **policymaking** at any level of education or governance where this influences curriculum, funding and procedures in education; and
- **administration**, dealing with recruitment, admissions, retention, progression, graduation, timetabling, reporting, and management.

In a traditional learning environment (such as a school or university) these aspects of practice tend to relate to each other in familiar ways. When we talk about open education we're really interested in the ways in which our practices can change as a result of adopting open practices, but also in education outside of formal institutions.

Open Education is a collective term used to refer to many practices and activities that have both openness and education at their core. First and foremost, open education is about removing barriers to education. This may be through removing entry requirements, as The Open University (UK) has done, or by making content and data freely and legally available for reuse. However it also reflects other cultural changes, such as the move to open up learning methods and practices, which sees the blurring

or removal of traditional roles such as teacher and student, moving towards roles such as mentor and learner.

The priorities and practices of Open Education are continually changing. Many aspects of open education engender debate (such as content licensing, definitions of open, incentives for participation, etc.) while other aspects that are less contentious, such as the need for technology to support learning, data use to support education initiatives in the developing world, etc. Overall, there is increasing recognition that education is being transformed and that open education can play a significant role in this transformation.

Some people tend to think about open education in terms of the content and resources used in education. Seen this way, a piece of data or content is open when it meets the **Open Definition**, "if anyone is free to use, reuse, and redistribute it — subject only, at most, to the requirement to attribute and/or share-alike." This means that, with the right 'open' license, resources like textbooks, websites, videos, curricula, lesson plans, audio and image files can be free to share and adapt according to pedagogical needs.

Open licensing typically results in resources being made available more cheaply (or for free). Some commentators have suggested that the distinction between 'open' and 'free' that is derived from the **open source movement**. While free software focuses on the freedom of agents within the software world (eg. users and developers) 'open source' software focuses on the advantages to the software development process of transparency and sharing.

In open education, for a resource to be open, it must be both 'gratis' and free/open. That is, one must be able to access the educational resource at no cost and have the legal rights to reuse, revise, remix and redistribute the resource and/or adaptations of the resource.

In the context of open education the focus until recently has tended toward open access to resources, but there are other ways of being open, reflected in the language of 'open educational practices' (OEP). These are innovations in educational practice that are made possible by open licensing of resources.

It is worth remembering that the open in 'open education' does not apply just to content, data or resources. Openness is part of wider change and movement towards equality and collaboration.

Further resources

- An excellent introduction to open education is provided by the Open University's [Open Learn Open Education MOOC](#).
- [Winning entries of the Why Open Education Matters video competition](#)
- [The Capetown Open Education Declaration](#)
- [The Hewlett Foundation's white paper on Open Educational Resources](#)
- [UNESCO's portal to Open Educational Resources](#)
- [The benefits of open - position paper by CETIS/Open Scotland](#)
- [The Battle for Open - a perspective by Martin Weller](#)

1.2 History of open education

Open Education covers a broad range of activities and has a long history. From the public library movement of the 19th century which promoted open universities and state-provided education, when education suddenly became accessible to all, to the setting up of institutions like the Open University in the UK which lowered the boundaries to access.

An historical reconstruction is provided by Peters and Deimann (2013) who begin with the scholastic movement of the Middle Ages. They write:

- The late Middle Ages were characterised by a number of changes that "opened" education from

what had been, until then, one mostly restricted to monastery open schools. A major factor was the growth of medieval towns and increasing urbanisation of society.. Out of the cathedral schools grew what we today recognise as institutions of higher learning, then termed "studium generale". The "generale" or general nature already recognised the importance and signified that it was "intended for entire Christendom without regard for national or territorial boundaries".

- By the late 1500s access to knowledge and learning had become very different. No longer a place for the free exchange of students, teachers and ideas, the higher education institution had become increasingly closed. By the 1600s the invention of the printing press was beginning to spread knowledge more widely.

- 17th century coffee-houses provide us with another instance of openness. Here patrons from all walks of life were given access to the premises and could sit down and read (or listen) to the latest news, pamphlets and books and participate in lively discussions covering science, religion, business, literature and of course the latest gossip.

- The 18th century is marked by wide-ranging popular literacy among men. The popular response to Thomas Paine's 1791 Rights of Man fuelled "literacy from below" as artisans and the new industrial working class taught one another to read and established growing numbers of self-education societies.

- From the late 19th century until the end of the Second World War, miners' libraries emerged as the thirst for knowledge and rise of interest in self-education coincided with the growth of the coal industry. With few exceptions, every mining town and village had its own "workmen's institute", containing, among other a reading room and a library that would be at the heart of the establishment.

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- The 20th century continued to see education "open" as the belief in the people's right to access society's knowledge grew. In Argentina for instance, this is particularly visible in the University of Buenos Aires, as shaped by the ideas of the 1918 Cordoba reform.

- Openness was also enabled by further developments in distance learning. Best known is probably The Open University (UK) founded in the 1960s, at a time of significant developments in communications technology and mass media.

More recently it has taken on new impetus in a new direction, not disconnected with that history, but not entirely similar in focus.

Fabian Tompsett from Wikipedia argues that:

- Open Education has its roots in the Civil Rights movement in America, in particular the Freedom Schools which were tied in with the Greensboro sit-ins where students broke down the colour bar. The students involved in this sit-ins took their college books with them and used the time to study.

- People like **Mario Savio** and **Tom Hayden** acknowledge the role of what they learnt from their participation in the civil rights movement in their subsequent activities like the **Berkeley Free Speech Movement** and the **Port Huron Statement**. These social movements played a crucial role in providing the environment which gave rise to Silicon Valley.
- The **People's Computer Company** were advocates of Open Source, and went on to spawn the **Homebrew Computing Club**. It was the social activism of the sixties and seventies which gave rise to the knowledge revolution and the technological advances which have had such an impact on contemporary society. Fabian also points out that schools played a part too and **Ivan Illich** and questioned the role of schools and advocated learning webs.

Technological innovation has naturally contributed to changes in educational practice but tools are often enablers rather than drivers. Open education is very much the result of a dialectical relationship between technology and human aspirations. As **Ivan Illich** said in *Deschooling Society*: “Technology is available to develop either independence and learning or bureaucracy and teaching.”

As **Martin Weller** notes in *The Battle for Open*: “Openness has a long history in higher education. Its foundations lie in one of altruism, and the belief that education is a public good. It has undergone many interpretations and adaptations, moving from a model which had open entry to study as its primary focus, to one that emphasises openly available content and resources. This change in the definition of openness in education has largely been a result of the digital and network revolution. Changes in other sectors, most notably the open source model of software production, and values associated with the internet of free access and open approaches have influenced (and been influenced by) practitioners in higher education. The past decade or so has seen the growth of a global open education movement, with significant funding from bodies such as the **William and Flora Hewlett Foundation** and research councils. Active campaigners in universities have sought to establish programmes that will release content (data, teaching resources, publications) openly, while others have adopted open practices regarding their own working, through social media and blogs. This has been combined with related work on open licenses (notably **Creative Commons**) which allow easy reuse and adaptation of content, advocacy at policy level for nation or state-wide adoption of open content and sharing of resources, and improved technology and infrastructure that make this openness both easy and inexpensive.”

Further resources

- **Open Education Timeline** - the interactive online timeline created by the Open Education Working Group

- **Intro to Openness in Education** - a course by **David Wiley** for the School of Open
- **Kernohan, David and Amber Thomas (2012) OER - a historical perspective**
- **Tompsett, Fabian (2013) Vernacular Education**, a presentation at Eduwiki 2013.

1.3 Benefits of open education

There are many organisations, groups and individuals who can potentially benefit from open education and open educational practices.

The OER Research Hub project investigates some of the key claims made about the benefits of OER and open education. Their research hypotheses provides a good overview of the potential benefits.

- Use of OER leads to improvement in student performance and satisfaction
- People use OER differently from other online materials
- OER widen participation in education
- Use of OER is an effective method for improving retention for at-risk students
- Use of OER leads to critical reflection by educators, with evidence of improvement in their practice
- OER adoption brings financial benefits for students/institutions
- Informal learners use a variety of (quality) indicators when selecting OER
- Informal learners develop their own forms of study support
- Open education acts as a bridge to formal education
- OER use encourages institutions to change their policies
- Informal assessments motivate learners using OER

The latest evidence for these claims can be reviewed at **OER Impact Map**.

Much has been written about more specific instances where open education approaches can bring benefit.

The Commonwealth of Learning report *Benefits and Challenges of OER for Higher Education Institutions* notes that: “anecdotal evidence suggests that OER may improve educational practices, coherence across courses, technical quality and research into pedagogy; facilitate technical improvements and the development of high

quality and shareable images; and improve mechanisms for accreditation and external endorsement. Survey responses suggest that OER does not reduce materials development costs directly, but instead is still requiring additional funding. However, OER may indirectly increase the number of registrations thereby increase tuition fees; lower some of the marketing costs; and enable a new business model through offering services around OER.”

Institutions have also benefited from open data and transparency that can lead to better funding and infrastructure.

The Open Michigan report *Open Educational Resources: Benefits for Faculty and Students* argues that openly-licensed learning materials are easy to find and access, encouraging more independent and flexible learning opportunities for students. OER courses allow students to explore materials before enrolling, making them better prepared before they arrive in the classroom.

Open education has given access to those who previously had no access to educational materials, resources and practices. This means that someone can study using a Massively Open Online Course (MOOC) or OER generally without having to attend a formal learning institution.

Further resources

- [Benefits of openness in education](#) - wiki for Open Education Summit 2012

1.4 Access, participation, collaboration

It is possible to regard openness in different ways. One approach is to contrast 'open access' with 'open participation' or 'open contribution'. Open Education has in the past tended to focus on access, but an argument can be made that open participation and contribution is a more important indicator of openness than access to resources.

P2PU offers a course in *Designing Collaborative Workshops* that explores ideas around open participation.

Within the course it defines the following terms:

- **Participatory** - Trying to break down the barriers between the student and the teacher.
- **Collaborative** - Collaborative processes help us move away from the dominant theory of single author works, or ownership by one organisation/individual of what is created or the tools used to create it.

Open participation goes beyond the student-teacher relationship; it arguably can embody the student-student relationship, the student-course relationship and possibly more relationships. Open participation can involve many

different communities, from established education institutions with a wealth of experience, to commercial companies, and individuals who are new to open practices.

The **Heartbleed Bug** offers a cautionary tale for the Open Education community. It occurred because everyone was using OpenSSL code, but no one was checking the work. Participation is an important part of an open process.

The challenge is for Open Education Practitioners and communities to bring in those from outside. Once people recognized that open knowledge can be enriched by individual academic experience they will feel more motivated to know and participate, not just as an audience member but as a protagonist.

If Open Education is primarily about access to (open) resources then to some extent the burden and responsibility is placed on those with the technical ability to create resources and share them. The balance of power is uneven, resources continue to be designed from a particular perspective and one could argue that to some extent Open Education becomes a form of socio-cultural colonialism. For example, there are still relatively few people currently taking on the dual role of consumer and developer of open education resources (this is often more pronounced in developing countries).

Further resources

- [Open as in oer and open as in MOOC](#) by Pat Lockley

Chapter 2

Open Education Resources

2.1 Open Educational Resources (OER)

One way of thinking about open education is with reference to making educational resources - materials that are used for teaching and learning - more openly available. This is typically done by putting them online and making them available on an open licence which permits or encourages adaptation and/or re-use.

The Hewlett Foundation defines open educational resources (OER) as follows:

“Open Educational Resources (OER) are teaching, learning, and research materials in any medium that reside in the public domain or have been released under an open license that permits their free use and re-purposing by others.”

Some argue that for a resource to be an open educational resource, it must be both free to access and openly licensed (or in the public domain). One could describe OER as “liberally licensed stuff for use in education”. Wikipedia describes them (as of 21 November, 2014) as “freely accessible, openly licensed documents and media that are useful for teaching, learning, educational, assessment and research purposes.” OER can consist of full courses or components of courses, including course materials, lesson plans, textbooks, learning objects, videos, games, tests, software, or any other tool, material, or technique that supports access to knowledge.

OER maximize the power of the Internet to improve teaching and learning, and increase access to education.

Open Educational Resources meet the “4Rs Framework,” meaning that users have free access and all of the legal rights necessary to:

- **Reuse:** Content can be used in its unaltered form;
- **Revise:** Content can be adapted, adjusted, modified or altered;

- **Remix:** The original or revised content can be combined with other content to create something new;
- **Redistribute:** Copies of the content can be shared with others in its original, revised or remixed form.

Although some people also consider the use of an open technical format to be an essential characteristic of OER, this is not a universally acknowledged requirement.

Further resources

- [The Hewlett definition of OER](#)
- [Understanding OER in 10 videos by OER Research Hub](#)
- [The Jisc InfoKit provides an excellent introductory guide to OER](#)

2.2 Types of OER

Open Educational Resources (OERs) can be divided up in many ways. For example open courseware, open textbooks and MOOCs can all be OER.

Here are some examples of OERs:

- Complete courses
- Individual course units or modules
- Textbooks
- Lesson plans
- Syllabi
- Lectures
- Assignments
- Games
- Quizzes
- Podcasts

- Videos

OER can also be divided up by their content format, though most OER will be comprised of a variety of media.

- Text led
- Video led
- Animation led
- Multiple media

One distinction which may be useful to think about is between 'Big' OER and 'Little' OER.

Big OERs are institutionally generated ones that arise from projects such as OpenLearn. These are usually of high quality, contain explicit teaching aims, presented in a uniform style and form part of a time-limited, focused project with portal and associated research and data. Little OERs are the individually produced, low cost resources. They are produced by anyone, not just educators, may not have explicit educational aims, have low production quality and are shared through a range of third party sites and services.

Further resources

- Martin Weller on 'Big and little OER'.

2.3 Why use OER?

Economic benefits

Releasing OER can have significant reputational gain and others may do so if you do not. It is an opportunity to be a leader in a fast moving and highly significant area. Letting students preview high quality resources prior to applying at your institution may boost recruitment and is good practice.

Good sharing practice

Apart from these (economic) reasons, publishing resources openly is reclaiming traditional academic practice of sharing knowledge. Releasing material can help bridge gaps between groups. Seeing the content used for for teaching and learning in universities can help people realise that higher education may not be too big a step for them.

Concerns

Concerns may focus around lack of knowledge about the intellectual property rights (IPR) of your resources. For example you may be sure about IPR but know you cut some corners. Institutions and staff may also worry about criticism of their materials.

Educator perspectives

Creation of OER has big benefits to individuals, educational institutions and society as a whole. If you are an educator it makes sense to create and use OER.

It should be noted that there are differences between OER activity in schools and in tertiary education institutions. In schools, OER are hugely valuable for teachers, especially those in the developing world. In tertiary education and for researchers, the focus shifts and it is not just about access to materials, but about making it possible (usually via open access models) to share materials more easily and creating platforms for more work to become visible (and therefore attract funding).

Teachers are responsible for creating great learning experiences, not (necessarily) for creating all the resources needed for this themselves. Reusing existing OER frees up time that can be spent on other aspects of the teaching and learning process. Their use can help you expand your range of teaching materials.

If you are teaching a common subject, chances are that somebody else has already created great learning resources for the same or a similar context. Students can also access these resources on their own, so why not point them to these resources or incorporate them into your teaching? This can provide motivation to further improve the resources and re-release them openly for others to reuse.

Getting your materials out there as an educator can both help raise your profile and allow your resources to be improved by other users. Creating OER can also improve practice by encouraging reflection, and may facilitate networking and collaboration with other subject experts. Use and creation of OER facilitates looking outside your immediate environment and getting broader and different views on topic areas.

Institutional Perspectives

Creating OER puts content-rich material on the the web that will be indexed by Google and can be used to attract potential students to departmental web pages. OER creation and use align well with institutional missions where (at least) part of that mission is to disseminate knowledge broadly and with minimal impediment.

OER can also make it easier for staff to find what other educators have produced, encouraging further sharing

within your institution. It sends a message that reuse - building on the efforts of others - is more efficient than a go-it-alone approach and can bring pedagogical benefits. OER work allows potential partners to see what you cover in your courses, which may facilitate partnerships with, for example, local colleges or businesses.

OER production and use can be encouraged by institutions who offer some professional recognition to scholars who practice open education.

Learner Perspectives

OER help learners can find information instantly on virtually any topic, and connect with peers across the globe. OER can help informal learners to build up confidence about formal education and support their transition into institutional contexts. By lowering the cost of education, OER also help students to begin and complete their courses of study, where they may feel more free to focus because of reduced financial pressure.

Using OER allows students to be educators and start experimenting with learning and teaching materials. As a learner you can become an educator, mentor, facilitator, or simply a much better informed citizen.

