

THE NEW PEDAGOGY OF OPEN CONTENT: BRINGING TOGETHER PRODUCTION, KNOWLEDGE, DEVELOPMENT, AND LEARNING

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ABSTRACT

The fast growing Open Content movement has profound consequences for pedagogical approaches to learning. This paper will explore the use of Open Content in higher education, including training for scientists and scholars at large, and consider its pedagogic implications. Relevance of these issues is expected to grow in the near future, involving the ability of scholars to cope with the increased need to access, search through, and fruitfully draw knowledge from data, especially for teams where cross-disciplinary competences are required to analyse, evaluate, and exchange data across a variety of research fields.

Keywords: Open content, E-learning, Pedagogy, Higher education

1 INTRODUCTION

There is no clear agreement on exactly what we mean by Open Content or Open Educational Resources (OER). The idea of Open Content is based on the emergence and rapid spread of Open Source Software. Open Source Software is characterised by the availability of the source code and the freedom to amend that code. But whilst software code is a tangible product, educational content is less easy to define. It may encompass scholars' insights, outcomes of research, reports, lesson and activity plans, and textbooks and readers as well as e-learning and multi media materials. Indeed one of the results of the movement towards OER is the realisation that learning resources may be drawn from many different contexts, including those from outside the educational world.

Notwithstanding such problems of definition and scope, there has been a groundswell of interest and activity in OERs in the past three years. This includes initiatives such as the MIT Open Courseware initiative to provide open access to Courseware or projects such as Rice University's Connexions project to develop community repositories of modular learning programmes. It includes the development of institutional repositories providing access to the outcomes of research and the rapid growth of open journals, free to users. The increasing popularity of the Creative Commons License is facilitating the development of community publishing ventures, particularly in developing countries. Many cultural organisations have initiated projects to provide free access to collections, whilst some media organisations, particularly those publicly funded, have begun to provide easier access to content. Noteworthy is the British Broadcasting Corporation Open Archive initiative. Perhaps more fundamental, is the growing development of shared internet based resources such as Wikipedia, the Creative Commons licensed open encyclopaedia based on user contributions, and of media sharing sites such as YouTube and services for sharing bookmarks such as Deli.cio.us or CiteULike.

Many of these developments have been driven by the use of the Internet for developing and sharing knowledge. Signatories to the Berlin Declaration state that "the Internet has fundamentally changed the practical and economic realities of distributing scientific knowledge and cultural heritage. For the first time ever, the Internet now offers the chance to constitute a global and interactive representation of human knowledge, including cultural heritage and the guarantee of worldwide access."

The signatories, drawn from leading universities and cultural organisations throughout Europe, committed themselves to promoting "the new open access paradigm to gain the most benefit for science and society."

In this short paper we will examine the driving forces behind Open Content and Open Educational Resources. We will suggest that Open Content involves a new relationship between producers and consumers. We will go on to examine some of the ideas that can support such a new relationship, including communities of practice, activity

theory, and narrative. In the next section we will examine some of the barriers to these wider forms of knowledge production and sharing, and in the final section we will discuss the future development of the Open Content movement.

2 DRIVERS FOR CHANGE – BACKGROUND TO THE OPEN CONTENT

Open Content, or Open Educational Resources, is hardly a new idea. Indeed it could be said that everyday teaching involves the open sharing of knowledge, ideas, and content. Furthermore, much of scientific development through publicly funded universities has been premised on the sharing of research and research outcomes with often elaborated cultural and social processes both for assuring the quality of those outcomes and for regulating the exchange of knowledge. It may be that rather than seeing Open Content as a new phenomenon, we should rather look at changing forms of cultural exchange and regulation based on changes in production processes, new forms and organisation of innovation, new understandings of knowledge production, and of course, rapid changes in technologies.

The extent to which these changes are affecting not only education and scholarly production but also all citizens of a global information society is part of the current debate.

