The development of new disciplines in Education – the Open Education example

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The advent of digital, networked technology has had an impact on many aspects of scholarly practice. The influence can be seen as both technical and cultural, as new technologies allow different practices to emerge, and cultural norms from the internet also shape expectations and behavior. In some areas, this has seen the emergence of distinct disciplines, which have built on existing ones and combined these with networked practices. This chapter examines one such example, that of Open Education, and considers whether such areas can be considered as new disciplines. The emergence of such fields is suggested as analogous to the urban renaissance and the development of towns when certain conditions arose.

Keywords: Open Education; Open Educational Resources; Massive Open Online Courses; Higher Education; Digital Scholarship.

I. Introduction

The advent of digital, networked technology has had diverse impacts across all sectors of educational practice. This can be seen in terms of individual practice, with digital scholarship (WELLER, 2011) and also at the disciplinary level. As well as impacting upon the practice of any particular discipline, e.g. the creation of online digital databases in History, it can also lead to the emergence of sub-disciplines and new fields, for example digital humanities. In this chapter the process of the emergence of one such field, namely Open Education, is considered in detail. From this example, general trends can be observed that are applicable in the development of other new fields. The presence of common antecedents and characteristics that define a new area, which is built on existing frameworks is analogous to the urban renaissance, it is suggested, and this analogy can offer a useful means of framing the future development of such areas.

The term 'open' (and 'openness') is one that has grown in use over recent years in relation to Higher Education (HE). The following expressions are all used in regular practice in many areas of HE:

1. Open access
2. Massive Open Online Courses (MOOCs)
3. Open eEucational Resources (OERs)
4. Open Data
5. Open Educational Practices (OEP)
6. Open Research

These can be seen as distinct areas; for example, there is a strong thread of Computer Science research in the MOOC field, while Library and Information Science professionals influence Open Access publishing. However, there is a good deal of overlap

between these sub-domains in terms of practice, beliefs and people. As technology shapes education, different topics emerge. Some of these fail to develop beyond a niche interest, others are best viewed as subsections of an existing domain, while others form a domain that can be considered distinct within education. In this chapter, the development of the open education field will be examined, with a focus on one particular area, namely that of open education resources. However, the process described here can be seen as generalizable for other newly emerging areas, as a comparison with Learning Analytics will demonstrate.

It is first necessary to consider how the current interpretation of openness in education developed. From this, a base set of principles can be determined which helped shape the movement. I would suggest that there are three key strands that have influenced the current understanding of openness in education: open access education, open source software and web 2.0 culture.

II. Open Universities

Open access to education goes back beyond the foundation of the United Kingdom Open University (UKOU), to public lectures, but the establishment of the Open University is often stated as the start of open and distance access education as it is commonly interpreted. Originally proposed as a 'wireless university' in 1926, the idea gained ground in the early 1960s, and became Labour Party manifesto commitment in 1966.[1] The institution was established in 1969 with the mission statement that it is 'open to people, places, methods and ideas'. The aim of the OU was to open up education to people who were otherwise excluded either because they lacked the qualifications to enter higher education, or their lifestyle and commitments meant they could not commit to full-time education.

1 Available at: <http://www.open.ac.uk/about/main/the-ou-explained/history-the-ou>. Acessed on: 10 January 2017.

The university's approach was aimed at removing these barriers by making education part-time, distance, supported and open access. The OU model was very successful and a number of other open universities were established in other countries using this as a model. The need to expand access to HE to those who could not access the conventional model became something many governments recognized, and the reputation of the OU for high-quality teaching material and good learning experience made the approach respectable. Many of the aims of such open universities, to democratize learning and reach excluded groups, would re-emerge with the arrival of MOOCs (KOLLER, 2012).

Note that there is no particular stress on free access in this interpretation, or on the ability to reuse content, which are key characteristics of the modern open education movement. The emphasis was on *affordable* education, as, before the Internet, the other forms of openness were seen as more significant. It was with open source that 'open' and 'free' began to be linked or used synonymously.

III. Open Source and Free Software

In the 1970s, Richard Stallman, a computer scientist at MIT, became frustrated with the control over computer systems at his institution, and this frustration would lead to a lifelong campaign about the rights associated with software. In 1983 he started the GNU project to develop a rival operating software system to Unix, which would allow users to adapt it as they saw fit. The code for GNU was released openly, in contrast to the standard practice of releasing compiled code, which users cannot access or modify. He quickly recognized that licenses were the key to the success of the project, and championed the copyleft (in contrast with copyright) approach, that allowed users to make changes as long as they acknowledged the original work (WILLIAMS, 2002).