Further resources

- [Jisc: A guide to OER: case studies](#)
- [Open Courseware Consortium Toolkits page](#) for addressing concerns, making the case, getting an OCW project off the ground

2.4 History of the OER movement

The [Free to Learn Guide](#) offers a brief history of the OER movement. The [MIT OpenCourseWare](#) project is seen as the first recognised OER project, though the open education movement predates this event with roots in open source, open and distance learning and open knowledge. David Wiley coined the term open content in 1998 and OER was first used at UNESCO's 2002 Forum on the [Impact of Open Courseware for Higher Education in Developing Countries](#). In September 2007 a meeting in Cape Town led to the [Cape Town Open Education Declaration](#) release on 22 January 2008.

The OER movement is comprised of four main categories (from [SPARC site](#)):

- [OpenCourseWare \(OCW\)](#): OpenCourseWare is the digital publication of high quality educational materials that are freely and openly licensed, and are available online to anyone, anytime. They frequently include course planning and evaluation tools along with thematic content. OpenCourseWare initiatives

range in scope from mirroring traditional classroom sized endeavors, to the emerging MOOC (massive open online course) model, which enables large-scale participation by anyone with Internet access.

- [OER Publishers](#): The rapid rise in the cost of textbooks, combined with the high demand for affordable alternatives, has led to the emergence of new open publishing efforts for textbooks and other OER. This category also includes initiatives geared toward developing specific collections of OER, such as the [Khan Academy](#) and [Saylor Foundation](#).
- [OER Repositories](#): Digital repositories have evolved into a convenient place to find, share and remix OER from a variety of sources. They range in scope from portals and gateways that provide access to information on OER and aggregated content resources to institutional repositories with source content and tools to develop OER.
- [Publicly-Funded Initiatives](#): Increasingly, policy-makers on the local, state and national levels are developing policies that encourage the creation and adoption of OER. Approaches vary from directly funding the creation of OER to conditioning federal or state research dollars to require that any Education Resources produced as a result of that funding be made openly accessible. (See [POERUP](#) and [OER Policy in Europe](#))

Further resources

- [Open Education Timeline](#) by the Open Education Working Group
- [OER History](#) (University of Maryland)
- [History of OER](#) by David Wiley
- [OER History \(video\)](#) by Bernard Nkuyubwatsi
- [Kernohan, David and Amber Thomas \(2012\) OER - a historical perspective](#)
- [Open educational resources - the story so far \(JISC\)](#)

2.5 Finding and using OER

Finding OER

Though a Google search can often provide many relevant results (tip use [Google Advanced Search](#): filter by "Usage Rights") several search engines exist to help users find Open Educational Resources. The list from the [OER Info Kit](#) includes:

- [OCWFinder](#) - "search, recommend, collaborate, remix"

- **Temoa** - “a knowledge hub that eases a public and multilingual catalog of Open Educational Resources (OER) which aims to support the education community to find those resources and materials that meet their needs for teaching and learning through a specialized and collaborative search system and social tools.”
- **University Learning = OCW+OER = Free custom search engine** - a meta-search engine incorporating many different OER repositories (uses Google Custom Search)
- **XPERT** - “a JISC funded rapid innovation project (summer 2009) to explore the potential of delivering and supporting a distributed repository of e-learning resources created and seamlessly published through the open source e-learning development tool called Xerte Online Toolkits. The aim of XPERT is to progress the vision of a distributed architecture of e-learning resources for sharing and re-use.”
- **OER Dynamic Search Engine** - a wiki page of OER sites with accompanied search engine (powered by Google Custom Search)
- The **UNESCO OER Toolkit** links to further useful, annotated resources and repositories.
- **Jisc Digital Media** maintain guidance on finding video, audio and images online, including those licensed as Creative Commons.
- **OER Glue** - tool aiming to facilitate course building by 'stitching' together OERs from a range of sources
- **Creative Commons Search** is not a search engine, but rather offers convenient access to search services provided by other independent organizations
- **DiscoverEd** is a search prototype developed by Creative Commons to explore metadata enhanced search, specifically for OER
- **Jorum** is the UK’s largest repository for discovering and sharing Open Educational Resources for HE, FE and the Skills sector.
- **OpenCourseware Consortium / Open Education Consortium** is a worldwide community of hundreds of higher education institutions and associated organizations committed to advancing open education and its impact on global education.
- **Find OER** - guidance from the Open Professionals Education Network
- **OER Commons** is a worldwide learning network of shared teaching and learning materials made freely available online.
- **Curriki** - a nonprofit organization who provide open educational resources primarily in support of K-12 education
- **Wikipedia** is a multilingual, web-based, free-content encyclopedia project supported by the Wikimedia Foundation and based on an openly editable model.
- **Project Gutenberg** provides free, high quality e-books
- **Connexions / Openstax College** provide open textbooks.
- **CK-12 Foundation** is a California-based non-profit organization whose stated mission is to reduce the cost of, and increase access to, K-12 education in the United States and worldwide.
- **TED Education** provide lesson content that can be remixed.
- **SMartHistory** - a multimedia web-book about art and art history
- **Livebinders** - online content curation
- **Solvonauts** is an open education search engine.
- **Open Education database** provides a range of ways of navigating and finding open content.

Using OER

The JISC publication *A guide to OERs* offers some advice in using OER. Develop a clear rationale along with credible business and benefit cases, perhaps using examples from elsewhere in your institution.

- OER may be of interest to almost anyone in your organisation from library staff to learners to academics or marketing professionals
- Build on previous work, tap into staff expertise and capitalise on the enthusiasm that already exists
- Help staff develop the necessary skills and knowledge to create and use open educational resources
- Support changes in teaching practice through awareness-raising, workshops, capacity building and communities of practice
- Create a culture of openness across the institution
- Find ways to reward and recognise staff members who create and use open educational resources
- Consider building open educational resources into the approval processes for your virtual learning environment
- Take an incremental approach starting with the low-hanging fruit

- Adapt existing policies (relating to intellectual property, learning, teaching and assessment) where they already exist to create a gentle, less threatening transition towards openness
- Alternatively, initiate a new special open educational resources policy to act as a powerful signal that the institution is fully committed to supporting implementation
- Embed the creation and use of open educational resources into other institutional activities to make it more sustainable

2.6 Assessing OER quality

Naturally there are concerns about the quality of OER because they are typically made available for free. Users may worry about the source of a resource; for example, whether the resource was created by a legitimate institution or knowledgeable individual. Institutions may worry that releasing materials exposes flaws in teaching practices or materials. Many argue that the transparency of process will result in better quality resources than those developed in a closed environment.

Jisc infokit suggests the following criteria for assessment of quality:

- Accuracy
- Reputation of author/institution
- Standard of technical production
- Accessibility
- Fitness for purpose

There is also a role for subject specialists (educators and librarians) in assessing the quality and suitability of a particular resource.

If a resource can be improved, it should be improved: and then re-released on an open licence so others can benefit from better quality OER.

Further resources

- [Open educational resources Infokit: Quality](#)
- [OER Quality \(David Wiley\)](#)
- [Quality Assurance Framework by Wiki Educator](#)
- [OER Quality Project](#)
- [OPAL | Open Educational Quality Initiative](#)

2.7 Creating & developing OER

Both educators and institutions need to understand the landscape of open education. As an educator you need to familiarise yourself with your institution's licenses and policies. You can start to find alternatives to questionable resources in one of the OER repositories and talk to OER practitioners, or join a group like OER-Discuss. Look at what is out there and see if there is anything that you could use or re-purpose, and talk to colleagues to get their perspectives.

Once you have made the decision to develop OER you need to think about a strategy for moving forward. Successful approaches have used the following ideas:

- Develop incrementally, making generic versions available too
- Each part of an OER, such as a picture, or text, can also be an OER and can be shared as well
- You probably already have potential OER - any resource you use which does not use other people's copyrighted work could be an OER
- You don't need to be an elearning genius to make an OER: a Powerpoint file can be an OER
- Once developed - all you need to do is choose an open licence
- Construct the resource with the intention of releasing it as an OER from the start to avoid 3rd party copyrighted material rather than fix it retrospectively.

When creating OER you will need to:

- Check the license
- Attribute the author, and include a disclaimer and takedown
- If stuck, people working openly tend to like helping
- Share what you've made
- Share what you've learned

OERs in a completed state can sometimes be difficult to reuse. It is often the case that the separate components or elements of an OER have more reuse potential.

There has been some exploration around this idea. Megan Beckett from Siyavula proposes that "when creating/authoring/aggregating OER/open textbooks for reuse, the final step should then be to disaggregate it into its component parts to allow for easy and accessible remixing (ie. make up then break up!)."

Other ideas are the use of <http://coursefork.org/> described as a sort of a OER github.

The *Open Educational Ideas project* is looking at this area. It argues that one of the main challenges of OER reuse is their complete state: “What is clearly lacking is a feeling that learning opportunities have to be created by educators themselves. We call this concept emotional ownership which describes what kind of emotional / affective relation an educator has towards certain resources. Thus, the not-invented-here syndrome seems to be even more relevant in the educational domain”.

If you have made the decision to develop OER at your institution it is worth being aware of some of the biggest challenges. The three most significant challenges that you will need to address are copyright issues, quality control and sustainability of any OER developed. Researching in advance and planning for the future should help mitigate issues around copyright and sustainability. Starting out with a well-defined specification and testing content on both teachers and learners should help with quality assurance.

Challenges

The main challenge in OER creation is striking the balance between simplicity, as a requirement for educators, and complexity, as a requirement for developers. A number of other issues that might arise are listed below:

- Be sure to have appropriate permissions before you assign an open licence
- Think about what kind of metadata will be relevant and include only this
- Make sure that consent has been attained from relevant parties
- Don't ignore rights other than copyright (such as performance rights and data protection)
- Include a disclaimer and takedown policy, and act on it if necessary
- Think carefully about attribution
- Practise what you preach - use stuff that's already out there where possible rather than making more
- Encourage re-purposing and re-use

Educators need an editor that is simple and easy to use, otherwise they will not use it, developers need a level of complexity to achieve the functionality required,

Dirk Uys from P2PU explains: “I think the problem has two parts to it. The first part is to provide a tool that is easy to use. The second part is to teach the user more about the medium they are using. Without the second part I feel that we are just providing tools and not empowering educators. The questions for me becomes - in what way

do you teach more about the medium without distracting from the short term goal of creating/remixing some content and without intimidating the user too much?”

Another question posed by Raniere Silva is “what way do you teach more about the medium without distracting from the short term goal of creating/remixing some content and without intimidating the user too much?”

Some of the proposed solutions pose barriers for most educators self-publishing materials due to their technical nature. Many argue that tools for remixing ultimately need to make it easier to ‘copy and paste from one place to the other’.

Other challenges include licences, which as well as technical formats, effect the practicalities of moving course materials; version control which can also cause problems; and the benefit of using a distributed version control system versus a centralised system.

There are also issues with tools being editor dependent resulting the user will be limited by the editor features. It should be possible to use git and allow the user choose the HTML convert tool to allow he/she use the editor (or markup language) that best suit his/her needs. E.g. for a K-8 teacher a WYSIWYG editor is better but for a math high education teacher LaTeX can be preferable and for a engineering high education teacher IPython Notebook. MathML is also an issue, to some degree addressed by using the Aloha editor.

Michael Chesterman of FLOSS Manuals makes an argument for using ePubs. He explains that most OER are shared by the person / team that writes them and that online courses, Moocs, OER repositories are increasingly the place where OER are collaboratively written using blog type, WYSIWYG tools which output HTML pages. Format specs like Scorm and metadata standards like LOM are too hard for self publishers to use, however ePubs are the most suitable candidate to allow importing and exporting of OER into these platform allowing us the freedom to exit and remix between repositories. EDUPUB is in danger of bringing a lot of complexity to the equation and hindering uptake. He argues that we shouldn't get hung up on interactivity but should get the workflow working with simple ePubs first and use the web coding principle of “progressive enhancement” to bring more interactivity to OER. He points out that exported ePubs work well on mobile devices. However math on the Web and ePub has many issues. MathML is a W3C recommendation for how to insert math in Web pages and was adopted by EPUB3. The first issue is that only a few browsers and ePub readers support it. Firefox is the web browser with best support to MathML and it doesn't support many important features. iBooks support part of MathML specification there are currently no ereaders that do it. Right now, almost all web pages that need maths is using some polyfill solution, e.g. MathJax, and this approach has some problems, specially for ePubs. Another issue is that type math isn't easy. Some times you request

that the user knows LaTeX or other markup and others time the user need to spend time selection “anchors” at a WYSIWYG editor.

Pat Lockley argues that most reuse of OERs is through linking. With this practice comes the massive problem of link-rot. Especially given the influence of venture capital in the sector where OER are online for as long as the funding is coming in. A case in point is coursefork.org - which stopped before it even really started. Linking out to resources on a platform that invites user contributions with no real commitment to keeping them there is a real problem. Data portability should mitigate the problem so users of the platform can at a minimum archive their own data and upload it somewhere else. And ideally it encourages reuse /remix. Also, as a hack, where the licence permits it, users should grab HTML pages and import them into longer lasting community driven OER repositories which are in it for the long run. It is possible handle URLs, or mirror sites (some form of LOCKSS) would help here.

Further resources

- [Open Educational Resources: Opportunities and Challenges](#)
- [Challenges of developing OERs for an international audience](#)
- [Realising the Open in Open Educational Resources: Practical Concerns and Solutions](#)
- [Wikieducator OER Handbook for Educators](#)

2.8 Useful software for OER creation

There is a considerable amount of software that can support the development and release of OER. Take a look at:

- [Audacity](#) - a free and open source audio editing tool
- [Open Office](#) - a free and open source alternative to Microsoft Office, handy for changing the formats of files
- [Jing](#) or [Camstudio](#) - handy for making screen captures
- [Xerte](#) - an open source tool developed by the University of Nottingham ()
- [BlueGriffon](#) - an open source WYSIWYG HTML editor

- [USEEK](#) is a public tool providing search over a wide range of software tools available for educational purposes (such as OER authoring) <http://linkededucation.org/applications/#useek> & <http://www.gsic.uva.es/seek/useek/>
- The [OERPub](#) is in the process of developing an on-line editor (to be ready in 2014), which will allow for easy development and editing of OER, facilitating the process of sharing, licensing and adapting resources.

You might want to avoid some software. For example [Adobe Acrobat](#) (PDF while handy is not really an open format). Good practice is to provide open versions of closed documents like PDF as well (e.g. on [OpenOffice](#), [LibreOffice](#) .ODT, .ODS, .ODP formats). It's possible to bundle both versions using a free compression software like [7-Zip](#). Popular formats like Microsoft Word, Excel, Powerpoint etc. while ubiquitous are not truly open. Open alternatives would e.g. be RTF or the OpenOffice formats, ODT for texts, ODP for presentations etc. Be careful with anything having an Apple sign on it because most Apple formats are proprietary (e.g. [iTunesU](#)). You can release stuff on iTunesU but good OER practice would be to release them in Open formats in parallel (which is little extra effort). Also try and avoid anything that needs a plugin and Flash.

These sites are also very useful:

- [Xpert Picture](#) attribution allows you to search Creative Commons Licensed content and embed the license
- [Flickr](#) allows you to search for pictures and videos with a Creative Commons License
- [Wikimedia Commons](#) allows you to search for media files, some of which will have Creative Commons Licenses
- <http://creativecommons.org> Creative Commons] lots of useful links and resources on licensing content
- [Web 2 Rights](#) lots of resources on intellectual property on the internet

There are certain sites where you may need to tread carefully:

- Content on Youtube may be in violation of copyright - public doesn't mean open
- Content from MOOC sites - MOOCs refer to 'open' in that the courses are free and open to everyone, but they are generally not openly licensed.

- Resources in the Public Domain - some resources are “Public Domain”, but “Public Domain” can mean “Free of Copyright”- but it’s meaning is not consistent internationally
- University Sites - just because it is on a University site, doesn’t mean you have the right to use it
- Your own VLE - other lecturers may have different licence agreements.

2.9 Publishing OER online

There are lots of options for publishing OER online, including:

- Pictures - Flickr is widely used, free and has Creative Commons support
- Video - Vimeo and YouTube have support for Creative Commons licenses
- Sound - Soundcloud has support for Creative Commons licenses
- Powerpoint - Slideshare has support for Creative Commons licenses
- Your own blog - you can use the [Creative Commons Licence Picker](#) to get the HTML to attribute your resources
- Jorum is the UK’s largest OER repository
- OER Commons is a worldwide learning network of shared teaching and learning materials made freely available online
- Curriki is a nonprofit organization who provide open educational resources primarily in support of K-12education
- Creative Commons has a [wiki page](#) featuring a few of the most popular communities where you can publish your media under CC licenses

However, it should be noted that no well-known definition of Open Educational Resources (OERs) states that the resource must be available online in order to be considered open.

In fact **OERs do not even have to be digital**. Public domain novels, poetry, photographs, and videos can be used as OERs. Modern creators can open license their artwork, film photographs and videos, and hand-written or manually-typed materials. These can be reproduced using photocopier techniques. Creative Commons give details on how to apply licenses offline. The original Open Bible, advocated through the work of William Hunter and others, can be seen as an early offline OER. Even some sculptures can be reproduced using moulds.

