Degrees of Openness: The emergence of Open Educational Resources at the University of Cape Town

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ABSTRACT

Information and communication technologies (ICTs) provide a range of opportunities to share educational materials and processes in ways that are not yet fully understood. In an extraordinary development, increasing numbers of traditional and distance universities are using ICTs to make a selection of their teaching resources freely available as 'open education resources' (OER). The University of Cape Town recently signed the Cape Town Open Education Declaration signalling some senior level support for the notion of OER. In anticipation of an institution-wide roll-out, lecturers and educational technologists at UCT are grappling with the issues that need to be addressed to meet this intent. This paper suggests that careful analysis of existing educational materials and processes is necessary to provide an indication of what can be done to make them more openly available beyond the confines of an individual teaching and learning space. However, the deceptively simple term "open" hides a reef of complexity.

This paper endeavours to unravel the degrees of openness with respect to key attributes of OER, namely social, technical, legal and financial openness in an attempt to make the task of identifying where changes could be made to existing teaching materials or processes a little easier for the lecturer and the educational technologist alike. While acknowledging the potential value of content, we contend, however, that it is the opening up of educational processes, which we are calling Open Pedagogy (OP) enabled by the Web 2.0 technologies that are set to play the more transformational role in the collaboration between students and lecturers.

Keywords: *Open Education, Open Educational Resources, open content, e-learning, open educational processes, Open Pedagogy, degrees of openness, Information and Communication Technologies (ICTs), higher education*

INTRODUCTION

Information and Communication Technologies (ICTs) provide a range of opportunities to share educational materials and processes. Most higher education institutions (HEIs) in developed countries (Weller 2007), and a number in developing countries, have some type of learning management system (LMS) in place. The development of the so-called Web 1.0 and Web 2.0 tools has extended the array of ICTs available to distribute and to share information and activities. Where Web 1.0 provided the opportunity to make information available for people to find, Web 2.0 provides the opportunity for people to contribute and share. As Weller observes: "Web 2.0 is often specified in one of two ways – either as an approach, a way of thinking about the internet, or as a set of technologies that embody these principles" (2007:152). The shift from the archetype Encyclopaedia Britannica written by experts and made available online to the emergence of Wikipedia, the online encyclopaedia being contributed to on a regular basis from a range of people around the world is indicative of the change from a top-down approach to a web of sharing, where the boundaries blur between the traditional providers of information and the traditional users of information.

The emergence of OER is an interesting, yet paradoxical, social development in the current higher education environment. With the opportunity to extend their reach with ICTs, distance and traditional campus-based universities now face even stiffer competition locally and internationally than before. This extraordinary trend of making teaching and learning resources and approaches freely available to other lecturers and students within this competitive climate has been dubbed a new "culture of contribution" by Atkins, Seely Brown and Hammond (2007:3) who recently reviewed the achievements, challenges and new opportunities of the OER.

Although not the first, the Massachusetts Institute of Technology's OpenCourseWare (OCW) initiative, and the subsequently established OCW Consortium, are currently one of the most globally familiar providers of open educational resources. The MIT OCW is billed as "an ideal that flows from the MIT Faculty's … conviction that the open dissemination of knowledge and information can open new doors to the powerful benefits of education for humanity around the world" (MIT OpenCourseWare Story[1]).

MIT partnered with Sapient Corporation to create and deploy one of the largest content management systems in higher education. This enabled MIT to fulfil its mission and make 1900 of their courses available to the world. These materials may be:

> 'used, copied, distributed, translated, and modified by anyone, anywhere in the world. All that is required of adopters of the materials is that the use be non-commercial, that the original MIT faculty authors receive attribution if the materials are republished or reposted online and that adapters openly share the materials in the same manner as MIT OCW" (The MIT OpenCourseWare Story: 1).

The Open University (OU), in the United Kingdom, a traditional distance education institution, has likewise made some of its content available to potential students through its OpenLearn initiative in two key ways. OU's LearningSpace offers access to learning materials, while LabSpace offers content that can be downloaded, remixed, adapted and reused.

The two institutions embody the concept of OER, albeit in slightly different ways that perhaps reflect their identities: MIT makes individual components of their courses available that favours reuse by lecturers and graduate students, while the OU makes fully integrated courses available that favours the self-learners or distance learners who do not usually attend lectures on campus.

CONCEPT AND TYPES OF OPEN EDUCATIONAL RESOURCES

The Open Educational Resources concept is based on the philosophical view of knowledge as a collective social product and the desirability of making it a social property (Prasad & Ambedkar cited in Downes 2007:1). Major funders of OER, the William and Flora Hewlett Foundation contend that: 'At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world's knowledge is a public good and that technology in general and the Worldwide Web in particular provides an extraordinary opportunity for everyone to share, use, and reuse knowledge'.