Stallman advocated that software should be free in this sense of re-purposing and set up the Free Software Foundation in 1985. This is an ideological position about freedom. As the GNU organization puts it, 'the users (both individually and collectively) control the program and what it does for them. When users don't control the program, the program controls the users.'[2]

Related to the free software movement was the open source software movement. The two are often combined and referred to as FLOSS (Free/*Libre* Open Source Software). The open source movement is commonly credited to Eric Raymond, whose essay and book, *The Cathedral and The Bazaar* (2001), set out the principles of the approach. The open source movement, although it has strong principles, can perhaps be best described as a pragmatic approach. Raymond appreciated that software development was nonrivalrous (in that you could give it away and still maintain a copy), and that code could be developed by a community of developers, often working out of their own time and not for financial reward. The driving principle behind open source is that it is more efficient to produce software by making it open. The mantra coined by Raymond is that 'given enough eyeballs, all bugs are shallow'. By making code open then, better software is developed.

To non-developers, this distinction between free and open source often seems pedantic or obtuse. The two are generally grouped together, and indeed many open source advocates are passionate about freedoms also. It is worth noting the difference, however, as it has resonance with the motivations in Open Education. Openness in education can be seen as a practical approach; for instance, open textbooks can be adapted and save money (HILTON et al., 2014). But the 'social' argument is also at the core of open education, for example in making the outputs of

2 Available at: <http://www.gnu.org/philosophy/free-sw.html>. Acessed on: 12 January 2017.

publicly funded research available to all, rather than in proprietary databases.

The free and open source software movements can be seen as creating the context within which open education could flourish, partly by analogy, and partly by establishing a precedent. Their work on open licenses also created the predecessor to Creative Commons licenses, which form the basis of much of the open education movement. The Creative Commons licenses are permissive rather than restrictive – they allow the user to do what the license permits without seeking permission. These licenses have been a very practical requirement for the OER movement to persuade institutions and individuals to release content openly, with the knowledge that their intellectual property is still maintained.

IV. Web 2.0

Although it is a phrase that has now been through the peak of popularity and passed into history, the Web 2.0 phenomenon of the mid ’00s had a significant impact on the nature of openness in education. The term was used to recognize a growing development in the way in which people were using the Web. It wasn’t a deliberate movement, but rather a means of distinguishing the more read/write, user-generated nature of a number of tools and approaches. In 2005 Tim O’Reilly outlined eight principles of Web 2.0, which characterized the way tools were developing and being used. This included sites such as Wikipedia, Flickr and YouTube. Some of the principles turned out to be more significant than others, and some related more to developers than users, but they encapsulated a way of using the Internet that shifted from a broadcast to a conversational model. This set of developments would later combine with social media such as Twitter and Facebook.

In terms of open education, the Web 2.0 movement was significant for two major reasons. Firstly, it decentralized much of the engagement with the Web. Educators didn't need to get approval to create websites; they could set up a blog, establish a *Twitter* account, create *YouTube* videos and share their presentations on *Slideshare* independently. This created a culture of openness amongst those academics who adopted such approaches, and this would often lead to engagement with open education in some form. Secondly, it created a context where open and free were seen as the default characteristics of online material. Users, be they educators, students, potential students or the general public, had an expectation that content they encountered online was freely accessible.

V. Coalescing Principles

From these three main strands – open universities, open source and Web 2.0 – a number of principles coalesce into the current open education movement. From open universities we have the principles of open access and removal of barriers to education. This was restricted to a particular interpretation of open education, however, and closely allied with particular national policies. Open source software gives us principles of freedom of use, mutual benefit in sharing resources and the significance of licenses. This didn't spread much beyond the specialized community of software developers. Lastly, Web 2.0 provides the cultural context within which the openness becomes widely recognized and expected. A list of general principles inherited from these three strands might be:

1. Freedom to reuse
2. Open access
3. Free cost
4. Easy use

5. Digital, networked content
6. Social, community based approaches
7. Ethical arguments for openness
8. Openness as an efficient model

We can now examine one aspect of the open education movement, namely that of OER, and examine how these principles have shaped the emergence of the field.

VI. Open educational resources

OER represent a good example of the overall open education movement to examine because they have acquired a certain maturity, dating back to 2001, which provides a sufficient time period to examine how the field develops. It is, however, still a comparatively young area, in respect to to traditional disciplines.