Materials that are digital need not be online; they can be used on paper or on devices not connected to the Internet. Two studies (PIRGS and PEARSON) show that students prefer bound textbooks 3 to 1 over digital (note that other surveys also show an increasing preference for digital books). If open textbooks are to compete with commercial textbooks, they must be available as bound paper books.

If we define online as “on the Internet” then we are overlooking other technologies to allow us to share resources, such as: radio, television, telephone, and text.

A early forerunner of Massively Open Online Courses (MOOCs) were correspondence courses invented by, among others, Briton Isaac Pitman in 1840. American university level distance education began in 1874 at Illinois Wesleyan University where bachelor and graduate degrees could be obtained in absentia. Educational radio began in 1920 and educational television mid-century.

If a resource is not available online then some might argue that stops it from being available to a global audience. However these resources are already open so when the conditions are right and some has the time they can be digitised and uploaded and made available.

However **when a version is available online there is need to encourage OER producers to offer an offline/portable version wherever feasible**. The main reason for this is to enable those who do not have access to broadband, computers or internet-enabled devices to still be able to use open resources. This issue was discussed at the [Making it Matter workshop](#) held in London in May 2014:

“Poor infrastructure (energy, ICT, etc.) means that education can rarely be carried out solely online. We need to stop making technology and device assumptions and ensure adaptability of resources and data.”

The Khan Academy is seen as exemplary in this regard. At least two different groupings of Wikipedia (in English) are available for schools offline and are highly valued in schools in relatively remote locations (for example, in the islands of Fiji or in Vanuatu).

It has been noted that there is a reluctance in the mainstream IT community (corporates as well as most academic researchers) to work with anything offline because today’s big profits in IT are available in Internet technologies. However, there is no reason why a MOOC cannot be partly offline. In fact, processes like examinations-for-certificates are increasingly “offlined” if they were to have value to future or current employers (an example: <https://onlinecourses.nptel.ac.in/explorer>). Similar to the examination, part of an online course can be delivered offline.

Back in the 1990s a lot of emailing in India used to be part offline: people composed email in a stand-alone computer and bicycled to an Internet café from where it was emailed and mail was also received. As recently as 2007, a small campus of an international Ag research center in Niger enabled staff to compose email on the Local Area Network (LAN). Twice daily someone carried a CD to the only city nearby to up/download messages.

There is however a hidden assumption that unless one has the level of IT infrastructure fairly comparable with what one obtains in a mid-level OECD country, many of the online processes would not be viable. This is not valid. It is also important to note that, in emerging economies, Internet access from mobile devices is fast outstripping access from laptops and PC's- a fact reported in the famous Meeker's report (KPCB) on Internet Trends even in 2013.

Ideally a resource should be in **an open format using an open standard** (a standard that is publicly available and has various rights to use associated with it) to be open. However this will not always be the case. Some OERs are not available online and others may use proprietary formats.

Further resources

- Student PIRGs Report: Make Textbooks Affordable
- Pearson Foundation: Survey on Students and Tablets
- KPCB Internet Trends 2014
- Open Floss Manuals: Rights and Freedoms - data portability
- The \$5 Textbook - Utah Open Textbook Project
- The Open Professional Education Network's (OPEN) tech formats for open educational resources as specified for the US Department of Labor's TAACCCT program grantees

2.10 Editor tools for building and remixing OERs

Once OERs have been created then building on them, remixing them, forking them and restructuring them requires editor tools. Currently tools are available but aren't always suitable.

Software carpentry describes the problem:

“And then there's the maintenance problem. Software Carpentry's lessons are constantly evolving; how can someone who depends on them know whether everything

they require is still there a year or two down the road? With software, they can recompile their program or re-run its unit tests and see whether things still work. There's no equivalent for lessons---no easy way to find out whether dependencies that used to resolve are still there. Sooner or later, any large, multi-author project has to find a way to track and manage dependencies. Conversely, I believe that if a project can't do this, it won't be able to scale up. It isn't the only obstacle to collaborative lesson development, or the biggest, but it is an obstacle, even within Software Carpentry itself. If we can figure out how to solve it, we'll be one step closer to helping all the potential Lorena Barbas out there create a network of wonderful lessons.”

Tools

There are many possible solutions including:

- Github - is a repository web-based hosting service, it provides a web-based graphical interface and desktop as well as mobile integration.
- Mercurial - a cross-platform, distributed revision control tool for software developers.
- CrossFork - a WYSIWYG Git editor
- Kathi Fletcher's OER ePUB editor - open-source tools for authoring, adapting, remixing, and publishing open education resources and then delivering them to the web, mobile, tablet, and print, based on github too.
- OpenStax and Connexions - developer tools.
- ePub - a free and open e-book standard by the International Digital Publishing Forum (IDPF).
- Grabmy books - application that allows you to grab content from the web and easily convert it in an ePub file.
- Booktype - The open source platform to help you write and publish print and digital (used to produce this handbook).
- Pressbooks - makes it easy to create files you need to publish your books and ebooks.
- Calibre e-pub editor - free and open source e-book library management application developed by users of e-books for users of ebooks.
- Xerte Online Toolkits - is a learning object editor. It is open source, integrates with Moodle, allows LOs to be shared between users and you can allow people to download the entire LO and import it into their own system.

Case studies Siyavula have been working with Kathi Fletcher on the OERPUB editor, helping to test it and also at an actual workshop with educators. In 2013 they facilitated a workshop to remix one of their Physical Sciences textbooks using the OERPUB editor. This was initiated and driven by a group of South African teachers.

They intend to use an instance of the OERPUB editor once it is finished to enable educators to come and create their own versions of our textbooks and export their own pdf/ePub/etc. They have already seen cases where teachers have created their own versions of our content by adding some of their notes, taking out images for tests, etc. But, they often just do this by taking screen shots. Megan Beckett at Siyavula believes that for OER to be remixed, we need to break it down into its parts again. She has had many requests for the images and concept maps in textbooks as teachers want to re-use these to create their own summary notes for learners or tests. So, although they have created the whole, nicely packaged, open textbook, when they actually want to reuse it, we need to break it down again to make it accessible.

Raniere Silva and Rémi some time looking at these questions at the Mozilla Science Lab Sprint. Their notes are available at <https://softwarecarpentrylessonmanager.github.io/lesson-manager/04-howto.html> and <https://etherpad.mozilla.org/sciencelab-2014summersprint-lessons-package-manager>.

Further Resources

- Lengthy discussion about the use of tools such as Git on the oer-discuss Jiscmail list in 2012
- The git and the pendulum by Amber Thomas
- Dataportability article in Wikipedia
- Open Web Floss manuals
- WYSIWAT Aloha Editor selected as OERPUB & Sourcefabric booktype editor
- When does a book become a web platform? Cetus blog - by Wilbert Kraan
- Software Carpentry import lessons
- Import Lesson - Is it Possible?
- When MOOC Profs Move
- Digital literacy in practice: Developing an interactive and accessible open educational resource based on the SCONUL Seven Pillars of Information Literacy by Nick Shephard and Erin Nephin - looks at reuse issues and Xerte
- Mick's ePub series

2.11 Impact of OER

Studies have been carried out to gauge the effect of Open Educational Resources (OER) use on teaching and learning. The Jisc OER Impact Study was conducted between November 2010 and June 2011 by a team from the University of Oxford. It concluded in July 2011, the research report concluding that OER's main impact factors are pedagogic, attitudinal, logistical and strategic. The OER Research Hub is also looking at the question 'What is the impact of OER on learning and teaching practices?' and will be releasing reports in forthcoming years. Some argue that OER have so far failed to reach their potential. The paper, *Ten Years Later: Why Open Educational Resources Have Not Noticeably Affected Higher Education*, and *Why We Should Care* notes that significant adoption hurdles to OER exist including discoverability, quality control, failure to organise and acquisition.

A recent study by Pirkkalainen, Jokinen & Pawlowski lists the following barriers to OER adoption:

- Lack of motivation to share resources or information around those resources
- Lack of time for production and localization of OER
- Need for Rewards and Acknowledgement
- Lack of contextual information for the resources – how can be used or modified
- Open content does not fit the scope of the course / curriculum
- Lack of trust towards unknown authors or systems where resources retrieved from
- “Not invented here” notion; hesitation to receiving knowledge someone else has created
- Hard to assess the quality and relevance

The EU funded Open Educational Ideas project claims: “The main purpose of licensing educational material under open licences is to allow for anyone to use, re-use or re-purpose them. However, despite a strong movement in recent years to publish such material, OER reuse is still not a common practice in Higher Education, schools and enterprises.”

OER are being used by K-12 teachers (who teach school education), but this is still an emerging area.

The teachers in some countries have embraced open materials more than those in others, this is often driven by cost and availability of traditional materials. For example in the United States College open textbooks have become more common due to the high cost of textbooks that has to be borne by parents and students.

One interesting project is the initiative by Leicester council in the UK to create guidance for secondary school

staff. The OER project is part of the Council's DigiLit Leicester initiative, designed to support schools in making the most of the city's current investment in technology, as part of Leicester's £340 million pound Building Schools for the Future Programme. The project has identified a gap in support and information for teachers relating to the use and creation of Open Educational Resources. An understanding of OER and open licencing will support schools and staff in sharing and accessing resources, and in developing staff and learner digital literacy skills and knowledge.

The team working on the project have previously worked on several initiatives which support the creation and use of use of Open Education Resources by schools across Europe and internationally, including the ORBIT project and the OER4Schools programme, at the Faculty of Education, University of Cambridge.

Further resources

- OER Impact Map from OER Research Hub
- OER4Schools, Cambridge University
- Open Educational Resources for Teacher Education (ORBIT)
- Open Education Germany - by Zwetana Penova
- OER Research Hub collaboration with K12
- Understanding Open Educational Resources: Information for Schools
- What's wrong with Open Educational Resources? Barriers and Solutions

2.12 OER & Accessibility

(Content taken from chapter of the *Into the wild – Technology for open educational resources.*)

Accessibility is about the provision of content and services in a manner most suitable to the user, no matter what disability they may have, in order for them to fully participate with it. By sensible design, based on awareness of user needs (and provider responsibilities) the delivery of materials should not present any significant barriers to the user.

Why accessibility is important

Accessibility is absolutely vital for a project to produce truly "open" educational resources. The ethos of "open" is to be accessible – consider "open" in the widest social sense, not (as often illustrated) geographically. If the outputs are not meeting appropriate accessibility requirements then they have failed to be 'open' before they have

even left the building, and a sustainability decline has already commenced.

A principal philosophy behind open educational resources is to maximise opportunity for others to be able to engage, not only as recipients but also as potential contributors. For a resource to be adopted (i.e. used "as is") or adapted (i.e. enhanced, disaggregated or integrated into other resources) in another institution it must be attractive in terms of its content and the standards it follows. But accessibility does not have to be onerous or restrictive; a lowest common denominator. It merely needs to be carefully considered to avoid creating accidental barriers and provide alternative routes or enhancements. For a simple example, it may be just provision of an image - perhaps something difficult for another individual to obtain themselves e.g. an electron micrograph captured during a research investigation which would have value for other communities, if it was made readily available to them. Its potential issues have to be considered as soon as possible: its description needs to be concise and accurate (not only to use it but also to discover it) with some authentic provenance; its licence may need to be suitable not only for re-use, but also for editing or annotation for a wider audience including those with disabilities, not as a possibility but as a certainty because it is, by philosophy, open to all. Therefore, some thought needs to be given to its other potential uses before it is exposed to a wider audience: this is necessary for OER projects, it's not "showing off". The resource description therefore can be made to a standard suitable for a radio listener or podcast thereby automatically meeting the needs of visually impaired students. If a quality description is a core element of the resource's metadata then the resource is far more likely to be discovered and reach a wider audience, perhaps drawing more to the project it is embedded within. Another simple example is the use of video transcripts; far easier to translate into other languages and search, and if pre-scripted (thereby providing the accessibility option by default) the narrative is often far more focussed on the topic, a higher quality of output is generated for all.

Programme approaches to accessibility

For a project to meet its accessibility requirements it needs to consider users with disabilities as equal stakeholders to the generic "students" that were probably quoted in the project specification: a project may have assumed that identifying "students" alone was sufficient, using this broad descriptor in its inclusive sense. By recognising "students with disabilities" as separate stakeholders their needs can be addressed with some equivalence, i.e. not as a small fraction of the wider population and therefore an equivalent small fraction of the effort available, a 'bolt-on' solution. The irony is that to solve the requirements for this stakeholder group alone all other non-disabled students are catered for: two tasks collapse into

one.

For many projects it has often been thought efficient to create the resources first, then tackle the additional requirements for a series of appropriate “special needs”, be it a visual or hearing impairment, or a learning disability like dyslexia. Planning for this retro-fitting is easier, there is no plan! However, it is expensive in terms of time and effort; and difficult to complete in a compressed time-scale towards the end of the project, when the funding is becoming exhausted, as well as the staff. Accessibility is not a process of fine tuning, it’s a design principle; there is no reason why this content should not be understood for what it is by anyone who meets it. It is a far easier solution to direct a little effort during the design stage and realise that many other barriers and issues will be removed in this way before they can grow to become difficult hurdles towards the end.

There are many sources of information for solving most digital delivery problems already available in the JISC network, including those from JISC TechDis, where a pedagogical approach to the application of inclusive Accessibility technologies helps explain the issues they address. Note that experiences in one education sector can lend themselves to OER in others. If a resource is to have an impact then it must not hold any unnecessary limitations. The structures and hierarchies of Higher Education will inevitably be challenged by a population circumventing the barriers of its “walled garden”.

Reporting requirements for projects need to highlight the value of accessibility for the wider usability and sustainability of the project or initiative. An “Accessibility Challenges, Issues and Benefits” tactic is therefore recommended:

- **Challenges:** What would challenge those with visual or hearing impairments, motor difficulties or print impairment? How might alternatives be provided?
- **Issues:** How were disabled people included in user testing? What were the situations that arose that required consideration and the decisions made to ensure the resources remained accessible? Did user-testing give valuable feedback?
- **Benefits:** How did accessibility improve during the project? What wider benefits might this bring (e.g. accessing on a mobile device, or benefits to ESOL (English for Speakers of Other Languages) students, or enhanced usability)?

The term “disabled student” can be misleading as it can subconsciously imply the disability affects the “studentness” of the individual, whereas thinking of a “student with disabilities” can isolate this issue. The facility to gather, evaluate and synthesise knowledge is rarely affected if suitable (often inexpensive and ubiquitous) technologies are utilised. With appropriate support, disabled students can excel just like any other learner.

Many software solutions to accessibility are available as FOSS - Free and Open Source Software, freely available to download and use at no cost, often without needing a costly technical install if used from a pen-drive or memory-stick. Without adequate environmental provision (including managed software permissions) we are disabling students themselves. OER projects that link to recommended support FOSS support tools would often assist both internal and external users. There are many resources available through JISC TechDis resources to assist with improving accessibility; FOSS resources, techniques and technologies, to tools to help validate the outputs; Sim-dis enables authors to visualise how content may appear to users with disabilities, and the Accessibility Passport helps producers check they have considered other needs.

Issues

During the preliminary Phase One of the UK OER Programme many projects sought to make their outputs accessible but it was often difficult to highlight the advantages of the approach as these were often “taken for granted” and not emphasised. This was highlighted by a survey by Anna Gruszczynska which sought to discover how embedded accessibility as a design process was within UK OER. Gruszczynska notes that although accessibility was a consideration by most respondents, this was less apparent in the outputs, “rarely mentioned or incorporated in the project workflow”. For the issue to be addressed it needs to be explicitly reported and disseminated for the benefit of these stakeholders.

Future directions

In the future, the information about the accessibility of a resource may be an expected part of its accompanying metadata; perhaps as part of the Dublin-Core initiatives or community developments in other countries e.g. Merlot.org, to raise the profile of this more professional approach. Publishers are also working with JISC TechDis to create a framework for accessibility as part of EDItEUR. If better metadata becomes coupled with community generated paradata (usage data about learning resources including pedagogic context, inferred through the actions of educators and learners) then more novel uses of resources may be better realised, practice shared, and benefits maximised. Access for all is attainable and sustainable if we know what we want and we can agree how to get it.

Accessibility is a design component best tackled early. Explicit inclusion of accessibility in testing and reporting will considerably improve the usability of the output and links to appropriate FOSS support tools may also help. Finally, consider accessibility as a component of resource metadata to explain to potential users how best to utilise the OER.