While this concept is simple enough – "universities and similar institutions [making] their academic materials freely available online for everyone to use. ... [it] hides a wealth of complexity and has profound implications for the way we conceive and practice higher education" (Weller 2007:149). One aspect of which is the question of "openness", in other words: "What is 'open'?" or more theoretically: "What does the concept of 'openness' encompass – content, process or both?"

An analysis of the various definitions of OER yield a range of answers as to what open resources are. UNESCO's (2002) definition or OER and Holotescu's rewording of this definition, make it clear that OER are synonymous with 'content':

> … technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes (UNESCO 2002, Paragraph 3) or as reworked as 'the open provision of educational resources enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes (Holotescu 2007).

Likewise Johnstone's classification of three types of OER implies that OER is restricted to 'content' alone:

• *Learning resources – courseware, content modules, learning objects, learner-support and assessment tools, online learning communities*
• *Resources to support teachers – tools for teachers and support materials to enable them to create, adapt and use OER, as well as training materials for teachers and other teaching tools*
• *Resources to assure the quality of education and educational practices (Johnstone 2005:16).*

Margulies' conceptual map (2005 in OECD 2007:31) provides an influential conceptualisation of OER as 'content'.
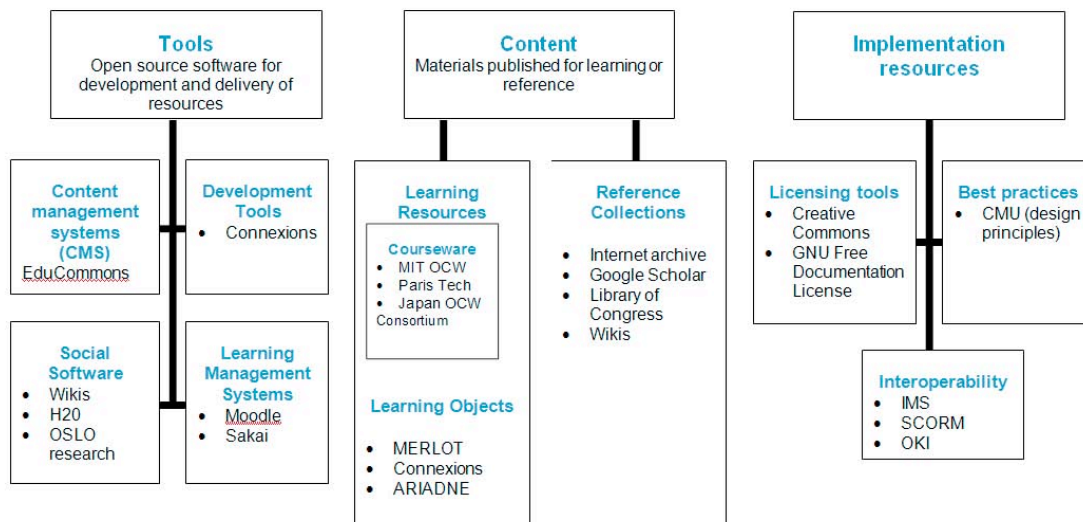
Figure 1: *OER conceptual map*

(Margulies 2005 in OECD 2007:31)

By contrast, in their definition of OER, Atkins, Seely-Brown and Hammond hint that OER includes aspects of 'process' such as 'techniques used':

> … 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 or 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 (Atkins, Seely-Brown & Hammond, 2007:4).

While acknowledging the potential value of actual content, we contend, however, that it is the opening up of educational processes, which we are terming Open Pedagogy (OP) enabled by the Web 2.0 technologies, that are set to play the more meaningful role in the collaboration between students and lecturers than content alone.

What is meant by the term "open" may at face value appear obvious and self evident, either a product or educational process. Deeper analysis of the concept of 'openness' shows that there are a number of different attributes that might render OER more or less open.

ATTRIBUTES OF OPENNESS

Various activists and researchers have endeavoured to pinpoint how the concept 'openness' is to be understood in relation to OER. Some of these suggestions are plotted in Table 1 in an endeavour to obtain a sense of the range of attributes associated with the concept of 'openness'.

Table 1: *Attributes of openness*

Attributes of "openness"	Bissell (2008)[2]	Walker (OECD 2007:32 in Daniel 2006)	D'Antoni (OECD 2007:32 in Daniel et al 2006)
Social openness	Shareable Authoritative Useful	Effective	Accredited
Technical openness	Interoperable Internationally accessible Easily identifiable Findable Indexed	Convenient Available	Accessible
Legal openness	Shareable Adaptable		
Financial openness		Affordable Sustainable	Affordable

What is clear is that there are a range of attributes associated with the concept of OER. Further examination of the attributes makes it evident that there are indeed 'degrees of openness' in relation to each of four key attributes of social, technical, legal and financial openness.