Open Educational Resources have been part of the educational landscape since 2001 with the announcement of MIT's OpenCourseWare project, and longer if the Learning Objects movement is viewed as a precursor to OER (WELLER, 2014). There are several definitions of OER, but with a good deal of overlap between these. The William and Flora Hewlett Foundation (n.d.), who funded the MIT project, define OER as:

> […] teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

This is a broad definition that can include whole courses (MOOCs) as well as individual resources, textbooks and software. A key element to this definition is the stress on the license that permits free use and re-purposing. In order to satisfy the Hewlett definition it is not enough to simply be 'free' at the point of use; it should also support intellectual and creative re-use. This is usually realized through the use of Creative Commons licenses. There are other definitions of OERs available[3] but even if they do not explicitly mandate an open license, they all emphasize the right to reuse content.

Following the MIT declaration, a number of other OER projects were founded to create and share content, including OpenLearn in the UK, MERLOT, BCCampus and the JISC OER programme. UNESCO view OER as essential in meeting their strategic priorities and have established a number of Chairs in OER, as has the ICDE (International Council for Open and Distance Education). In the US, the Department of Labor launched a $2 billion programme, *Trade Adjustment Assistance Community College and Career Training* (TAACCCT), aimed at improving workforce and employability training. All new material produced through grants awarded by this programme were mandated to release their content under a Creative Commons licence (ALLEN, 2016), as OER.

There have been a number of policies relating to OER, including the UNESCO 2012 Paris OER Declaration, (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION, 2012) which set out the following recommendations for States:

> a. Foster awareness and use of OER.
> b. Facilitate enabling environments for use of Information and Communications Technologies (ICT).

3 Cf. Creative Commons (2016) for a comparison of these.

> c. Reinforce the development of strategies and policies on OER.
> d. Promote the understanding and use of open licensing frameworks.
> e. Support capacity building for the sustainable development of quality learning materials.
> f. Foster strategic alliances for OER.
> g. Encourage the development and adaptation of OER in a variety of languages and cultural contexts.
> h. Encourage research on OER.
> i. Facilitate finding, retrieving and sharing of OER.
> j. Encourage the open licensing of educational materials produced with public funds.

This indicates that the OER movement has been successful in many respects, including gathering funding, influencing policy and practice and making educational content available to learners, over a sustained period. However, the movement has also seen a many projects fail to survive beyond their initial funding, giving rise to questions over sustainability.

OER can be seen as emphasizing some of the principles of the Open Education movement outlined above. Key to their definition are the freedom to reuse, open access and free cost. One version of OER is the production of open textbooks, which is particularly evident in North America. This often makes claim to openness being a more efficient model, in that it is more efficient to produce openly licensed content than purchase copyrighted works (WELLER, 2016a). Of the other principles listed above, they are seen in varying degrees in OER projects. For example, although community based projects have been developed, OER is often produced by well-funded projects or institutions, rather than by a dispersed community. Similarly, although ethical arguments can be made about releasing all teaching material under an open license, this has not gained the same traction as it has with open access publishing.

VII. Types of OER users

The open education movement in general, and OERs specifically, form a basis from which many more general teaching practices benefit, but often practitioners in those areas are unaware of OERs explicitly. One way to examine the development of the OER field is to track how it has reached new audiences. The focus in the fledgling OER community was to expand the group of 'OER aware' users, but mainstream adoption has seen OER usage by new audiences. Weller et al (2016) has suggested three categories of OER users: OER active, OER as facilitator, and OER consumer.

a. OER active

This category of user is aware of OER issues, in that the term itself will have meaning for them, they are engaged with issues around open education, are aware of open licences and are often advocates for OERs. This group has often been the focus of OER funding, conferences and research, with the emphasis on growing the size of this audience. An example of this type of user might be the Community College teacher who adopts an openly licensed textbook, adapts it and contributes to open textbooks.