Further resources

- JISC TechDis is an advisory service for inclusion and accessibility
- JISC TechDis Accessibility passport
- Gruszczynska, A. (2012). [http://www8.open.ac.uk/score/files/score/file/Anna%20Gruszczynska%20SCORE%20Fello%20wship%20Final%20Report%20-%20web%20version.pdf OER-related accessibility issues and their relevance to practices

of repurposing/reuse]

- Dublin Core Metadata Initiative AccessForAll Framework
- Merlot OER and Accessibility

2.13 MOOCs (Massively Open Online Courses)

Massive Open Online Courses (MOOC) are a recent development in distance learning and open education. MOOC combine different OER, e-learning methods and social networks culminating in an online learning experience. MOOC have a relatively high media profile and are often the subject of controversial claims. MOOC grew out of the OER movement in Canada, where Stephen Downes and George Siemens developed the first MOOC ('Connectivism and Connective Knowledge') in 2008.

MOOC can take place entirely within a virtual learning environment, entirely outside it, or in some hybrid form. By definition MOOCs should be open in many respects, though this can mean different things in different contexts. They typically do not require entry requirements or tuition fees, and do not carry course credits that are valid towards a formal qualification.

It is common to distinguish different types of MOOC. The distinction made most often is between xMOOC and cMOOC.

Broadly speaking, xMOOC tend to:

- Strive for large scale education, transmitting information to a wide audience
- Make use of short video lectures
- Feature quizzes and automated assessment

While cMOOC tend to:

- Emphasize learner interaction

- Make use of Connectivist and Constructivist pedagogies
- Place the accent on forming learning communities
- Use peer assessment

Some have argued that cMOOC represent the original spirit of the MOOC experiment more authentically, while xMOOC focus on scalable business models and sustainability.

MOOC Providers

There are an increasing number of ways to find MOOCs. Some of the search engines below are a good starting point.

- MOOC list
- Course talk
- MOOC Resource page
- MOOC.org
- Open Culture MOOC list
- MOOC directory
- CourseSites MOOCs
- Unimooc

The LinkedUp Project is encouraging the development of apps and prototypes that ease access to recommendations and guidance when choosing appropriate curriculum of courses and related resources. The **Pathfinder track** includes MOOC recommendations.

- Coursera
- Udemy
- Udacity
- EdX
- EduKart in India
- ALISON in Ireland
- Aprentica in Latin America
- Khan Academy
- 10gen Education
- Lore
- FutureLearn
- NovoEd

- OpenUpEd
- iversity
- Canvas
- OpenLearning

Institutions that offer MOOCs include:

Europe

- University of Southampton
- University of Edinburgh
- University of Reading
- University of Sheffield
- German Hasso Plattner Institute, Potsdamen OpenHPI

Worldwide

- MIT's Open Courseware
- Udemy
- Harvard
- iTunesU
- Stanford
- UC Berkeley
- Duke
- UCLA
- Yale
- Carnegie
- Peking University
- University of Amsterdam
- MRUniversity

Further resources

- A Comprehensive List of MOOC (Massive Open Online Courses) Providers
- Edupunk: Open Content
- Wikipedia: MOOCs - includes history
- MOOCs and anti-MOOCs - a blog post on the recent ups and downs of MOOCs by Audrey Watters
- xMOOC vs cMOOC

- Proposed Taxonomy of 8 types of MOOC
- Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility
- Mooc creators criticise courses' lack of creativity
- MOOC Research Hub

2.14 OER for the developing world

The current publication system creates a developed world bias, leaving researchers in the developing world without a voice and without access to publication spaces. The developing world is an area where OERs can have real impact. Initiatives include

- Commonwealth of Learning
- National Developments
- Sakshat: One Stop Education Portal
- OSCAR: Open Source Courseware Animations Repository
- Free or open textbook programmes, such as Siyavula in South Africa

Previous programmes focused on the developing world have suffered from a lack of commitment locally and no clear strategy for implementation. There has also been a 'not-made-here' mentality and materials were considered too generic. On reflection the Commonwealth of Learning recommends that projects not only to develop capacity and content but to ensure a buy-in from local partners and to have a clear implementation strategy

Just as most other projects and activities of the "open movement", Open Educational Resources can have real impact on local development in developing countries. Direct benefits of developing, using, sharing and distributing OER in local contexts include:

- Increase access to educational resources
- Unlock knowledge for the local needs
- Reduce authoring and distribution costs of educational resources
- Increase efficiency and optimize resources by reusing OERs
- Capacity building at teachers and authors levels
- Increase awareness at students and institutional levels
- Facilitate collaboration in the local educational communities

- Cost/Effort effective modernization of the local educational resources
- Potential of OER in developing countries

The potential of OER in developing countries

The lack of intellectual property protection laws or their enforcement by authorities resulted in a wide use of “illegally” copied or “pirated” software and content in many of developing countries. While not considering copyright and license agreements in data and information sharing activities including education, developing countries can still have limited access to very useful educational resources in other parts of the world. Educators in developing countries, like their peers all over the world, may not be aware of the license restrictions on the materials they use in their classes. Authors and producers of educational resources may also want know more about using, reusing and sharing available resources and offering their resources under an appropriate license to increase their outreach and benefit.

The potential of OERs in developing countries arise in multiple areas including:

- Spreading locally developed educational resources that meet local needs
- Building local contribution communities and increase resources’ quality
- Establishing the culture of sharing in the educational context

Further resources

- OER Africa
- Open Learning Exchange
- Making it Matter: Supporting education in the developing world through open and linked data
- TESS-India
- Commonwealth of Learning

2.15 OER communities and interest groups

Europe

- Open Education Europa
- The University of Southampton - has a large OER repository

- The University of Nottingham - has a large OER repository
- The University of Oxford - has several OER sites, including <http://podcasts.ox.ac.uk>
- The Open University has OpenLearn
- The textbook project “L3T” (textbook for learning and teaching with technologies”) is a prizewinning CC-BY-SA project in German language, its second version was collaboratively developed within 7 days and more than 250 people

US and Australia

- “Copyright for Educators” courses aimed at primary school teachers and librarians in the US and Australia. While there is a jurisdiction-specific focus, they provide a great grounding for anyone in the teaching space

Global South

- The African Virtual University
- OERu
- MIT OpenCourseWare
- Various initiatives in Utah
- Temoa in Latin America
- CORE
- Siyavula Education in South Africa
- National Repository of Open Educational Resources in India
- OER Africa

Groups of people or individuals interested in OER

- OER-Discuss mailing list
- Open Knowledge Foundation Open Education Working Group
- OER research hub
- SCORE fellows
- OER Asia
- OER Advocacy mailing list
- OER University
- School of Open Google Group
- UNESCO OER community

- Educause Openness Constituent Group
- Open Courseware Consortium
- OER Community at Athabasca University
- OER Forum
- WikiEducator
- P2PU Community
- Peer 2 Peer University (P2PU)

2.16 Open Textbooks

An open textbook is an open educational resource or set of open educational resources that either is a textbook or can be used in place of a textbook at a higher education institution. The rising cost of text books has led to alternative solutions being considered and in the United States in particular there is a growing open textbook movement.

Some have argued that open textbooks could be the most significant step in the OER movement. A summary of the arguments in favour of open textbooks can be found on US senator Dick Durbin's website.

Gerd Kortemeyer writes in his article *Ten Years Later: Why Open Educational Resources Have Not Noticeably Affected Higher Education, and Why We Should Care*: "The flaws in the textbook market are clear, as is the solution: An outside player needs to provide a platform for content from various sources (faculty, grant projects, publishers, etc.) to be shared under common licensing schemes, including the means to sell content on a fine granularity level. In this model, faculty put together on-line course packs. They could choose and sequence content at granularity levels anywhere from individual pages or problems to whole chapters or modules, or even to complete prefabricated course packs, depending on how much work they want to invest in individualizing their materials. Students would buy access to these course packs at a price that depended on the contents, and the "player-device" (an iPod in the music-world example) would be the integrated CMS. The service provider for this system would collect the fees from students and distribute them to the content providers. If a particular course pack only contained OER content, it would be free."

Providers of open textbooks include:

- California Open Source Textbook Project
- Global Text Project
- CK12
- Siyavula Free text books
- WikiFM

- College Open textbooks
- OpenStax College
- BC Open Textbook Project

Another tool worth mentioning here is the *Open Content Toolkit*. Specifically aimed at the schools sector, the toolkit is a gateway to both contemporary and historical open digital media content from media archives and collections around the world. It includes links to resources, exemplars of how open digital content might be used in schools and links to resources for in depth study. It has been set up as a collaborative space to explore, discuss and share examples of the use of open media at all school stages and at all levels of education. It is intended to be a truly cross-curricular resource.

2.17 OER Resources and Handbooks

A vast amount of introductory material has already been created relating to OERs. These provide both introduction and practical examples of OER programmes and of OER creation and use.

- *OER handbook for educators*. Great handbook created in 2010, so a little out of date. Created by the Center for Open and Sustainable Learning (COSL) and hosted on WikiEducator (cc-by)
- *Introduction to OERs on Wikibooks*. Wikimedia project (cc-by-sa)
- CETIS publication *Into The Wild* by Amber Thomas, Lorna M. Campbell, Phil Barker and Martin Hawksey (Eds). December 2012. This book is not intended as a beginners guide or a technical manual, instead it is an expert synthesis of the key technical issues arising from a national publicly-funded programme. It is intended for people working with technology to support the creation, management, dissemination and tracking of open educational resources, and particularly those who design digital infrastructure and services at institutional and national level.(cc-by)
- *InfoKit on OER*. This infokit includes information about the three year *UK Open Educational Resources Programme (UKOER)* (2009 - 2012) and offers links to a wide range of resources which describe the outcomes (lessons learned) and outputs (reports, guidance materials and toolkits) that emerged.(cc-by-sa)
- *OER IPR Support/Web2Rights*. This website was set up to provide IPR and licensing support for JISC/HEA funded OER Phase 1, 2 and 3 projects

in order to help them identify and manage IPR issues with particular emphasis on the use of Creative Commons Licences. It includes a starter pack, diagnostic tools and a range of videos.

- UKOER synthesis and evaluation report. This site is the JISC/HE Academy OER Programme synthesis wiki. Lots of useful resources. (cc-by-nc)
- **Creating OER and Combining Licenses.** Video intended to help you choose compatible resources and choose a valid license for your work. (video, cc-by)
- **Free to Learn Guide.** An overview of OER for higher education and how governance officials can initiate OER at the policy level.
- **OER White Paper (pdf)** by the Hewlett Foundation. The foundation's exploration to better understand how its philanthropic can help integrate OER into mainstream education.
- **Survey on Governments' Open Educational Resources (OER) Policies** by Sarah Hoosen (Neil Butcher & Associates) (Editor), COL, UNESCO (June 2012)
- **Fostering Governmental Support for OER Internationally,** COL (March 2012)
- **Exploring the Business Case for Open Educational Resources** by Neil Butcher (Author), Sarah Hoosen (Author), COL (September 2012)
- **Open Educational Resources in Poland: Challenges and Opportunities** by Kamil Śliwowski, Karolina Grodecka, UNESCO Institute for Information Technologies in Education (October 2013)
- **Open Educational Resources in Brazil: State-of-the-Art, Challenges and Prospects for Development and Innovation,** Andreia Inamorato dos Santos, UNESCO Institute for Information Technologies in Education (2012)

The Commonwealth of Learning have published several books about OER on a CC BY SA licence.

- **A Basic Guide to Open Educational Resources (OER)** by Asha Kanwar (COL) (Editor), Stamenka Uvalić-Trumbić (UNESCO) (Editor), Neil Butcher (Author)
- **Guidelines for Open Educational Resources (OER) in Higher Education,** COL, UNESCO (November 2011)
- **A report on the Re-use and Adaptation of Open Educational Resources (OER): An Exploration of Technologies Available** by Ishan Sudeera Abeywardena, COL (May 2012)
- **Perspectives on Open and Distance Learning: Open Educational Resources and Change in Higher Education: Reflections from Practice** by Jenny Glennie (Editor), Ken Harley (Editor), Neil Butcher (Editor), Trudi van Wyk (Editor) COL, UNESCO (June 2012)
- **Report on the Assessment and Accreditation of Learners using OER** by Dianne Conrad (Author), Wayne Mackintosh (Author), Rory McGreal (Author), Angela Murphy (Author), Gabi Witthaus (Author), COL (July 2013)
- **Copyright and Open Educational Resources** by Achal Prabhala, COL (2010)
- **Perspectives on Open and Distance Learning: Open Educational Resources: An Asian Perspective** by Gajaraj Dhanarajan (Editor), David Porter (Editor), COL (2010)

Further resources

- Additional guides may be listed at the OER Policy Registry's supporting resources
- Bibliography of OER, ROER and related subjects

Chapter 3

Open Licences and Copyright

3.1 Intellectual Property, Rights & Licensing

Intellectual Property Rights (IPR) are the legal rights given to persons over creations. Under intellectual property law, owners are granted certain exclusive rights to creations including musical, literary, and artistic works. Copyright is the right to control the copying and dissemination of an original work. Clarification of copyright is essential for release, use and remixing of open educational resources and for open educational practices.

IPR and copyright are important in the open education field because for others to make full use of a resource it needs to have been released under an open licence. This means that the owner/creator has agreed to allow others to use it, and indicated this through open licensing.

The verb 'to licence' means to give permission while the noun 'licence' refers to that permission as well as to the document recording and representing it. Licences can be thought of as legal tools that allow certain actions. They make the materials they apply to more usable.

In some legal traditions licences are unilateral acts of permission, in others they are simply bilateral contracts dealing with rights. Usually licences state very precisely which rights are granted by whom (licensor) to whom (licensee) for how long. They often also include details on whether these rights are granted exclusively to the licensee or not and describe the territory they are to cover, which can be a specific country or worldwide.

Furthermore, licences can be based on conditions, meaning that the grant of rights they represent is only valid as long as certain conditions are met. Once these conditions are not met any more, the licence automatically also ends.

Further resources

- Jisc Infokit: Legal aspects of OER
- Web2Rights OER IPR support
- Jorum: Copyright and licensing for OER

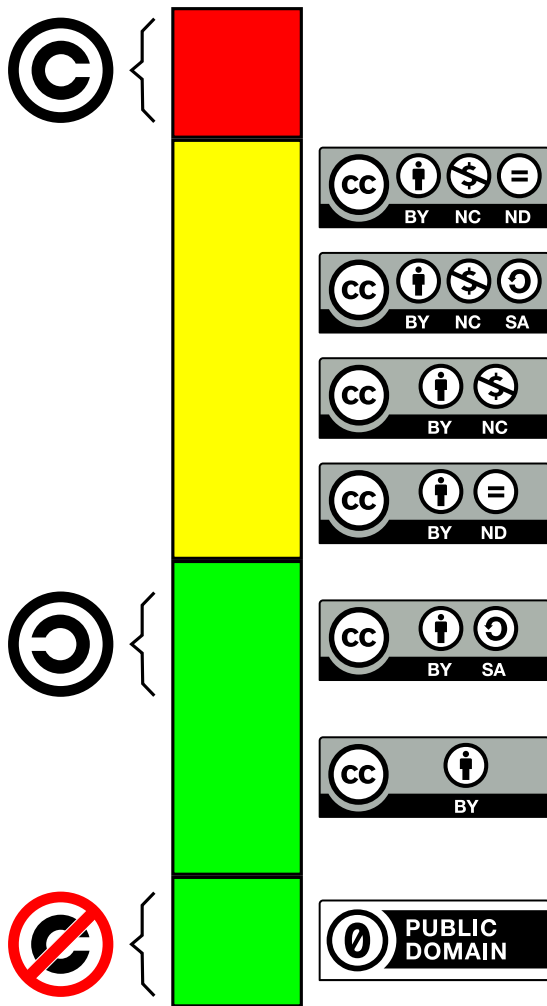
- UNESCO: Open educational resources and intellectual property rights

3.2 Open Licences

The definition used in the Open Definition effectively limits open content to libre content; any free content license would qualify as an open content license. According to this narrower criteria, the following still-maintained licenses qualify:

- Creative Commons Licenses: only Creative Commons Attribution (CC BY), Attribution-Share Alike (CC BY SA)
- Creative Commons Public Domain Tools: CC Zero (not a license but a tool that allows creators to dedicate their works to the public domain)
- Open Publication License (the original license of the Open Content Project, the Open Content License, did not permit for-profit copying of the licensed work and therefore does not qualify)
- Against DRM license
- GNU Free Documentation License
- Open Game License (a license designed for role-playing games by Wizards of the Coast)
- Free Art License

In addition to Open Definition aligned licenses, more copyright licenses exist. For example, the full suite of Creative Commons licenses are outlined at <http://creativecommons.org/licenses>. Below are the CC licenses as aligned to a spectrum from Least Open to Most Open. Examples of use for each license are provided at <http://creativecommons.org/examples>.



There are several common misperceptions of copyright among educational practitioners. Copyright is only one of several intellectual property rights (IPR). You do not need to study the legal intricacies but you should be aware of the basic outlines of IPR in education. Being ignorant or taking a gentlemanly approach to intellectual property rights can backfire, certainly when protected material is re-released into the commons as OER.