In universities, the ability of sharing knowledge will get more and more important. The patterns and cadences of interactivity among faculty members, learners, instructional development staff, knowledge management staff, and expert practitioners will assume new forms. As the ability to generate just-in-time knowledge becomes more prevalent, so will the reliance on ‘canned,’ static knowledge decline. Pervasive, perpetual learning, richly supported by knowledge management, will become the new gold standard for many learner experiences.

In the research domain, the boundaries among academic disciplines are increasingly blurred, and growing numbers of investigations are being carried out by larger and more geographically distributed teams. Knowledge sharing is the sine qua non of collaborative research. If the results of such research are to be applied, they must be captured and disseminated in ways that facilitate their discovery by the people who are in the best position or have the greatest need to apply them (Collier et al., 2003).

2.1 What are the drivers of such developments?

Firstly there is an ethical and idealistic argument for Open Content and shared research. The Berlin Declaration talks of a “vision of a global and accessible representation of knowledge.” Interestingly it defines open access as “a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community.” Further ethical arguments are based on the idea that free access to knowledge is a fundamental requisite to democracy. Such ethical considerations have very profound impacts. One of the major pressures for open access to research has been in the medical community. 100,000 scientists worldwide have signed an open letter demanding that scientific journals in the fields of medicine and the life sciences release their copyrighted articles after six months to an on-line public library, PubMed Central, which would provide free and unrestricted access to the information these journals contain (Roberts et al, 2001). Their argument is based on the right of the public to have free and open access to the knowledge created by “tens of billions of dollars of mostly public money each year, and representing the original ideas and millions of hours of hard work by hundreds of thousands of scientists, and the voluntary participation of hundreds of thousands of patients in clinical studies” (Public Library of Science). Within Europe, there is increasing pressure to ensure public access to research and development activities undertaken with public funding. The UK Higher Education Authority JISC e-learning programme now stipulates that all outcomes of publicly funded projects must be published under an open access license.

However, the argument for free access to scientific content through open publications is not based on idealistic or ethical considerations alone. JISC state: “There is accumulating evidence that shows that research articles that have been self-archived are cited more often than those that have not. Across most subject areas there is at least a twofold increase in citation rate. In some subject areas it is even higher. This form of Open Access means that research has much more impact than before. Moreover, the research cycle – where work is published, read, cited, and then built upon by other researchers – is enhanced and accelerated when results are available on an Open Access basis.”

A further argument for Open Content, especially in the area of Open Educational Resources, is sustainability. Although access to learning in the form of textbooks and other printed materials has been limited in many parts of

the world, this has not been previously seen as a major problem in the more economically developed countries. With the growth of e-learning, however, the expense of producing compelling e-learning materials has proved a major barrier to the introduction of ICT based learning and to the development of new pedagogies (Attwell, 2003). This is especially so in more specialized subject areas or in countries with a smaller language population. Through the development of standards for the interchange of materials, often allied to the implementation of Open Source software, educational resources can be exchanged and repurposed for use by different learners. Furthermore, if systems can be developed to allow teachers and trainers to develop and share their own learning materials, it may be possible to develop a sustainable ecology of e-learning materials.

In many ways the debate over open content parallels discourse over innovation. Innovation is increasingly understood as a non-linear process, dependent on networks among enterprises and among enterprises and knowledge institutions and on the sharing of innovation related activities and products. As such, innovation is a social process, rather than a purely economic or technical development.

Having said this, there is no doubt that rapid technological change is a major driving force behind the Open Content movement. However, new technologies should be seen as a mediating knowledge exchange and production rather than as a determining factor. One of the major developments in this respect is our changing understanding of knowledge development through the emergence of Web 2.0 and social software. Social software is used here in the meaning of software that lets people rendezvous, connect, or collaborate by use of a computer network. It supports networks of people, content, and services that are more adaptable and responsive to changing needs and goals. Social Software adapts to its environment instead of requiring its environment to adapt to software. Social software underpins what is loosely referred to as Web 2.0. Whereas Web 1 was largely implemented as a push technology - to allow access to information on a dispersed basis, Web 2.0 is a two way process, allowing the Internet to be used for creating and sharing information and knowledge rather than merely accessing external artefacts.