While the OER active group has continued to expand and has established a successful community, it is unrealistic to assume that every educator will become interested and active in the OER movement. It may not be necessary for every educator to engage with OER for it to be considered mainstream, but, as with e-learning in general, it would need to impact upon the majority of educators' practice. A recent survey of educators in US Higher Education found that awareness of OER was low, but that awareness was not a requirement for adoption (ALLEN; SEAMAN, 2014). This leads to the second category of OER user.

b. OER as facilitator

This group may have some awareness of OER, or open licences, but they have a pragmatic approach toward them. OERs are of secondary interest to their primary task, which is usually teaching. OER (and openness in general) can be seen as the substratum, which allows some of their practice to flourish, but their awareness of OER issues is low. Their interest is in innovation in their own area, and therefore OERs are only of interest to the extent that they facilitate innovation or efficiency in this. An example would be a teacher who uses Khan academy, TED talks and some OER in their teaching.

Cost savings for students can be viewed as a primary goal, which OER can help achieve. Much of the motivation for the open textbook movement relates to the financial burden of buying proprietary textbooks. The potential savings here are one area of OER impact that has seen rigorous, quantitative research. Hilton et al (2014) found an average saving of $90.61 per student per course, across a wide range of community and stage college courses.

However, if cost savings were the only goal, then OERs are not the only way to realize them. Materials could be made free, or subsidized, which aren't openly licensed. The intention behind the OER approach is that it has other benefits also, in that educators adapt their material, and it is also an efficient way to achieve the goal of cost savings, because others will adapt the material, with the intention of improving its quality, relevance or currency. OERs are in this instance one means of achieving a related objective.

c. OER consumer

This group will use OER amongst a mix of other media and often not differentiate between them. Awareness of licences is low and not a priority. OERs are a 'nice to have' option but not essential, and

users are often largely consuming rather than creating and sharing. An example might be a student studying at university who uses iTunes U materials to supplement their taught material. For this type of user, the main features of OERs are their free use, reliability and quality.

VIII. Areas of OER Research

As well as users, another lens that can be used to examine the OER field is the nature of research undertaken. Weller (2016b) and Zancanaro, Todesco & Ramos (2015) have analyzed OER publications to determine categories of research within the field. Weller (2016b) identifies ten broad categories:

1. *Project case study* – this either reports on the findings of a particular case study, or announces the implementation of a project.
2. *Technical* – these papers focus on the technical specification of a particular project such as an OER repository, or the required technical specification for an ecosystem or framework project
3. *OER as subject* – this category is focused on the OER field itself, the nature of openness, the direction for OER, suggestions for adoption, the role of OER in distance education.
4. *Research with impact data* – this type of paper undertakes evaluation of the impact of OER implementation, using educational research methodology that would be recognized in more mainstream studies, such as control groups, pre and post test, etc.
5. *Policy* – these articles report on existing OER policies, the need for policy or standardized approaches, national frameworks and comparison of policies.

6. *Practitioner* – the focus of these articles is the use of OER by practitioners in a particular context, for example teachers or librarians.
7. *OER in developing nations* – the use of OER in the context of developing nations has received some attention with projects such as TESSA.
8. *MOOCs* – massive open online courses have been an area of considerable growth since 2009.
9. *Pedagogy* – several articles focus specifically on the possible impact of OER on pedagogy, or as a vehicle for change in teaching practice.
10. *Open data/practice/access* – OER is related to other areas of openness, and while the coverage is not exhaustive, such articles are sometimes included in the output of the OER community.

Zancanaro, Todesco & Ramos (2015) found eleven macro-themes, with considerable overlap:

1. *Theoretical discussions* – the conceptualization of the term Open
2. *Quality* – issues related the quality of OER, how this can be ensured, or measured
3. *Barriers to use* – addresses problems in the adoption of OER such as formal recognition
4. *Open education* – provides an overview of open education in general
5. *Incentive policies* – policies for OER adoption
6. *Survey* – detailing results of research carried out on the use of OER

7. *Technology* – detailing technical aspects of OER such as metadata and interoperability
8. *Type* – particularly the area of open textbooks
9. *Sustainability* – as mentioned above the sustainability of OER projects is an area of concern and these articles examine different business models
10. *Production* – different models of OER production, sharing and dissemination
11. *Open licenses* – copyright issues and Creative Commons licenses

Both articles highlight how the number of articles and range of categories has increased since the start of OER as a movement. Both of these analyses demonstrate that the field is reflective, examining what it means to be open, how best to implement OER and share practice, as well as more traditional impact research.

IX. Discussion

The current open education movement can be seen as one that has developed out of earlier educational innovations. Whether it is distinct from the Open Education movement as characterized by open and distance education universities, or just a current instantiation of this, is subject to debate. It is influenced by technical developments, but more significantly by the cultural shifts that have accompanied these. The sharing culture of the Internet, and the political arguments around ownership and rights relating to content have strongly shaped the open education movement. In this respect, open education can be seen as representative of many areas in education that undergo a transformation through the influence of internet culture, for example the Digital Humanities.