“Certainly I can use copyrighted material because it is for educational purposes”

There is no blanket license for educational purposes. This is a misconception that conflates US with British law (fair use / fair dealing). Normally your institution will have a license with the copyright agency setting out what you are allowed to do (in the UK: originally making as many photocopies of 5% of one chapter, whichever is greater) of any book your institution holds. This does not automatically include scans / digitisations for your VLE.

“Certainly I can use copyrighted material because it is behind closed doors (our VLE is only accessible to staff approved for my institution with a password)”

You may be less likely to be caught but you are still violating IPR. Many institutions archive VLE contents and things may come back to haunt you later. There are even reports of cases where students have tried to blackmail teachers about their copyright violations. Do you really want to expose yourself?

Further resources

- Open content licensing for educators
- Software Licenses in Plain English
- Creative Commons FAQ
- Creative Commons Toolkit
- Open.Michigan guide to releasing content
- P2PU course - Get CC Savvy

3.3 Misperceptions about OER & copyright

When you openly license an educational resource, you keep your copyright while allowing certain uses of your work through the open license, giving the world the legal rights and permissions to reuse, revise, remix and redistribute your work. Most OER creators use Creative Commons licences to openly license their OER, which are considered the global standard for openly licensing content like educational resources.

“It was not copyrighted because it had no © sign on it”

The © sign is just a symbol that a creator may choose to use to indicate copyright protection. Just because there is no © sign does not mean that the work is not protected. For example, in the US, the creator is granted exclusive copyright to her work at the moment of creation; she does not have to register or it or attach a © to it to gain this protection. Any artefact whether or not marked with a © is protected in the UK, and elsewhere, by intellectual property rights.

“It was available freely on the web, so I can use it.”

Nope. Local and international copyright laws apply to the Internet as well.

“My institution has a licence with the copyright agency, so we can use everything”

There are differences between photocopy licenses and online / digitisation licenses. Best to check with your institution. A typical license would be: staff are allowed

to make as many photocopies as necessary for teaching, of up to a chapter or 5% (whichever is greater) from any book held by the institution. This does not automatically mean that these photocopies can be scanned in and made available on the institutional VLE. Your institution will have (or not) have a separate license for digitised content, e.g. restricting digitisation to books published in a certain jurisdiction (e.g. the UK and/or US only). Annoying as this is, this means you can only legally use some teaching material offline not online.

Last but not least this is also an issue of academic credibility, with reputations of individuals and institutions at risk. Avoidance of plagiarism is a fundamental academic value that should be respected at all times.

Chapter 4

Open Education in Policy and Practice

4.1 Practising open learning

The Cape Town Open Education Declaration (with over 2,500 signatories) reads: “open education is not limited to just open educational resources. It also draws upon open technologies that facilitate collaborative, flexible learning and the open sharing of teaching practices that empower educators to benefit from the best ideas of their colleagues. It may also grow to include new approaches to assessment, accreditation and collaborative learning”.

Open learning is a term used to describe activities that either enhance learning opportunities within formal education systems or broaden learning opportunities beyond formal education systems. It often uses open education elements - such as open educational resources - but because it often takes place in a formal education infrastructure it is not always open in the way open education is.

Traditional pedagogy is based on the idea that a teacher transfers their knowledge to their students. The traditional form of teaching at a school also derives from the traditional way of knowledge storing in books and book storing in libraries. Schools and libraries have for the longest time been essential for teaching, and the easiest way was to get everyone together physically to be close to that knowledge. Teachers had to mediate between the books and the learners, i.e. they had to transfer the knowledge from the books to the learners. The situation has changed with the introduction of the Internet and the wider distribution of knowledge. Access to knowledge is (theoretically) given everywhere in the world with Internet access. At the same time, the amount of accessible knowledge has increased significantly. The challenge now is not to appropriately transfer the knowledge, but to teach learners how to appropriately extract the knowledge that they need independently. Teaching and learning is evolving from fact learning to competence development, where competence is the combination of knowledge and motivation for application.

Since the late 1970s the idea of open learning has developed. Open learning and practice (so called open pedagogy), see the blurring or removal of traditional roles such as teacher, student and educator and moves towards men-

tor and learner. These new approaches to learning where people create and shape knowledge openly together promotes practices and policies that advance the vision of removing barriers to learning.

Reconceived in this way, the boundary between learner and teacher can become blurred. Often in informal learning the result is individuals and groups who share personal and professional practice online through participatory blogs and online community networks.

Open learning and practice is still being shaped but there are a variety of approaches that provide interesting opportunities for more open processes.

Traditional classroom style

- Teacher in front of class, ex-cathedra.
- Uni-directional knowledge transfer.
- Single holder of knowledge (person), students are mere recipients.
- Examples: State schools, state universities.

Autonomous learning

- DIY-style.
- Self-driven appropriation of knowledge from a medium instead of a person.
- Examples: Books.

Feedback system

- Feedback in exercises.
- Examples: MOOCs.

Collaborative learning

- Knowledge is exchanged between equals. Teamwork.
- Self-reinforcing system which facilitates creativity and sharing.

- Examples: Forums (eg. MOOC discussion boards)

Workshops

- Less strict hierarchy; mentors/coaches/moderators. Learners are encouraged to share acquired knowledge.
- Talk about sharing of results, eg. showing works of arts or sharing results.
- Examples: OpenTechSchool.

Expert groups

- Individuals are assigned niche areas where they have to become an expert, only to share (teach) their acquired knowledge with others.

Peer-to-peer

- Bi-directional.
- Examples: P2PU.

Variations in these elements of educational systems have given rise to new forms of pedagogy. The [Open University Innovating Pedagogy 2013 report](#) suggests a number of different new and open ways of learning, including:

- Learning analytics
- Seamless learning
- Crowd learning
- Digital scholarship
- geolearning
- Learning from gaming
- Maker Culture
- Citizen inquiry

The biggest challenges associated with open learning are:

- Culture change
- Social change
- Institutional ambition and evolution
- Fostering mutual understanding between stakeholders
- Open accreditation
- Relevance

Further resources

- [Open University course on openness and innovation in elearning](#)
- [Dial blog: what does open practice mean to you?](#)

4.2 Open Educational Practices (OEP)

Open Educational Practices are teaching techniques that draw upon open technologies and open educational resources in order to facilitate collaborative and flexible learning. There are many ideas in this space including thoughts around collaborative working, fusing post-web pedagogy, andragogy (adult learning) and heutagogy (self-determined learning). Open licensing, open research, collaboration, and new approaches to assessment.

OEP have begun to be included in policy descriptions of open education. Existing definitions include:

- [Center for Open Learning and Teaching \(COLT\), University of Mississippi](#): “Open Educational Practices (OEP) offer contact with learners around the world, supporting self-directed learning and personal networking that can greatly enhance more traditional learning environments. Teachers and learners alike have much to gain from engaging openly with expert and diverse partners around the world.”
- [Cape Town Open Education Declaration](#): “Open education is not limited to just open educational resources. It also draws upon open technologies that facilitate collaborative, flexible learning and the open sharing of teaching practices that empower educators to benefit from the best ideas of their colleagues. It may also grow to include new approaches to assessment, accreditation and collaborative learning. Understanding and embracing innovations like these is critical to the long term vision of this movement.”

Graphic: [Conole, G. \(2011\) Defining Open Educational Practices](#)

- [Food for thought... learning is changing \(with Fred Garnet\)](#)

4.3 Open Assessment

Open assessment is the process of making assessment of students work open and driven by community rather than closed and proprietary. It is also used as an umbrella term

for describing models used to recognise informal learning.

In *Open Learning – Open Assessment?! the ideas of formal assessment and open assessment are contrasted. Open assessment takes the form of:*

- Formative Assessments
- Assessment for learning
- Assessment as learning
- Assessment for growth and development (transforming learning)
- Assessment of competences
- Performance, portfolios E-Assessment

It can also consider prior learning (RPL), prior learning assessment (PLA), or prior learning assessment and recognition (PLAR).

Open badges can be seen as accreditation related to open assessment.

Further resources

- OPASnet workspace for informed decision making
- Stephen Downes on open source assessment
- Introduction to Open Assessment (Canvas)

4.4 Open Badges

A digital badge is an online validated indicator of accomplishment, skill, or achievement. Digital badges are now awarded in a variety of online learning environments. Digital badges take their form from physical badges (such as those awarded by scouting movement). Badges can be issued by anyone (educational institution, work place, online learning organisations) to anyone. These badges can then be displayed publicly on a digital (or non-digital) space (blog, Web site, Facebook, email signature, CV etc). Digital badges are seen as having several significant motivation factors: they encourage users to participate and collaborate, they offer recognition for carrying out tasks and they offer an alternate assessment and accreditation approach.

“Digital badges will make the accomplishments and experiences of individuals, in online and offline spaces, visible to anyone and everyone, including potential employers, educators and communities.”

Many digital badges are open. Open Badges started as a collaborative project between MacArthur Foundation, HASTAC and Mozilla and has continued to grow through an open, collaborative approach.

Mozilla have built a digital badge infrastructure system called *Mozilla Open Badges*. Mozilla Open Badges are not proprietary — they use free software and an open technical standard. That means that any organization can create, issue and verify digital badges, and any user can earn, manage and display these badges all across the web.

Open Badges help knit your skills together. Badges can build upon each other, joining together to tell the full story of your skills and achievement. With Open Badges, every badge is full of information. Each one has important data built in that links back to the issuer, the criteria it was issued under and evidence verifying the credential — features unique to Open Badges. Open Badges let you take your badges everywhere. Users now have an easy and comprehensive way to collect their badges in a single backpack, and display their skills and achievements on social networking profiles, job sites, their websites and more. Open Badges are designed, built and backed by a broad community of contributors, such as NASA, the Smithsonian, Intel, the Girl Scouts, and more. The open source model means that improvements made by one partner can benefit everyone, from bug fixes to new features.

Individuals can earn badges from multiple sources, both online and offline. Then manage and share them using the Open Badges backpack (Mozilla Backpack), other organizations can use Open Badges to make their own backpacks too.

The paper *Six Ways to Look at Badging Systems Designed for Learning* gives an overview of how the badging system works and why people would chose to use open badges:

1. Badges as an alternative assessment – This is the idea that assessment can take the form of ‘validated accomplishments’ instead of tests
2. Gamifying education with badges – The games based achievement system has it’s origins in the Xbox 360 game score system – qualifications filtered through achievements.
3. Badges as Learning Scaffolding – Badges, as a form of scaffolded learning, reveal multiple pathways that youth may follow and make visible the paths youth eventually take.
4. Badges to Develop Lifelong Learning Skills – By offering names for their new competencies and supporting communities.
5. Badges as driver of digital media learning – Badges support digital, media and learning practices.

6. Badges to Democratize Learning – Some badges change who does the assessment and allow learners to shape the content of their badging system and perhaps even the structure itself.

Mozilla explain this in more simplistic terms. They see badges as a way to:

- **Get recognition for the things you learn.** Open Badges include a shared standard for recognizing your skills and achievements and helps make them count towards job opportunities and lifelong learning.
- **Give recognition for the things you teach.** Anyone who meets the standard can award badges for skills or learning.

To achieve recognition Mozilla emphasise the importance of displaying your verified badges across the web. They suggest you earn badges from anywhere, then share them wherever you want—on social networking profiles, job sites and on your website. Badges also verify skills. Employers, organizations and schools can explore the data behind every badge issued using Mozilla Open Badges to verify individuals' skills and competencies.

The main challenges posed by open badges include:

- **Standardisation** - How do you benchmark level or attainment for a certain skill or quality from one issuer of a badge to another. How do employers make sense of badge collections?
- **Proliferation** - Badges can be created easily, but might this lower their value?
- **Motivation** - Do badges actually motivate people?
- **Accreditation** - Should we be awarding/accrediting informal learning at all?

Some examples of use of open badging include:

- **User stories** - Everyday examples of badges in the real world.
- The 2 Million Better Futures project from CGI America aims to help 1 million workers and 1 million students succeed using Open Badges.
- This Chicago Summer of Learning was the first city-wide badging initiative developed, and it was so successful that Mayor Emmanuel committed to continuing the program next year.
- Participating Issuers on the Open Badges site for an updated list of badge issuers and designers.
- Badges in the real world
- Badges on P2PU - create a badge and get feedback on something you want to learn. Or give feedback to other people's projects.

Further resources

- P2PU - course - Open badges
- Wikipedia: Digital badges

4.5 Open Policy

Open policies require access to, and open licensing of, resources financed through public funding. For the purposes of open policies that contribute to the public good, we define policy broadly as legislation, institutional policies, and/or funder mandates.

A government open policy requires publicly funded educational resources be either openly licensed (CC BY preferred) or put directly into the public domain. Governments may also require government created and/or grant funded data be put directly into the public domain (e.g. using CC0) and publicly funded software to be openly licensed with an OSI certified open source software license.

Foundations are also adopting open policies on some of their grants. For example, the Hewlett Foundation's Education division requires (with some exceptions) its grantees to CC BY license resources produced with Hewlett funds.

Education systems are also adopting open policies. The Chancellor's Office of the US California Community Colleges recently adopted a CC BY requirement on all resources produced with its public funded grants and contracts.

It is relatively rare for K-12 educational institutions to adopt open institutional policies. Such policies are more common among academic institutions - although these often limit their open mandates to academic publications and research articles, and not educational resources.

There are several types of policies that concern open education.

- **International policies:** These are adopted by intergovernmental organizations and are usually not binding for its members. The most important such policy now in force is the **UNESCO OER Declaration**, formally adopted at the 2012 World Open Educational Resources (OER) Congress held at the UNESCO Headquarters in Paris from 20 – 22 June 2012.
- **National policies:** Many governments have required open licensing for the educational outputs of certain programs, eg. the U.S. Department of Labor's \$2 billion TAACCCT program requires CC BY on all educational outputs (more information: <http://www.doleta.gov/taaccct/>). Some countries have had national declarations in this space e.g.

Scottish Open Education declaration, Welsh Open Education declaration of Intent.

- **Regional policies** (for example, state-level policies): In several countries, policies have been introduced by state governments. Examples of such policies is the Bill HB 2337 “Regarding open educational resources in K-12 education”, passed by the Senate of the State of Washington (more information: <https://creativecommons.org/weblog/entry/31756>).
- **Institutional policies** set out a commitment to supporting open education through, for example, mandating or authorising OER production as a valid activity for staff; aligning curriculum with materials or textbooks that are openly available; or encouraging use of open resources in teaching and learning.

Funders mandates can be seen as specific types of policies that apply to funding programs of charitable organizations. They are important in themselves, but also set standards for other, public policies.

See the [OER Policy Registry](#) or [OER Policy Map](#) for examples of OER policies. The [POERUP](#) project has also collected a lot of data on OER policy.

Further resources

- [EC Opening Up Education](#)
- [OER Africa Policy](#)
- [POERUP Research Project into OER policy in the EU](#)

4.6 Open Advocacy

Convincing policy makers requires making both a business and a social case for open education. Advocates need to help policy makers to see that open education matters and that open policy effectively supports open education.

Open policy advocates need to present a coordinated case to policymakers that 21st century legal and technical tools can be used to significantly improve the effectiveness of investments in publicly funded resources. For instance:

- The global reach and increasing speed and bandwidth of the Internet
- The decreasing cost of hardware and marginal costs of digital storage, copying and distribution
- Open licensing and the popularity of mobile devices are making content more easily accessed

When policy makers understand the power of open policies, they can avoid the lock-in of stale frameworks and existing financial models, so they can maximize the positive societal impact of publicly funded resources.

Many open advocates use the [OER Advocacy Coalition email group](#) to share their experiences and form strategies for change.

There are some good arguments for open education in the videos from the [Why Open Education Matters](#) video competition.

Chapter 5

Open Data

5.1 Open Education Data

The phrase “Open Education Data” is loosely defined, but might be used to refer to:

- all openly available data that could be used for educational purposes
- open data that is released by education institutions

Understood in the former sense, open education data can be considered a subset of OER where data sets are made available for use in teaching and learning. These data sets might not be designed for use in education, but can be repurposed and used freely.

In the latter sense, the interest is primarily in the release of data from academic institutions about their performance and that of their students. This could include:

- Reference data such as the location of academic institutions
- Internal data such as staff names, resources available, personnel data, identity data, budgets
- Course data, curriculum data, learning objectives,
- User-generated data such as learning analytics, assessments, performance data, job placements

Benchmarked open data in education that is released across institutions and can lead to change in public policy through transparency and raising awareness. The World Economic Forum report *Education and Skills 2.0: New Targets and Innovative Approaches* sees there as being two types of education data: traditional and new. Traditional data sets include identity data and system-wide data, such as attendance information; new data sets are those created as a result of user interaction, which may include web site statistics, and inferred content created by mining data sets using questions.

Whatever their classification it is clear that open education data sets are of interest to a wide variety of people including educators, learners, institutions, government, parents and the wider public.