Social software is increasingly being used in education and training through such applications as web logs, wikis, tools and applications for creating and sharing multi media, and tools for sharing all kinds of different personal knowledge bases including bookmarks and book collections. Rather than monolithic vendor driven and designed applications, Web 2 and social software are based on the idea of 'small pieces, loosely connected' utilising commonly recognised standards and web services for linking ideas, knowledge, and artefacts.

Social software offers the opportunity for narrowing the divide between producers and consumers. Consumers become themselves producers through creating and sharing. One implication is the potential for a new ecology of open content, books, learning materials, and multi media, through learners themselves becoming producers of learning materials.

These developments are changing the way we understand knowledge production and classification, challenging both traditional taxonomies of knowledge based on disciplines and challenging the idea of 'expert knowledge' passed down to learners or consumers. In the third section of this paper we will examine some of the theoretical underpinnings of such new forms of knowledge production, based on communities of practice, activity theory, and discourse.

3 DEVELOPING AND SHARING THROUGH COMMUNITIES OF PRACTICE

Mark Smith (2003) has produced a useful summary of research and writings, particularly by Jean Lave and Etienne Wenger, on communities of practice. This section draws heavily on his text.

Wenger points out that we are all members of different communities of practice:

“Being alive as human beings means that we are constantly engaged in the pursuit of enterprises of all kinds, from ensuring our physical survival to seeking the most lofty pleasures. As we define these enterprises and engage in their pursuit together, we interact with each other and with the world and we tune our relations with each other and with the world accordingly. In other words we learn. Over time, this collective learning results in practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore to call these kinds of communities communities of practice” (Wenger, 1998).

Although the nature and composition of these communities varies, members are brought together by joining in common activities and by 'what they have learned through their mutual engagement in these activities' (Wenger, 1998:45).

According to Wenger (1998), a community of practice defines itself along three dimensions:

- “What it is about – its joint enterprise as understood and continually re-negotiated by its members.
- How it functions - mutual engagement that bind members together into a social entity.
- What capability it has produced – the shared repertoire of communal resources (routines, sensibilities, artefacts, vocabulary, styles, etc.) that members have developed over time”. (see also Wenger, 1999: 73-84)

A community of practice involves much more than the technical knowledge or skill associated with undertaking some task. Members are involved in a set of relationships over time (Lave & Wenger, 1991: 98) and communities develop around things that matter to people (Wenger, 1998). The fact that they are organising around some particular area of knowledge and activity gives members a sense of joint enterprise and identity. For a community of practice to function, it needs to generate and appropriate a shared repertoire of ideas, commitments, and memories. It also needs to develop various resources such as tools, documents, routines, vocabulary, and symbols that in some way carry the accumulated knowledge of the community. In other words, it involves practice: ways of doing and approaching things that are shared to some significant extent among members.

Rather than looking to learning as the acquisition of certain forms of knowledge, Lave and Wenger have tried to place it in social relationships – situations of co-participation. As William F. Hanks puts it in his introduction to their book: “Rather than asking what kind of cognitive processes and conceptual structures are involved, they ask what kinds of social engagements provide the proper context for learning to take place” (1991: 14). It is not so much that learners acquire structures or models to understand the world, but they participate in frameworks that have structure. Learning involves participation in a community of practice. And that participation “refers not just to local events of engagement in certain activities with certain people, but to a more encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities”(Wenger, 1999: 4).

Learning is not seen as the acquisition of knowledge by individuals so much as a process of social participation. The nature of the situation impacts significantly on the process.