By examining the development of one subset of the open education movement, namely OER, this process can be seen in detail. Such areas do not emerge fully formed, but rather can be seen as a progression from earlier developments. OER owed much to the Learning Objects approach, which had garnered interest at the end of the 1990s. While this became mired in technical issues and specifications, the underlying goal of easily sharing educational content was one that inspired the original OER movement (and featured many of the same individuals). Direct influences from the Internet and software culture were seen also in the concept of reuse, and in the practical application of licenses that permitted this.

Funding from foundations such as Hewlett was necessary to gain sufficient momentum. This created sufficient awareness globally for other nations to respond also. These early years were characterized by a focus on implementation, on creating content and demonstrating the principle in action.

As the field expands, there is an accompanying diversification in the stakeholders and their associated research interests. In the early phases, it is necessary to raise awareness and establish advocates for the movement in order for it to gain sufficient momentum. As it expands, however, a more critical stance can be seen to emerge, as evidenced by theoretical papers, and also research investigating measurable impact. Similarly, the stakeholders who have an interest in the subject diversify beyond the initial advocates and funded projects.

Most new areas in education will emerge because they are seen as offering a better way of realizing a goal, or solving an existing problem. This inevitably requires the involvement of practitioners, senior managers, and, hopefully, learners themselves. The number of perspectives on the topic therefore increases and with each of these there are different requirements and issues.

This process of development can be seen in other fields also. For example, Siemens (2016) details the development of the Learning Analytics field. It builds on previous work in the field of statistics and Web analytics, and utilizes the technical developments particularly in areas such as Learning Management Systems. It starts with a set of advocates, based on Siemens' own network, and initial funding to host a conference in 2011. From here the field expands, with a particular focus on research through the development of a research network (SOLAR). Whereas OER had much of its initial funding from foundations, Learning Analytic drew from a subscription model to SOLAR from universities, and corporate sponsorship. This seed funding performed the same function as the initial funding received by OER projects from institutions like the Hewlett Foundation, in allowing the field to reach a stage where it was addressing specific problems. It is now in the stage of reaching new audiences; for example, Siemens is working closely with Chinese universities who wish to develop learning analytics.

X. Urban renaissance as analogy

In conclusion, the impact of networked technology on HE is both technical and attitudinal. This is giving rise to new developments, and variations on existing disciplines, which over time can emerge as distinct areas of interest. These are characterized by specialist conferences, journals, large-scale projects, investment and a sustainable community who identify with the field. This has been the case with open education, as evidenced by the OER example. Each such area builds on existing aspects within education, but also draws upon elements of Internet culture and external influences. These aspects provide the initial motivation to develop a community, which is driven by enthusiasts and advocates. If the area gathers sufficient interest, and funding, then it can develop from here with a diversification of research themes and interested parties.

This process of emerging fields of interest in education is likely to be replicated, but with different initial driving factors and influences. This can be seen as analogous to the historical development of urban plans in towns. Borsay (1989) argues that following a period of peace and prosperity after the Restoration, many English towns underwent a renaissance period, with many common features, although there was no centralized plan. This renaissance was characterized by uniform house design, street planning, a growing middle-class population and increased leisure facilities such as assembly halls, public gardens and theatres. Towns began to gain an identity of their own, and living in towns became desirable. In order for this process to occur, a number of conditions needed to conspire to lead to change, including economic prosperity, the desire for social status, and the pre-existence of towns to build upon.

These conditions are closely analogous to those in the development of new educational areas. There is a requirement for growth, social attitudes inherited from the Internet and existing work in education as a foundation. When the initial antecedents were in place the urban renaissance was then characterized by common features, such as street lighting, and thus it is with new educational areas. The common features in these emerging disciplines are the arrival of new commercial interests, the establishment of new conferences and journals, the development of a new research agenda and identifiable communities. In the urban renaissance, the new towns that emerged were related to the existing urban development, but also entirely new in character. So it is with the emerging education disciplines – the modern open education movement is both an extension of the established open universities movement, but also a very distinct entity with different features.

The urban renaissance analogy also reveals how some such areas flourish, while others diminish or remain static. Although they

share common features, each town is also affected by its immediate context, and develops accordingly. Thus it will be with the new domains that emerge in education over the next decade.

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