Finding Open Data

One good source of open data is governments, who increasingly make data about their citizens available online. Examples from the UK include school performance data, data on the location of educational establishments and pupil absenteeism. There is also data from individual institutions such as that collated on linked universities and on data.ac.uk and from research into education, such as the Open Public Services Network report into *Empowering Parents, Improving Accountability*.

Previously much of the release and use of open educational data sets has been driven by the need for accountability and transparency. A well-cited global example has been the situation in Uganda where the Ugandan government allocated funding for schools, but corruption at various levels meant much of the money never reached its intended destination. Between 1995 and 2001, the proportion of funding allocated which actually reached the schools rose from 24% to 82%. In the interim, they initiated a programme of publishing data on how much was allocated to each school. There were other factors but [Reinikke and Svensson's analysis](#) showed that data publication played a significant part in the funding increase.

However recent developments, such as the current upsurge of open data challenges (see the [ODI Education: Open Data Challenge](#) and the [LAK data challenge](#)), have meant that there is an increasing innovation in data use, and opportunities for efficiency and improvements to education more generally. Their potential use is broad. Data sets can support students through creation of tools that enable new ways to analyse and access data e.g. maps of disabled access and by enriching resources, making it easier to share and find them, and personalize the way they are presented. Open data can also support those who need to make informed choices on education e.g. by comparing scores, and support schools and institutions by enabling efficiencies in practice e.g. library data can help support book purchasing.

Education technology providers are also starting to see the potential of data-mining and app development. So for example open education data is a high priority area for [Pearson Think tank](#). Back in 2011 they published their blue skies paper *How Open Data, data literacy and*

Linked Data will revolutionise higher education. Ideas around how money, or savings, can be made from these data sets are slowly starting to surface.

Using Open Data

Some of the interesting UK applications of these data sets can be seen through services like **Which? University** which builds on the NSS annual survey held in Unistats, the Key information sets and other related data sets to allow aid students to select a university; **Locrating**, defined as ‘To locate by rating: they located the school using locrating.com’ which combines data on schools, area and commuting times; **Schools Atlas**, an interactive online map providing a comprehensive picture of London schools; **equipment data.ac.uk** - which allow searching across all published UK research equipment databases through one aggregation “portal.

The UK is not alone in seeing the benefit of open education data, in Holland, for example, the education department of the city of Amsterdam commissioned an app challenge similar to the current ODI one mentioned earlier. The goal of the challenge was to provide parents with tools that help them to make well-informed choices about their children. A variety of tools were built, such as **schooltip.net**, **10000scholen.nl**, **scholenvinden.nl**, and **scholenkeuze.nl**. The various apps have now been displayed on an education portal focused on finding the ‘right school’.

Further afield in Tanzania **Shule.info** allows comparison of exam results across different regions of Tanzania and for users to follow trends over time, or to see the effect of the adjustments made to yearly exam results. The site was developed by young Tanzanian developers who approached **Twaweza**, an Open Development Consultant, for advice, rather than for funding. The result is beneficial to anyone interested in education in Tanzania.

The School of Data, through their data expeditions, are starting to do some important work in the area of education data in the developing world. And in January the World Bank released a new open data tool called **SABER** (The Systems Approach for Better Education Results), which enables comparison of countries education policies. The web tool helps countries collect and analyze information on their education policies, benchmark themselves against other countries, and prioritize areas for reform, with the goal of ensuring that in those countries all children and youth go to school and learn.

All over the world, prototypes and apps are being developed that use and build on open education data.

Challenges

There are still challenges for those keen to develop applications using open education data. Privacy and data pro-

tection laws can often prevent access to some potentially useful data sets, yet many data sets that are not personal or controversial remain unavailable, or only available under a closed licence or inappropriate format. This may be for many reasons: trust, concerns around quality and cost being the biggest issues. Naturally there is a cost to releasing data but in many cases this can be far outweighed by cost-savings later down the line, so for example a proactive approach is likely to save time and effort should Freedom of Information (FOI) requests be made.

Further resources

- **Market place: Quantified student**

5.2 Open Data & Institutions

Open education is fundamentally about removing barriers to education. Opening up data of any sort fits with this agenda and activities around open licensing in particular are both important and hugely supportive. But secondly, and possibly more importantly, opening up education data gives us the potential to see education and its components differently. This new perspective provides us with an opportunity to revolutionise education and make it better.

As David Lassner, Interim president and former chief information officer at the University of Hawaii explains:

“Our opportunities for improvement are immense, and data provide a powerful lens to understand how we are doing internally and relative to our peers. This applies across all segments of what we do, from teaching and learning to administrative support. Performance metrics and dashboards are the beginning, but using data to understand deeper correlations and causality so we can shape change will be critical as we strive to advance our effectiveness.”

The movement for open education is ultimately about wanting better education for all. Open education data is proving to be an important instrument in achieving that goal.

Principle

The charitable mission of education can be helped through a commitment to open data, help educators and institutions to engage with learners more effectively and in better ways. Data openness and exchange can drive quality research (collaboration, testing, replication) while

promoting the social role and place of institutions themselves, helping maintain public and political commitment to the institution and making it more transparent.

Policy

Education institutions are already subject to freedom of information, but new open research data policies (such as the HEFCE consultation on inclusion as part of next Research Excellence Framework) may alter obligations. Large amounts of institutional data (finance, student performance, etc.) are already collected by HESA and UCAS and made widely available, and this is a trend which can be observed in many countries. The next logical step is for more open data about institutions to be made available. With agreed frameworks and metrics in place it will be easier to substantiate comparisons and claims about widening participation, or student performance, for example.

Practice

Institutions can use their own data to inform decisions and management practices, and improve business and pedagogical intelligence. By linking across other open data sets and curating the most relevant information staff and students can be supported in teaching and learning.

Always check with your institution before releasing any institutional information openly!

5.3 Types of Open Data

There are many different types of data that can be relevant to education and come from education. Relevant sources might include:

- Publications & literature: ACM, PubMed, DBLP (L3S), OpenLibrary
- Domain-specific knowledge & resources: Bioportal for Life Sciences,
- historic artefacts in Europeana, Geonames
- Cross-domain knowledge: Wikidata, DBpedia, Freebase, ...
- (Social) media resource metadata: BBC, Flickr, Wikimedia Commons, ...

Explicitly educational datasets and schemas include:

- University Linked Data: eg. The Open University UK, , Southampton University, University of Munster (DE), <http://education.data.gov.uk>

- OER Linked Data: mEducator Linked ER, Open Learn LD
- Schemas: Learning Resource Metadata Initiative (LRMI), mEducator Educational Resources schema
- Learning Analytics & Knowledge (LAK) Dataset
- Vast Open Educational Resource (OER) & MOOC metadata collections (e.g. OpenCourseware, OpenLearn, Merlot, ARIADNE)
- KIS data
- Education GPS is *the* OECD source for internationally comparable data on education policies and practices, opportunities and outcomes. Accessible any time, in real time, the Education GPS provides you with the latest information on how countries are working to develop high-quality and equitable education systems.

There are also many different ways to categorise this data.

- **Student data:** attendance, grades, skills, exams, homework
- **Course data:** employability related to courses, curriculum, syllabus, VLE data, number of textbooks, skills, digital literacy...
- **Institution data:** location data, success/failure rates, results, infrastructure, power consumption, location, student enrolment, textbook budget, teacher names and contracts, drop out rates, total cost of ownership, sponsorship, cost per pupil, graduation rates, male vs female, years in education, ratio of students to teaching staff
- **User-generated data:** learning analytics, assessments, performance data, job placements, laptop data, time on tasks, use of different programmes/apps, web site data
- **Policy/Government data:** equity, budgets, spending, UNESCO literacy data, deprivation and marginalisation in education, participation

In addition to information about open licensing, a more detailed description of an open data set may include:

- *Provenance*
 - Reference (gov data, geo-data, etc.) - e.g. national curriculum
 - Location of schools, Unis etc
 - Core/Internal (course catalogue, course resources, staff data, buildings, etc.)
 - User-generated/contributed (user activities, assessments, etc.)

- *Granularity*
 - individual/personal
 - aggregated/analytics
 - report
- *Descriptiveness*
 - data streams (multimedia resources)
 - data content (textual content, database)
 - resource metadata
 - content metadata
 - paradata (as in metadata about data collection)
- *Content*
 - Usage/activity data (paradata as in the learning analytics definition)
 - student personal info
 - student profiles (interest, demographics, etc.)
 - student trajectories
 - curriculum / learning objectives / learning outcomes
 - educational resources (multimedia or not)
 - resources metadata (including library collections, reading lists - see Talis Aspire)
 - assessment/grades
 - institutional performance (e.g., OFSTED, KIS)
 - resource outputs (publication repositories, etc.), research management data (projects and funding, etc.), research data
 - cost and student funding data, budgets and finances
 - Classifications/disciplines/topics (e.g. JACS)
- Keep it simple. Start out small, simple and fast. There is no requirement that every dataset must be made open right now. Starting out by opening up just one dataset, or even one part of a large dataset, is fine – of course, the more datasets you can open up the better.
- Remember this is about innovation. Moving as rapidly as possible is good because it means you can build momentum and learn from experience – innovation is as much about failure as success and not every dataset will be useful.
- Engage early and engage often. Engage with actual and potential users and reusers of the data as early and as often as you can, be they citizens, businesses or developers. This will ensure that the next iteration of your service is as relevant as it can be.
- It is essential to bear in mind that much of the data will not reach ultimate users directly, but rather via ‘info-mediaries’. These are the people who take the data and transform or remix it to be presented. For example, most of us don’t want or need a large database of GPS coordinates, we would much prefer a map. Thus, engage with infomediaries first. They will reuse and repurpose the material.
- Address common fears and misunderstandings. This is especially important if you are working with or within large institutions such as government. When opening up data you will encounter plenty of questions and fears. It is important to (a) identify the most important ones and (b) address them as early a stage as possible.

Opening up data

- Choose the dataset(s) you plan to make open. Keep in mind that you can (and may need to) return to this step if you encounter problems at a later stage.
- Apply an open license.
- Determine what intellectual property rights exist in the data.
- Apply a suitable ‘open’ license that licenses all of these rights
- Make the data available - in bulk and in a useful format. You may also wish to consider alternative ways of making it available such as via an API.
- Make it discoverable - post on the web and perhaps organize a central catalogue to list your open datasets.

Further resources

- [Call for more data on job placements of PhD students](#)
- [Linked Universities](#)
- [UK Department for Education: Open data strategy](#)

5.4 Creating Open Data

How you open up data is covered in detail in the *Open Data Handbook*. There are three key rules recommend when opening up data:

When making data open it’s important to think about the possible ethical implications of a release. A useful resource in thinking about this is the *OER Research Hub Ethics Manual*.

Machine-readable data While human users are unequivocally the ultimate consumers of open data, as in education so in any other domain, human interaction is not necessarily the only means to consume and process these data until they are delivered to end-users in a form that responds to their needs. More often it will be for software systems, in the form of applications and services, to take the role of consuming data and delivering them, or a by-product thereof, to the user.

Much existing content, however, is presented or even simply exists in a form that is for the human brain to process, such as natural language text, images and audio-visual footage. Although there are technologies for software systems to extract meaningful data out of this content, a cleaner and less error-prone way is for the data providers to publish their content in a machine-readable form. In most cases, these data do not *replace* their natural language or audio-visual forms: on the contrary, they can be used to *enhance* the content presented in human-readable form in a variety of ways.

Common open data technologies:

- CSV, XML, Linked data
- Common Data Management
- RDBMS
- Common tracking tech.
- Logs, analytics platform
- Specific metadata standards
- XCRI, MLO, LRMI, LOM, ...

Linked Data A fundamental principle to be understood concerning the availability of linked data as resources reachable via a URI, is that they do not prevent the same resource to be presented in another format on the same URI. It is not implied that pasting the same URI in a Web browser will necessarily deliver an RDF document that describes that resource, just as it does not mean that only one RDF format can be delivered at that address. Thanks to modern Web Service standards such as the REST architectural style, for any URI an application can negotiate on-the-fly a format that both the application itself and the data provider support.

5.5 Using Open Data

Well-defined use cases are starting to emerge but can be still hard to find. It would be good to find use cases for policy makers, university managers, academic instructor, researchers, policy and education departments and in the vocational area. This section discusses some case studies and provides information about a range of projects using open data for education.

Open Discovery Space Case Study

The EU-funded **Open Discovery Space (ODS)** project aims to create a platform for teachers across Europe for sharing and repurposing of open educational resources. This objective is covered well in the resources section of this handbook. However, ODS, also deals with mining data and usage for further improving the value chain of educational resources and open education. It creates a social data layer around education resources that crowd sources appreciation and usage data. Social data in this context is appreciation metadata that further describes a resource. It comprises intentional user inputs such as Likert scale star ratings, comments, free or guided tags, shares, etc. From these datasets aggregations can be used in an infinite number of mashups to provide e.g. resource recommendations or karma measures. In addition, ODS also uses tracking data (called paradata) which collects users' activities in the ODS portal (e.g. looking at a resource, downloading, etc). This allows for other statistical analytics such as most looked-at, or most downloaded resource. In more sophisticated ways it also permits to draw conclusions about the similarity of users that looked at or downloaded the same resources or that follow similar type users. Analogous methods are well known from social networks (Facebook: "friends you may know", Twitter: "people who you may want to follow"), sales sites (Amazon: "people who looked at this also looked at..."), or review portals (Tripadvisor: "most popular or most highly rated hotel").

ODS goes beyond collecting data from users of the portal alone, but also harvests social data from other OER portals. This is to say that if a user star-rates a resource in a sister portal to ODS, this rating will enter the ODS ratings data through a data harvesting cycle. In this way, opinion mining is not restricted to a single portal alone and enhances the value of the resource descriptor no matter where the users tag it. Harvesting social metadata from other portals encounters no legal obstacles, even if this data is not linked open data, because: (1) it is anonymous data and cannot be connected to a user's identity, (2) there is no copyright associated with protecting user expressions like star ratings, bookmarks or keyword tags. This is because it does not constitute an act of (substantial) creativity on behalf of the author of such social metadata.

ODS not only re-uses social data from associated repositories, it also aims at exposing its own data as open linked data to other third party service providers. It has to be said, though, that paradata (recording user activities in the portal) is not going to be exposed due to ethical and privacy reasons.

Higher Education

- **Equipment data:** The development of equipment.data is funded by EPSRC in response to the

need to improve visibility and utilisation of UK research equipment. This relatively simple technology enables searching across all published UK research equipment databases through one aggregation “portal”, allowing greater accessibility with the aim to improve efficiency and stimulate greater collaboration in the sector. The data used is available to download from the site.

- **Interacting with Linked Data**
- **Discovering Open University Content from Other Online Resources** <http://discou.info> / <http://data.open.ac.uk/applications/iswc2012-demo.pdf>
- **Interpreting Data Mining Results with Linked Data for Learning Analytics**

School

- **London Schools Atlas:** The London Schools Atlas is an innovative interactive online map providing a uniquely detailed and comprehensive picture of London schools, current patterns of attendance and potential future demand for school places. Data behind the atlas is available from the [data store](#).
- **RM Schoolfinder:** School Finder allows you to compare and contrast different schools, find out about what they excel at and how well children do academically. Most of the information comes from official statistical releases published by the Department for Education and Ofsted including School Performance Tables, GCSE Subject Results, school information from Edubase and summaries of the Ofsted school inspection report.
- **Guardian GCSE schools guide:** The Guardian GCSE schools guide is designed to help parents find and research local schools in England. Search by postcode to find which schools offer individual subjects, and compare how they have performed in GCSE results. Data is supplied by the Department of Education. School impact measures are based upon FFT contextual value-added scores by permission of FFT Education Ltd.
- **OFSTED School Data Dashboard:** The School Data Dashboard provides a snapshot of school performance at Key Stages 1, 2 and 4. The dashboard can be used by school governors and by members of the public to check the performance of the school in which they are interested. The data is available in [RAISEonline](#) - you will need to login to access the data and not all is openly available.
- **Shule.info:** Shule.info presents Tanzanian Form 4 exam results in some very interesting ways., the site was put together by a group of young Tanzanian software developers, led by Arnold Minde, with some support from Twaweza. The site uses open data from the Tanzanian government.
- **E-school Estonia** - Provides an easy way for education stakeholders to collaborate and organize teaching/learning information. The system has a range of different functions for its various users. **Teachers** enter grades and attendance information in the system, post homework assignments, and evaluate students' behavior. **Parents** use it to stay closely involved in their children's education. With the help of round-the-clock access via the internet, they can see their children's homework assignments, grades, attendance information and teacher's notes, as well as communicate directly with teachers via the system. Students can read their own grades and keep track of what homework has been assigned each day. They also have an option to save their best work in their own, personal e-portfolios. District administrators have access the latest statistical reports on demand, making it easy to consolidate data across the district's schools.
- **Education GPS** - the OECD source for internationally comparable data on education policies and practices, opportunities and outcomes. Accessible any time, in real time, the Education GPS provides you with the latest information on how countries are working to develop high-quality and equitable education systems.
- **The Learning Curve Index** combines national data and a number of international rankings - including PISA, TIMSS and PIRLS - to provide an interpretation of how countries systems are performing relative to each other.
- **The Open Institute** based in Nairobi worked on **KCPE Trends** which aggregates and visualizes education performance data for the Kenya Certificate of Primary Education (KCPE) from 2006 to 2011.
- In Brazil the school census collects data about violence in school area (like drug traffic or other risks to pupils). Based on an open data platform developed to navigate through the census, it was possible to see that, in a specific Brazilian state, 35% of public schools had drug traffic near the schools. This fact created a pressure in the local government to create a public policy and a campaign to prevent drug use among students.
- In Burkina Faso they have opened their open data portal (data.gov.bf). The open data team of the government have worked with civil society and some start-up to realise a pilot project that consist on visualizing on a map the primary schools of a municipality. In addition, some important indicators for Burkina were present. Those indicators (proximity of canteen, latrine, or potable water point) can help

parents choose the best school for their children, investors to choose the better place to build a school, or the government itself to measure the impact of its actions. They also have information on success rates in examinations, the number of classes, the number of teachers, the number of girls and boys, the geolocalisation of the school, and we also displayed a picture of the school.