“Learners inevitably participate in communities of practitioners and... the mastery of knowledge and skill requires newcomers to move toward full participation in the socio-cultural practices of a community. Legitimate peripheral participation provides a way to speak about the relations between newcomers and old-timers, and about activities, identities, artefacts, and communities of knowledge and practice. A person’s intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice. This social process, includes, indeed it subsumes, the learning of knowledgeable skills” (Lave & Wenger, 1991: 29).

In this there is a concern with identity, with learning to speak, act, and improvise in ways that make sense in the community. What is more, and in contrast with learning as internalization, “learning as increasing participation in communities of practice concerns the whole person acting in the world” (Lave & Wenger, 1991: 49). The focus is on the ways in which learning is “an evolving, continuously renewed set of relations” (ibid.: 50).

Following these ideas, open content is developed through a series of wider social interactions and commitments over a period of time and requires a framework with structures for a community to emerge. At the same time the community has to develop the tools, documents, routines, vocabulary, and symbols that can carry the accumulated knowledge of the community. It needs support for processes to enable newcomers to move towards full participation, through mediating communication, through enabling the development of a shared repertoire, including not just artefacts, but the ability to create artefacts, and through defining social identities for the community as a whole and for individuals within the community. This is particularly important for two reasons. A community based on Open Source Software and Open Content involves bringing together people and practice drawn from different domains and disciplines (and practices). For such a community to emerge it must develop its own (unique or defining) identity. At the same time it is at the very boundaries of the community - and in its interchanges with communities and practices from outside that community - that innovation will occur. For Open Educational Resources, this means bringing together social practices from teachers and trainers, from learners and from educational technologists and software developers.

4 ACTIVITY THEORY AND THE THEORY OF EXPANSIVE LEARNING

Daisy Mwanza and Yrjö Engeström have written a short summary of the ideas behind activity theory and expansive learning (2004).

“Activity theory presents a collection of basic ideas for conceptualising both individual and collective practices as developmental processes of the context in which human activities normally takes place” (Engeström, 1987; Leontev, 1978). The idea of studying human activities as developmental processes is crucial for identifying changes and contradictions that exist in an activity. Therefore, contradictions serve as the means by which new knowledge about the activity being examined emerges (Engeström, 1987) According to Leontev (1978), the concept of activity entails a complete system of human practices. Engeström (1987) conceptualised a representational model to portray the various elements of an activity system as shown in Figure 1.

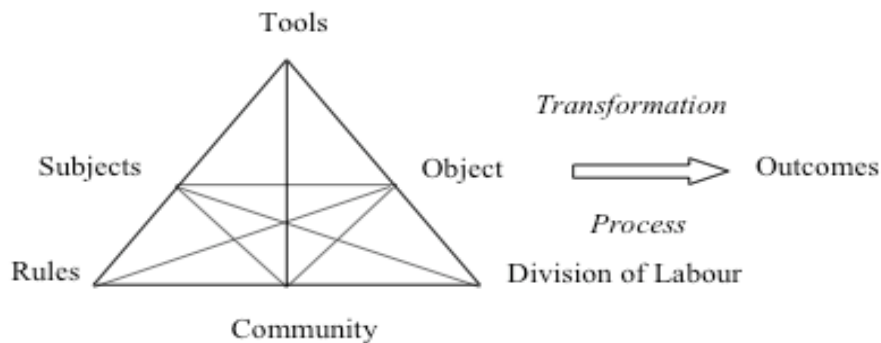


Figure 1: The Activity Triangle Model (Engeström, 1987)

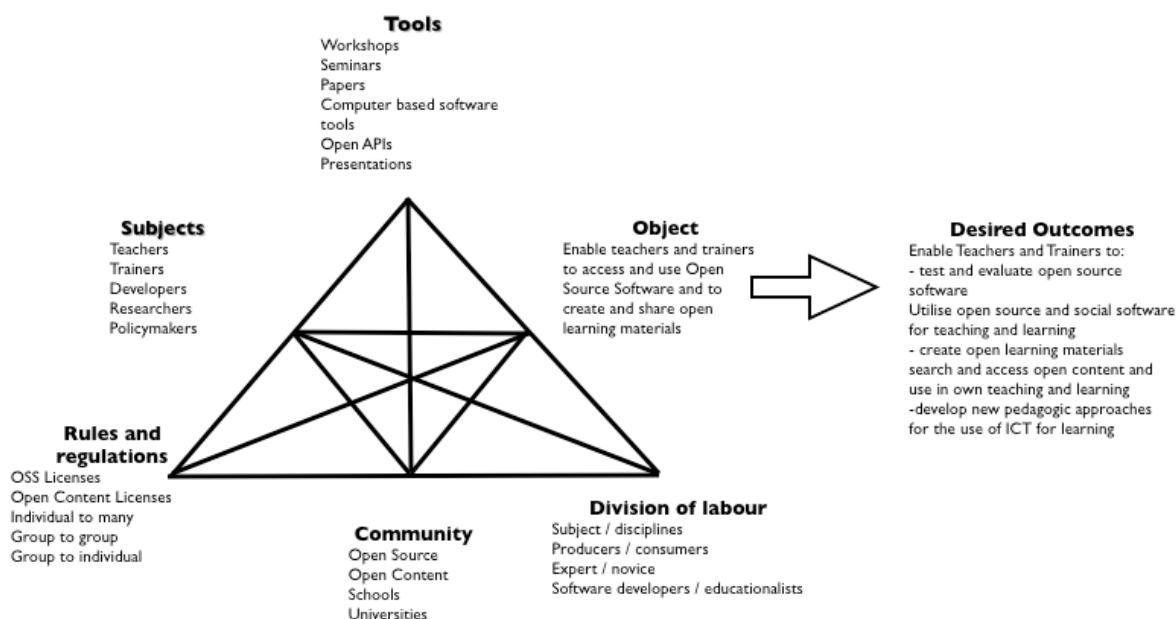
The Activity Triangle Model or activity system representationally outlines the various components of an activity system into a unified whole. Participants in an activity are portrayed as subjects interacting with objects to achieve desired outcomes. In the meanwhile, human interactions with each other and with objects of the environment are mediated through the use of tools, rules, and division of labour. Mediators represent the nature of relationships that exist within and between participants of an activity in a given community of practices. This approach to modelling various aspects of human activity draws the researcher’s attention to factors to consider when developing a learning system. However, activity theory does not include a theory of learning; instead, activity-theory-oriented pedagogical concepts are incorporated in Engeström’s (1987) “Theory of Expansive Learning”

“The pedagogical stance of the activity-theoretical concept of expansive learning differs from traditional types of learning in that:

- (a) The contents and outcomes of learning are not merely knowledge in texts and the heads of students but new forms of practical activity and artefacts constructed by students and teachers in the process of tackling real-life projects or problems - it is ‘learning what is not yet known’.
- (b) Learning is driven by genuine developmental needs in human practices and institutions, manifested in disturbances, breakdowns, problems, and episodes of questioning the existing practice.
- (c) Learning proceeds through complex cycles of learning actions in which new objects and motives are created and implemented, opening up wider possibilities for participants involved in that activity. This perspective on teaching and learning highlights the potential impact of new tools as vehicles for transforming activity procedures.”

Activity theory is particularly useful for understanding the development of Open Content and Open Education Resources for three reasons. It allows an understanding of the role of tools in mediating knowledge development. Secondly it allows us to understand the different communities with whom we seek to engage and that these communities may have different and contradictory rules and motivations. Finally the emphasis on developmental needs in human practices and institutions and on new forms of practical activity and artefacts constructed by participants reflects the ideas of Open Content creation.

The following Figure 2 is an attempt to model an activity system for the community around Open Source and Open Content.