- **Kenya** - Using data that we collected from the Kenya National Examinations Council (KNEC) and the Kenya Open Data Portal, the Open Institute released **KCPE Trends**, a simple tool designed to visualise Kenya Certificate of Primary Education (KCPE) performance records of primary schools in Kenya from 2006 to 2011.
- **Social Accountability for the Education Reform in Moldova** - website enabling the public to monitor the schools' performance. We've put up the planned expenditures for all the schools in Moldova (2014), on <http://www.budgetstories.md/bugetul-scolii-2014/>, until we build the new website. There is budget expenditure for 2013 and investment for capital repairs, data displayed using OpenSpending's treemap.
- **Open Government Data: Helping Parents to find the Best School for their Kids** (World Bank)
- **Discover Your School**, developed under the Province of British Columbia of Canada Open Data Initiative, is a platform for parents who are interested in finding a school for their kids, learning about the school districts or comparing schools in the same area. The application provides comprehensive information, such as the number of students enrolled in schools each year, class sizes, teaching language, disaster readiness, results of skills assessment, and student and parent satisfaction. Information and data can be viewed in interactive formats, including maps. On top of that, Discover Your School engages parents in policy making and initiatives such as Erase Bullying or British Columbia Education Plan.
- **The School Portal**, developed under the **Moldova Open Data Initiative**, uses data made public by the Ministry of Education of Moldova to offer comprehensive information about 1529 educational institutions in the Republic of Moldova. Users of the portal can access information about schools yearly budgets, budget implementation, expenditures, school rating, students' grades, schools' infrastructure and communications. The School Portal has a tool which allows visitors to compare schools based on different criteria – infrastructure, students' performance or annual budgets. The additional value of the portal is the fact that it serves as a platform for private sector entities which sell school supplies to advertise their products. The School Portal also allows parents to virtually interact with the Ministry of Education of Moldova or with a psychologist in case they need additional information or have concerns regarding the education of their children.
- **RomaScuola**, developed under the umbrella of the **Italian Open Data Initiative**, allows visitors to obtain valuable information about all schools in the Rome region. Distinguishing it from the two listed above is the ability to compare schools depending on such facets as frequency of teacher absence, internet connectivity, use of IT equipment for teaching, frequency of students' transfer to other schools and quality of education in accordance with the percentage of issued diplomas.
- **Open Data for Education in Brazil**
- **In New Zealand: open government data on schools in an app** to help you find schools in local area
- **Education.data.gov** provides a wealth of information about education in the USA. The **Open Data inventory** provides more data reported to the Department of Education.
- **Brazil example** where local schools analysed data on crime in the local area and used this to encourage government intervention.
- **Bahawalpur Service Delivery Unit (BSDU)**, an initiative by the Government of Punjab province in Pakistan, aims to engage citizens in the governance of service delivery. Led by Imran Sikandar Baloch, District Coordination Officer of Bahawalpur district in Punjab, this initiative is built on open data and has already delivered increased attendance of teachers and students over the past year. Technology and design partner for this initiative is Technology for People Initiative based at the Lahore University of Management Sciences. It features a mobile app that allows officials and citizens to monitor attendance by teachers and students at school. The information is aggregated online and made publicly accessible. The aim is to enable and motivate citizens to collect, analyze and disseminate service delivery data in order to drive performance and help effective decision making. The initiative has led to improved teacher attendance, which in turn has led to improved pupil grades. By showing how open data can help in the developing world, BSDU won the Making Voices Count global innovation competition.
- **Check My School** is a social accountability initiative designed and instituted by the Affiliated Network for Social Accountability in East Asia and the Pacific (ANSA-EAP), and uses a blended approach through on-the-ground mobilization effort and community monitoring, tapping modern technology as a

key tool. The CMS project is supported by the Open Society Institute and the World Bank Institute.

- **Open Education Challenge** is an EU funded initiative to support projects who receive mentoring and seed funding through the European Incubator for Innovation in Education. Their ten finalists present different approaches to the use of open data in education.
- Using open data relating to the UK education system. As part of the Open Data Challenge Education, the Open Data Institute has compiled a set of interesting resources, including a list of potentially interesting datasets.

5.6 Open Data and Learning Analytics

Online education is producing vast amounts of data about students. Much of these online courses are openly available and the data from them should be too. The data will enable academic institutions and course providers to deliver their courses more efficiently and more appropriately to their students. It will also allow students to personalize their educational experience to best suit their needs. Data collected can include administrative data, demographic information, grade information, attendance and activity data, engagement metrics, course selection etc.

Learning analytics is defined as the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.

Data from online courses can:

- Enable grade prediction and student success
- Improve student retention
- Determine what learners know and what they currently do not know
- Monitor learner engagement
- Personalize learning
- Ensure relevant content is delivered
- Reduce classroom administrative work
- Measure student performance
- Have other uses yet to be discovered

Open data can support students:

- Through creation of new tools that enable new ways to analyse and access data e.g. maps of disabled access, tools for disciplines

- By enriching resources, making it easier to share and find them, and how to personalize the way they are presented
- By allowing student to explore resources, concepts, ideas and objects in various areas
- To make informed choices on education e.g. by comparing scores, course data etc.

Open data can support education institutions:

- Learning analytics data can help retain students
- Use data can enable efficiencies in practice e.g. library data can help support book purchasing
- Benchmarking and performance measuring
- Providing real world examples for learning

5.7 Open Source Education Tools

Open source software is software where the source code is openly licensed so others can change and distribute the software to anyone and for any purpose.

Naturally the open community are keen to support open tools and there are a significant number of open source open education tools available.

There is a considerable amount of open source software for use in the education sector. An impressive list is available from [OSSWatch](#).

The Free Software Foundation Europe(FSDE) also write a blog and have a section on education

Other resources

- [Why Aren't More Schools Using Free, Open Tools?](#)
- [Open Source School](#): An initiative to replace monolithic and proprietary educational technology with open source software

5.8 Open data for education: LinkedUp Challenge

The LinkedUp Project organised the LinkedUp Challenge: three consecutive competitions looking for interesting and innovative tools and applications that analyse and/or integrate open web data for educational purposes. Here are some of the highlights from the shortlists.

LinkedUp Veni Shortlisted Entries - use cases

There were 8 shortlisted entries in the LinkedUp Veni competition. They offer real-world examples of how linked and open data can be used in an educational way. Three of the shortlisted demos and tools show how linked data from various resources allows learners to explore resources, concepts, ideas and objects in various areas.

- **Knownodes** is a collaborative websites that enables relating, defining and exploring connections between web resources and ideas, making use of graph visualizations. Knownodes scored high on educational innovation.
- **Mismuseos** connects museum data with sources including Europeana, Dbpedia and Geonames. With Mismuseos, learners can browse and explore the backgrounds and relations between objects from multiple Spanish museums.
- **ReCredible** is a browsable topic map with wikipedia-like content next to it. The topic library showcases interesting topics varying from dog breeds and alternative medicine to nanotechnology and information systems.

Another focus, which can be seen in the next three shortlisted candidates, is how open and linked data can be used for enriching resources, making it easier to share and find them, and how to personalize the way they are presented.

- **DataConf** is a mobile mashup that enriches conference publications. The reviewers applauded its nice and effective design. DataConf is especially useful at the graduate education level.
- **We-Share** is a social annotation application for educational ICT tools. We-Share can help educators to find tools to support teaching at all educational levels, and received high scores on educational innovation.
- **YourHistory** is a Facebook app that makes history tangible by showing historic and global events that are related to your own life events and your interests.

Last but not least, the next two applications are less generic than the previous ones, but both of them are great examples on how effective use of linked data can help to learn about and make sense of the world we live in.

- **Globe-Town** is a 'fun to use' tool that lets users find out the most important trade partners, migrant populations and airline routes of their own countries. It also provides infographics on issues regarding society, environment and economy.

- **Polimedia** connects transcripts of the Dutch parliament with media coverage in newspapers and radio bulletins. Polimedia employs innovative information techniques and provides an attractive front-end that invites exploration and browsing.

LinkedUp Vidi Shortlisted Entries - use cases

In the LinkedUp Vidi Competition we asked for tools and demos that analyse or integrate open web data for educational purposes. We received fourteen submissions with innovative ideas in areas such as agriculture, arts and medicine.

Apart from innovative aspects, attractiveness, usefulness and other forms of 'awesomeness', our evaluation panel also looked at the relevance for education, the usability and performance of the tools, the data it uses or provides, and the way privacy and other legal aspects were dealt with.

It was not an easy task to select the nine submissions for the shortlist, and not all of the panelists' personal favorite submissions are included. What we do all agree upon is that the following demos and tools are really outstanding examples on how to use open data for education.

Open track submissions The open track received seven submissions that all aim to make it easier to find or explore data. Some tools even allow you to connect data.

Two submissions seem to provide just a simple search box, but there is far more behind it.

- **AGRIS** links bibliographic references from the agricultural domain to external datasets, among others DBpedia, World Bank and nature.com. For end-users – researchers, scientists, cataloguers – it is simply a **single point of access** to these resources. AGRIS also provides a Sparql endpoint. [Read more about AGRIS](#)
- **Solvonauts** is an open educational search engine, which searches over 1,500 open educational resource end points. All resources are licensed Creative Commons or Public Domain. They also have **plugins** for Moodle and WordPress. [Read more about Solvonauts](#)

The following tools have been made for connecting things and people with one another.

- **Rhizi** is the revamped version of KnowNodes, which was submitted to our Veni competition. Rhizi allows users to make connections between things, such as blogs, research data, video segments and people. The site is interactive, with chat, commenting, notifications, voting and a reputation system. [Read more about Rhizi](#)

- **Konnektid** is all about connecting people for educational purposes. When you want to learn something you can ask the people nearby to help you. If you allow the system to do so, it creates your personal profile based on data from Facebook, Google+, Twitter and LinkedIn. [Read more about Konnektid](#)
- **LOD Stories** lets you connect artworks, artists and places into a chain that functions as a storyboard.

The cool thing is that you can actually transform the storyboard into a narrated video. In order to get this done, LOD Stories exploits DBLPedia. [Read more about LOD Stories](#)

Finally, the next two tools help you to make sense of data with various visualizations.

- **DBLPXplorer** is a browsing and exploration interface for the **DBLP** computer science bibliography, which provides insight in research published at conferences. The attractive visualizations are made with D3 and based on DBLP data, annotated using WikipediaMiner. They also expose the DBLP data via a Sparql endpoint. [Read more about DBLPXplorer](#)
- **TuVaLabs** has a growing number of interesting datasets on various topics, including drought in California, AIDS and Barbie. Students and teachers can explore and visualize these datasets and teachers can create activities or assignments around them, to stimulate them to think critically about data. [Read more about Tuvalabs](#)

Focused track submissions: Simplificator The Simplificator track called for applications that make access to complex information easier by summarizing them in a simpler form. We received two interesting submissions.

- This visualization of labour conflicts in the Netherlands for the last 700 years connects statistical data on strikes with articles from the Dutch KB newspaper archive. It provides several timeline and map overviews that allow you to zoom in to a particular period. [Read more about visualization of labour conflicts in the Netherlands for the last 700 years](#)
- **eDL** is an app that can be used for creating semantically enriched electronic Discharge Letters, for patients who leave the hospital. eDL uses various knowledge sources and vocabularies to ensure that patient information can be automatically translated into another language. Patients can use the eDL for finding relevant background information about their diagnoses. [Read more about eDL](#)

LinkedUp Vici Shortlisted Entries - use cases

The LinkedUp Vici Competition is the last competition on tools and demos that use open data for educational purposes. This time we asked for mature prototypes that are actually in use or that have been used.

We received **thirteen** submissions that have been evaluated by a panel of experts, who rated the submissions on their innovative aspects, attractiveness, usefulness, usability, performance, use of data, and the way privacy and other legal aspects were dealt with.

We are happy to announce the shortlist of ten submissions, which are all running sites or apps that you can try out yourself.

Several submissions bundle and offer open educational resources to growing educational communities.

- **AGRIS** from the FAO of the United Nations provides access to publications on food and agriculture. Linked data and mash-up techniques are used to create one hub for different repositories. “Even though the application displays a lot of information in a single page, it is still easy to use”, according to one reviewer.
- **Didactalia**, developed by the people from GNOSS (who participated before), helps you to browse, find and use learning material on many different topics, for different age groups and from various educational repositories. The reviewers found it an outstanding initiative. Currently, most material is in Spanish.
- **LearnWeb-OER** gives users the opportunity to search for resources from the Web and to reuse them in a learning context. The platform allows for collaborative searching and sharing. The reviewers could see that the tool would be very useful to students and teachers alike.

Two other submissions use and enhance existing material to provide users with novel opportunities for learning.

- **FLAX** is a site that helps you to learn a language by reading and watching open source material, varying from TED talks to academic collections. Learn to distinguish different word types and the context in which particular words are typically used. The reviewers called it a “very sophisticated application that is also easy to use”.
- As the name already indicates, **HyperTED** lets you explore TED talks. It automatically annotates the textual material, recognizes where the main concepts and topics are discussed and provides quick links to reference sites while you watch. The reviewers found it a great addition to watching ‘talking heads’ online.

- **GroupMOOC** is not a site but an app (for the iPhone) that you can use for creating course plans based on MOOCs (Massive Open Online Courses). You can check your workload and deadline, and connect and collaborate with groups of friends. The reviewers noted that “A MOOC aggregator with social network functionality addresses a real need”.

The final two submissions to the open track use visualization techniques for making it easier to find and connect information.

- **ResXplorer** focuses on scientific publication and shows you relations between authors, papers and conferences. By clicking on an author, paper or conference you make it the center of the next round of exploration. The reviewers found it “a good looking site with actionable information”.
- **Histropedia** lets you interactively build and publish timelines that give an overview on events in history, based on data in Wikidata and Wikipedia. Teachers can create their own timelines by combining events that they think should be included. “A powerful tool for fast timeline creation.”

Last but not least, the shortlist contains two submissions to the Focused Tracks of the competition. The creators of these submissions spent a great of effort to work with the data required for these tracks and to address the track-specific goals.

- **ISCOOL** is a serious game, submitted to the focused track ‘Supporting Developing Countries’. It is an informal learning environment that creates a visual game based on the text that you provide. The reviewers found it “a very innovative idea that could help particular aspects of the learning very well”.
- The visualization of **Water Resources & Ecology** provides rich means to search journals, tweets and Wikipedia annotations. The interactive visualizations address the targeted content track, proposed and supported by Elsevier, to see how linked data can be used for making the learning experience more appealing and enhanced. The reviewers spent quite some time clicking around and were “overall happy with the interface and with the data”.

5.9 Open Data - Useful Links

Two useful starting points come in the form of other handbooks:

- **Open Data handbook**
- **The Data Journalism Handbook**

There are also many online resources on the subject of open data:

- **LinkedUp competition**
- **LinkedUniversities**
- **LinkedEducation**

- **Katy Boner** – her research focuses on the development of data analysis and visualization techniques for information access, understanding, and management. She is particularly interested in the study of the structure and evolution of scientific disciplines; the analysis and visualization of online activity; and the development of cyberinfrastructures for large scale scientific collaboration and computation.

- **Equipment.data.ac.uk** - Funded by **EPSRC** in response to the need to improve visibility and utilisation of UK research equipment. Enables searching across all published UK research equipment databases through one aggregation “portal”, allowing greater accessibility with the aim to improve efficiency and stimulate greater collaboration in the sector. The technology behind this development has been a partnership between a number of UK universities, primarily outcomes of the UNIQUIP Project.