Activity system for Open Educational Content

Figure 2. Model of an activity system for the community around Open Source and Open Content

5 NARRATIVE AND STORY TELLING

There is an increasing realisation of the power of story telling and narrative as a way not just of information transition but as a means of negotiating meanings and developing innovation and knowledge. Such realisation is linked to an understanding of the importance of tacit knowledge, within organisations and within communities. Tacit knowledge is defined by Polyani as “knowledge that we do not know we have.” In a study undertaken in 1996, David Orr showed how knowledge about practice was shared amongst photocopying technicians by telling ‘war stories’ in break times. The transfer of tacit knowledge was important because the formal knowledge contained in manuals was inadequate for solving many day to day problems. Nonaka and Konno have written of how tacit knowledge is transferred to shared and explicit knowledge within organisations through a knowledge development loop. Story telling and the use of metaphor is a key tool for such knowledge conversion. Steve Denning explains the use of narrative in establishing meanings.

”A narrative or story in its broadest sense is anything told or recounted; more narrowly, something told or recounted in the form of a causally-linked set of events; account; tale; the telling of a happening or connected series of happenings, whether true or fictitious.

Narrative meaning is created by establishing that something is a part of a whole and usually that something is the cause of something else. It is usually combined with human actions or events that affect human beings. The meaning of each event is produced by the part it plays in the whole episode.

To say what something means is to say how it is related or connected to something else. To ask the meaning of an event is to ask how it contributed to the story in which it occurs. It is the connections or relations between events.

Meaning is a social phenomenon. Meaning is produced not only by individuals but by groups, communities, societies and cultures which maintain - through language and agreed understandings - knowledge of the connections between signifying sounds and signifying events.

Groups, communities, societies and cultures also preserve collections of typical narrative meanings in their myths, fairy tales, legends, histories and stories. To participate in a group, community, society or culture requires a general knowledge of these accumulated narrative meanings. The cultural stock of meanings are dynamic and are added to by new contributions from members and deleted by lack of use.

Narrative meaning is about connections. It links individual human actions and events into inter-related aspects of an understandable composite. Narrative displays the significance that events have for one another. (The anti-story makes explicit that events do not have causal connections between each other)."

Storytelling can play different functions within a community (NHS, 2005) including to capture tacit knowledge.

"Tacit knowledge can be a multi-layered and multi-dimensional thing and as such it is often difficult to articulate (for example, have you ever tried to explain to someone who can't swim how to swim, without actually showing them?). Stories can provide a way of allowing people to express and share tacit knowledge in rich and meaningful ways, rather than being forced to articulate it in more 'structured' ways that can detract from its value"

Storytelling is also a means to embody and transfer knowledge.

"A simple story can communicate a complex multi-dimensional idea, not simply by transmitting information as a message, but by actively involving the listeners in co-creating that idea. Furthermore, as a story is told and retold, it changes, and so the knowledge embodied in it is constantly being developed and built upon."

Finally stories can develop innovation.

"The use of storytelling in innovation and knowledge creation can encourage people to move away from linear thinking towards a more multi-dimensional view, to see new connections between things, and also to marry scientific logic with a more creative or intuitive approach."

Open Educational Resources and Open Content are a means of conveying meaning and understandings. Such meanings are not delivered in a top down linear way, but are rather a process of negotiation based on context and use. In developing a community based on Open Content and Open Educational Resources, we need to explore the process of narrative, albeit sometimes mediated through technology for understanding the social meanings of knowledge and ideas and the social use of such resources.

6 BARRIERS, ISSUES, AND PROMISES

In the first section of this paper, we looked at the merger of the OER and Open Content Movement. The second section focused on the drivers for change viewing the development of Open Content as predominately a social process. In the previous section we have explored some of the theories that can explain how such social processes lead to shared content and knowledge development. In this final section of the paper we wish to explore some of the barriers to such development, the issues and challenges and finally the opportunities and promises of Open Content and knowledge sharing.

Probably the major barrier and threat to the Open Content movement lies in attempts to extend notions of private ownership to embrace concepts and ideas (sometimes described as intellectual copyright) and to commodify knowledge. In this paradigm, knowledge and ideas become just another product to be bought and sold in a capitalist market economy.

In an article entitled 'Why Open Content Matters' Bryan Pfaffenberger (2001) documents the transformation of copyright in the USA into "something approaching real property."

"Driven by lavish donations from lobbyists representing wealthy copyright holders and media corporations, the US Congress has passed a series of laws (including the notorious Digital Millennium Copyright Act of 1998) that not only restrict or eliminate fair use insofar as digital media are involved, but also criminalize any attempt to circumvent copyright management systems (even if no infringing duplication takes place!) and extend the duration of copyright to the point of near-perpetuity (with extensions, more than 150 years)" (ibid).

In Europe, there have been perpetual moves to tighten copyright law and to extend intellectual copyright to include software development. In summer 2006, Blackboard announced patents granted in the USA and pending in Europe to include many of the uses of new technologies for learning.

The argument for such draconian restrictions on reuse and re-purposing is that they provide an incentive for innovation. We would rather see them as a blatant attempt to develop new markets for capitalism benefiting not innovation, but the profits of large corporations. There is no doubt that these developments could cripple the nascent development of an Open Content Community.

However, if the attempt to extend copyright represents an external threat to the Open Content Community, there are other 'internal' challenges. One is that of quality. If previously quality relied on external 'kitemarking', by governments, institutions, and 'experts', user-generated Open Content requires new ways of recognising quality. However, the academic community has a long tradition of peer review processes. Admittedly, these processes may not be entirely effective, but especially if more resources could be diverted from commercial publishers, an extension of peer review may provide an effective quality system. Indeed, the use of social software in such commercial sites as Amazon or video sharing sites like YouTube provides a mass system of quality review through star rating systems.

Especially in the case of educational resources we need to consider the aspect of context. What may be a wonderful resource for me to use in a workshop, may be of little utility, and thus quality, for someone teaching in a different situation or with a different target group. Furthermore, resources which were created for one purpose could be re-purposed and thus given a different 'quality' in other contexts. So it may be that we need to redefine quality as not an absolute property inherent in an object, but something to be negotiated in the context of use.

Once more, technology could provide us with some answers, through allowing the collection of a distributed meta-data trail about the use of a resource, rather than merely data about its intended purpose on creation. However, an even stronger factor contributing to quality assessment could be provided by communities coordinated by trusted, skilled, and knowledgeable project managers, as already witnessed in several successful open source software projects.

A third and more fundamental challenge lies in how we categorize or describe knowledge. The development and description of knowledge has been based on a traditional taxonomy, of subjects and disciplines, established during the Reformation. That taxonomy is arguably inadequate to the new forms of knowledge production and sharing advocated in this paper. Indeed one of the problems with the development of ICT-based learning resources has been how to find adequate ways of describing those resources in order to develop standards for exchange and reuse.

The more recent development and use of folksonomies based not on agreed or imposed taxonomies but on allowing users free keyword descriptions and then on search and aggregation technologies may offer some new insights into this issue. However, searching for photographs on a particular topic on Flickr, the photo sharing service which uses such user driven folksonomies, can be a frustrating process.

Standards are important in allowing sharing and reuse, but the present 'official' standards are often too heavy weight in nature to be usable. Lightweight 'de-facto' standards such as RSS and FOAF have been arguably more effective in facilitating Open Content.

One of the most often cited barriers to the development of Open Content and Open Educational Resources is that of persuading users, in the form of teachers and trainers, to share. We are unconvinced that this is a real obstacle if we can develop a community to support such social processes. It is this community which is the real promise of OER and Open Content - a community based on shared principles and common understandings, a community in which we are all creators and all consumers and a community committed to a commonwealth of knowledge.

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