- **ViVo network** - Network of scientists facilitating scholarly discovery. Institutions will participate in the network by installing VIVO, or by providing semantic web-compliant data to the network.

- **LRMI** - The Learning Resource Metadata Initiative (LRMI) is working to make it easier to publish, discover, and deliver quality educational resources on the web.

- **Linked Data for Open and Distance Learning** by Mathieu D’Aquin - Commonwealth of Learning

- **BBC knowledge and learning** - The BBC Knowledge and Learning product will bring together factual and learning content from over 100 existing BBC websites.

- **LAK data challenge** - The LAK dataset provides access to structured metadata from research publications in the field of learning analytics <http://lak.linkededucation.org> , <http://www.solaresearch.org/events/lak/lak-data-challenge/>

- **LUCERO project** - Linking University Content for Education and Research Online

- **XCRI** - The XCRI Knowledge Base was created in response to requests from educational institutions to Jisc for a single source of information on XCRI - the information model and schema recommended by the national Information Standards Board in January 2009 as the UK eProspectus standard.

- **MLO - Metadata for Learning Opportunities - Advertising (MLO-AD)**, supported by CEN WS-LT (CWA 15903:2008), is a European standardized model addressing metadata sufficient for advertising a learning opportunity.
- **Ariadne - ARIADNE** has created a standards-based technology infrastructure that allows the publication and management of digital learning resources in an open and scalable way.
- **The Predictive Analytics Reporting (PAR) Framework** is a non-profit multi-institutional data mining collaborative that brings together 2 year, 4 year, public, proprietary, traditional, and progressive institutions to collaborate on identifying points of student loss and to find effective practices that improve student retention in U.S. higher education.
- **Which? University** - brings together information that exists about UK full-time and part-time undergraduate courses, including the Guardian and Times league tables, official employment and satisfaction statistics and UCAS course information.
- **EDUCATION.DATA.GOV.UK** - contains a snapshot of Edubase taken in 2009 and published as linked data.
- **PublicData.eu** is a Pan European data portal, providing access to open, freely reusable datasets from local, regional and national public bodies across Europe.
- **The Global Partnership for Education's Open Data Project**, providing instant access to key education indicators and more than 11,000 data points from 29 GPE developing country partners. For each country, the GPE Data catalog presents 57 indicators in 6 education categories encompassing key elements of each country's education sector, including domestic and external financing, learning outcomes and aid effectiveness indicators. Developing country partners played a central role in gathering and validating the data, which reflects their specific national education strategies and objectives.
- **EUCLID** is a European project facilitating professional training for data practitioners, who aim to use Linked Data in their daily work. EUCLID delivers a curriculum implemented as a combination of living learning materials and activities (eBook series, webinars, facetoface training), validated by the user community through continuous feedback.
- **Wikidata** is a free knowledge base that can be read and edited by humans and machines alike. It is for data what **Wikimedia Commons** is for media files: it centralizes access to and management of structured data, such as interwiki references and statistical information. Wikidata contains data in every language supported by the MediaWiki software.

Further resources

- **A Survey on Linked Data and the Social Web as facilitators for TEL recommender systems**
- **Interlinking educational Resources and the Web of Data – a Survey of Challenges and Approaches**

Chapter 6

Open Communities

6.1 Open Education - Conferences and Events USA

There are several points in the calendar where awareness of openness in education is raised. These include:

- Open Education Week (March)
- Open Access Week (October)
- Open Data Day (February)
- Education Freedom Day (January)

There are also many conferences dedicated to open education which take place all around the world.

Open Education Conferences

Europe

- Online Educa – Annual global elearning conference held in Berlin.
- OER14 conference – Annual conference held in the UK, focused on OER.
- Mozilla Festival – Annual event usually held in London, lots of teaching and learning activities related to web.
- OKFest – The Open Knowledge Foundation Festival – this year open education is likely to an important area.
- Wikimania - Annual conference centered on Wikimedia projects with tracks dedicated to education, free culture, open data, and more.
- Cetus Conference - Annual Conference from Cetus, UK centre that specialises in technology innovation and interoperability standards in learning, education and training.
- OPPI - Helsinki Learning Festival: Held in Helsinki, first year in 2014. Focuses on new learning practices.

- OpenEd conference – Annual conference held in US, currently the biggest Open education conference in the world.
- OCWC Conference – Held in the US and organised by the Open Courseware Consortium.
- Connections - US conference that brings together leading policy, academic and technology experts to discuss the future of open education resources (OER) as well as the technologies that are making this future a possibility.

Non-Western

- Inaugural International Conference on Open and Flexible Learning (ICOFE) – Annual event held last year in Hong Kong.
- International Conference of the African Virtual University – This year was the first year this conference ran, held in Kenya.
- Pan-Commonwealth Forum on Open Learning – Bi-annual event organised by the Commonwealth of Learning, held in Africa.
- Asia Regional OpenCourseWare And Open Education Conference - Held in Kuala Lumpur, Malaysia and organised by University of Malaya.
- EELU ICEL 2014 - EELU International conference on e-learning - Held in Egypt.
- OER Asia - Open Educational Resource Community in Asia Symposium - Held in WOU in Penang, now in its 2nd year.

6.2 Open Education Data - Conferences and Competitions

Data competitions and challenges are not new to universities and research institutes but there is now also an increasing number taking place outside the academic space.

Here are some example competitions where open data has played, or is playing a role.

Some conferences are devoted to open data and its social and educational value. These include:

- **Open data dialog** - held in Berlin
- **International World Wide Web Conference (WWW2014)**, Seoul, Korea
- **ARIADNE/GLOBE Convening – Open Federations 2013: Open Knowledge Sharing for Education, A Convening of Aggregators & Networks of Educational Repositories**
- **OKFest – The Open Knowledge Foundation Festival**

There are also many 'challenges' which encourage novel or effective uses of open data in education. These include:

The Open Education Challenge

Website: <http://openeducationchallenge.eu>

The Open Education Challenge, launched in partnership with the European Commission, is part of Startup Europe. It is an opportunity for cutting-edge education startups to receive mentoring and seed funding through the European Incubator for Innovation in Education, and get direct access to investors from day one. The competition is not focused on open data but open data use is encouraged.

The Open Data Challenge series

Website: <http://theodi.org/challenge-series>

The Open Data Institute is running a series of seven challenges to generate innovative and sustainable open data solutions to social challenges. So far the areas covered have been education, crime and justice and energy + environment.

The Mass EduData Challenge

Website: <http://www.eventbrite.com/e/the-mass-edudata-challenge-registration-11540647387>

The Massachusetts Department of Elementary and Secondary Education (DESE) maintains extensive data sets on education from all of the state's 351 cities and towns and is seeking to spark additional engagement and innovation around its data through the launch of the Mass EduData Challenge- a six week competition aimed at engaging the public in viewing, analyzing, and visualizing Massachusetts educational data to produce new insights, tools, and opportunities to improve outcomes and drive social benefit in the Commonwealth.

Apps4Europe

Website: <http://www.appsforeurope.eu>

Apps for Europe is a support network that provides tools to transform ideas for data based apps into viable businesses. They are bringing together a powerful European network of individuals and organisations who have been involved in open data programmes and in supporting promising ideas to help ideas to scale. As part of their programme they are supporting a series of data events, competitions and hackathons.

Science for Solutions open data competition

Website: <http://www.qld.gov.au/dsitia/initiatives/science-open-data/about-competition/>

A competition to promote the use, reuse and repurposing of science that is freely available on the Queensland Government open data portal. The aim is to encourage data visualisations, application development or other unique treatments of the science datasets provided by the Department of Science, Information Technology, Innovation and the Arts.

Open Data Stories

Website: <http://blog.okfn.org/2014/02/20/enter-the-partnership-for-open-datas-impact-stories-competition/>

Partnership for Open Data (POD) is inviting people to share stories about how open data has positively impacted you, or those around you; technologically, politically, commercially, environmentally, socially, or in any other way.

LAK Data Challenge

Website: <http://www.solaresearch.org/events/lak/lak-data-challenge/>

What do analytics on learning analytics tell us? How can we make sense of this emerging field's historical roots, current state, and future trends, based on how its members report and debate their research? The LAK data challenge uses data sets from the learning analytics field.

Career Hack

Website: <http://careerhack.appchallenge.net>

The CareerHack contest, run by the UK Commission for Employment and Skills (UKCES), asked developers to find innovative and inspiring ways of using data made available through its Labour Market Information (LMI) for All data site.

Land Registry Open Data Challenge

Website: <http://www.landregistry.gov.uk/campaigns/open-data-challenge>

A challenge to develop a creative idea that clearly demonstrates how the Land Registries public data can make a positive impact on the UK economy. The competition marked the release of the Land registries price paid data.

Apps voor Ouders Challenge 2012

Website: <http://www.openonderwijsdata.nl/2012/05/30/hackathon-workshop-apps-voor-ouders-challenge/>

The Dutch network Open Education Data ran an open data hackathon using open data sets from the Ministry of Education, Culture and Science released through data.duo.nl.

Open Data Challenge

Website: <http://opendatachallenge.org>

The Open Data Challenge was the first large-scale open data competition with 20,000 euros in prizes to win, and a total of 430 entries from 24 EU Member States. The winners were selected by an all star cast of open data gurus, and announced by Vice President of the European Commission Neelie Kroes at the Digital Agenda Assembly in Brussels.

6.3 Open Education Directory

- Combining Data
- Technology in support of learning and teaching mathematics in HE
- Discussion on components of current and emerging library, publishing, and related bibliographic meta-data
- EVIDENCE-BASED-LIBRARIES
- Economic and Social Data Service
- Educational Development Research Network
- CETIS-METADATA
- Digging for Data
- Research in Distance Learning
- EduBlog
- e-learning Research
- Digital technology in the theatre and theatre education
- Issues in museum education
- Higher Education Close Up - research into HE
- Data.ac.uk
- Web support Jisc mail
- Web site info management
- Jisc managing research data
- Museums Computer Group
- DBpedia discussion
- Spotlight group
- Best Practices for Multilingual Linked Open Data Community Group
- Data Driven Standards Community Group
- Development Linked Data Community Group
- Microdata/RDFa Task Force
- Linking Open Data project and the broader Linked Data community
- Networked Data Community Group
- Web Dev Data Community Group
- Google Group LODLAM
- ePsi Platform: open data in education group
- Linked Universities
- OKFN Open Bibliography
- Learning Analytics Google Group
- DCMI Education Community
- European Association for Technology-Enhanced Learning
- Adaptive Hypermedia - including Educational Adaptive Hypermedia
- ACL Community in Wales
- Association of History and Computing-UK
- Network for Aimhigher Data Analysts
- Advancing Research into Technology Enhanced Learning
- BCS Machine Translation
- Built Environment E-Learning Network
- Data Publication
- Evaluation of Online Learning

Open practitioners & academics

- Ale Armellini, University of Northampton, OER and pedagogy
- Grainne Conole, University of Leicester, OER and pedagogy
- Simon Kear - Learning Technologist, Goldsmiths
- Chris Follows - Open practice in art and design
- Anne-Marie Cunningham - GP and Clinical Lecturer
- Martin Weller - Open University
- James Clay - Group Director of Learning Technologies at Activate Learning
- Diane Laurillard, Institute of Education, open practice - rethinking university teaching
- OER Research Hub

6.4 Openness and the developing world

Open data can help identify gaps in the availability of education and provide simple solutions that can be delivered through the existing education system. In order to achieve this you need a robust analytical culture that demonstrates the impact of its work.

To date much work has been on the supply side of the education equation. Improving the quality of demand is key to making long term changes. Akshara Foundation recognised that a lack of publicly available data about public education was causing an imbalance between the education system and its users and within the system itself, so they set up the Karnataka Learning Partnership.

“We need to bring about transparency and use data-based evidence to push for reforms and accountability across the system. Usually, that would mean using existing government data, but our experience has highlighted a lack of technical and legal systems to be able to publish open educational data and we have had to create the data sets ourselves.”

- Akshara Foundation
- Karnataka Learning Partnership

Norrag reports on Sub Saharan African education issues and states that :

“Progress in the above areas requires both *better use of existing resources* and *more resources*. There is *good scope for improving quality and internal efficiency* through more strategic deployment and better management of teachers, improved accountability for teachers and principals, and provision of more and better training materials. Progress in these areas is often constrained more by weak technical capacity and political resolve than shortage of funding. But such constraints often prove more difficult to address than funding constraints.”

The Ugandan government allocated funding for schools, but corruption at various levels meant much of the money never reached its intended destination. Between 1995 and 2001, the proportion of funding allocated which actually reached the schools rose from 24% to 82%. In the interim, they initiated a programme of publishing data on how much was allocated to each school. There were many other factors (Hubbard 2007) but Reinikka and Svensson’s (2004) analysis showed that the data publication played a significant part.

- Reinikka, R., and J. Svensson. May 2004. Local capture: Evidence from a central government transfer program in Uganda. *Quarterly Journal of Economics*: 679–705.
- Hubbard P. (2007); Putting the Power of Transparency in Context: Information’s Role in Reducing Corruption in Uganda’s Education Sector; Center for Global Development Working Paper No. 136 accessed at www.cgdev.org/files/15050_file_Uganda.pdf on March 2nd 2012
- Uganda Open Government data readiness study
- Is money reaching schools in Tanzania? and where does education money go?

National Initiatives:

- Moldova
- Nigeria
- Rwanda
- Kenya
- Uganda
- Ghana

Sub-national initiatives:

- Edo state Nigeria

Sub-sector education:

- CHET South Africa Higher EducaBon Open Data project

6.5 Wikipedia

Wikipedia, the free online encyclopedia that anyone can edit, is arguably the biggest Open Education Resource in the world. The Wikimedia Foundation, the overarching foundation of which Wikipedia is a project, has the following statement at the heart of its mission: “Imagine a world in which every single human being can freely share in the sum of all knowledge”. Wikipedia has been utilised by people all over the globe as a way to “find out the answer to things”.

Wikipedia continues its fight to be seen as credible in an education context despite the fact that research has shown Wikipedia to be a hugely useful tool in education. For some, Wikipedia itself raises significant questions about education and the way we learn.

David White from the University of Oxford explored some of these questions in a talk given at Wikimania 2014. David argues that the fundamental problem with both Google and Wikipedia is that they are ‘too easy’ and lose the side effect of finding information - learning. The problem is not Wikipedia but that learning needs to evolve and we need to shift from a ‘pedagogy of answers’ to a ‘pedagogy of questions’.

Other Resources

- Wikipedia Education Programme
- Wiki Education Foundation
- Wikimania 2014: Wikipedia belongs in Education
- Wikipedia challenges us to adopt a pedagogy of questions
- Almost Wikipedia: What eight early online collaborative encyclopedia projects reveal about the mechanisms of collective action

Chapter 7

Other

7.1 Glossary

Other resources

- Open Education Europa: Key concepts in EdTech and Open Education
- Open Educational Resources Toolkit - Glossary
- SI521 “Open Educational Resources at the University of Michigan” Open Textbook/Glossary
- MOOCS.com - MOOC, SPOC, What? Untangling the Online Course Vocabulary
- Edshelf - The Education Technology Dictionary
- Common Sense Media - EdTech Glossary
- COL: OER TIPS Framework with CC Glossary

7.2 Frequently Asked Questions (FAQ)

Is fair dealing/use equivalent to OER?

No. Fair dealing and fair use rights are critical, but that is not the same as OER. See the OER definition.

Can OER be used to train teachers?

Yes, and this a key activity especially in the developing world.

Is a MOOC an OER?

MOOCs can be OERs if and only if their content is free to access and openly licensed (or public domain) to legally allow the '4 Rs' (reuse, redistribute, revise, remix).

What is the role of OER in open pedagogy/ open learning?

An open learner is an individual who embraces open technologies and approaches in their learning. An open learner model a type of learner model that encourages learner autonomy through self-awareness and self-regulation of the learning process.

How does policy relate to open education?

Open policies support the adoption and development of OER and OER uptake. They can help establish climates where open practices can have impact.

What support exists for open policy/policies?

Creative Commons, OKFN, SPARC and many other open advocates are building an Open Policy Network to support governments, systems and institutions as they create, adopt and implement open policies.

What is an open practitioner?

The term 'open practitioner' isn't widely used but suggests an educator who embraces open technologies and approaches in their teaching.

What is Open Accreditation?

Open accreditation is about awarding participation in new types of education. Open Badges are an example of dealing with accreditation, but you can also think about how MOOC participation can be awarded to make it more acceptable as part of a more traditional (eg. university) education. Other open assessment ideas include e-assessment, portfolios/diaries, PLEs, self-evaluation and learner created content.

What is the difference between open education and open learning?

Open learning is a term used to describe activities that either enhance learning opportunities within formal education systems or broaden learning opportunities beyond formal education systems. It often uses open education elements - such as open educational resources - but typically occurs within formal education infrastructure while open education per se is arguably unrestricted to formal learners.

Chapter 8

Text and image sources, contributors, and licenses

8.1 Text

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