DEGREES OF OPENNESS

The concept of 'degrees of openness' is not new; it has been used in relation to open economies (De Broeck and Sløk 2005); open source software (West 2007); openness of societies (Breen and Jonsson 2005) and more recently as a way of understanding the emerging trend of OER (Atkins et al. 2007, although not in relation to OER as yet. We use the concept of 'degrees of openness' firstly to understand the range of openness within selected key attributes associated with OER, and secondly to describe where particular OER or open educational processes, which

we are calling Open Pedagogy (OP), lie along the continuum. We contend that this can assist lecturers and educational technologists to identify where interventions could take place in order to realise the optimal value of OER and OP. But firstly, we endeavour to surface some of the characteristics of some of the key attributes associated with OER and subsequently OP.

SOCIAL OPENNESS

The fundamental attribute of openness is the willingness to make materials available beyond the confines of the classroom by lecturers, students and university management. Even if the technological infrastructure exits to allow materials to be a button-click away, unless lecturers are willing to share their materials or pedagogy, the technological affordance will remain unrealised.

It is worth noting that even as the largest provider of OER, MIT consider their faculty as 'the key stakeholder group and a key enabler of an opencourseware initiative' (MIT OpenCourseWare Story). To this end, the participation in the MIT OCW initiative was planned as a voluntary, 'faculty centric' initiative and involved faculty as early as possible on the program advisory board (MIT OpenCourseWare Story).

More importantly, with the emergence of Web 2.0 tools such as wikis, blogs and virtual communities, the differentiation between lecturers as producers of content and students as consumers of content has started to blur and has 'shifted attention from access to information towards access to other people' (Seely-Brown and Adler 2008: 18).

Lecturer-centred					Student-centred		Student, lecturer and broader community	
USE					CONTRIBUTE		SHARE	
Traditional Individual lecturer designs, uses & manages own materials for specific context LMS reflects 'silo' model of teaching	**Sharing** Individual lecturer designs, uses & manages own materials for specific context, but shares some Invited access to others' LMS space	**Coordinating** More coordinated curriculum design More sharing and reuse Partial access to others' LMS space	**Organising** Clear aims for working together Group design procedures More organised local materials Common access to the groups' courses in an LMS	**Managing** Courses designed, developed & managed by multi-disciplinary teams Materials managed centrally	**Participating** Participate in forums or chats within LMs spaces	**Contributing** Contribute opinions on content and processes in blogs	**Sharing** Sharing content and processes with peers and lecturers using wikis	**Collaborating** Collaborating with peers, lecturers and others (e.g. professionals in the field in virtual communities

Most didactic ← → Most participative

Figure 2: Social openness of OER

Drawing on the concept of openness in the open source software movement, Tuomi suggests that that 'openness in the social domain is fundamentally motivated by the expected social benefits and by ethical considerations related to human freedoms' (the freedom to use, the freedom to contribute, and the freedom to share) (2006: 8).

We extrapolate these freedoms to OER to describe the social openness for lecturers and students to use, contribute to and share educational materials and processes. We loosely draw on Casey, Proven and Dripps' e-learning change continuum model to illustrate the 'use' aspect of social openness (Figure 2).

It is important to note that while we differentiate between the two extremes of social openness, we are not making a value judgement on more or less participation, but rather surfacing the 'degrees of social openness'.

While social openness might seem to be a valuable principle to subscribe to by those who already buy into the new 'culture of contribution', it is nevertheless often contrary to policy directives within universities that both privilege research over teaching and learning activities and value copyrighted ideas in journal articles and in patents rather than the production of shareable teaching resources. These policy directives can constrain the amount of time lecturers have available to develop materials with the intention to share beyond the boundaries of their own teaching space. However, recent developments in the area of Open Source Software (see Stallman in Tuomi 2006) and Open Access, are challenging the status quo. Already there are a number of changes in terms of how academics can publish their work (see Pappalardo 2008). It is hoped that the successes of the Open Software and Open Access movements may encourage changes in the teaching and learning domain.

EXAMPLE OF SOCIAL OPENNESS AT UCT: INKUNDLA YEHLABATHI/WORLD FORUM

A good example of social openness at the University of Cape Town (UCT) is embedded in the 2nd year undergraduate International Public Law course, Inkundla yeHlabathi/World Forum. Here students play the role of legal advisors to a fictitious Minister in one of 10 African countries. The lecturer uses an open source based LMS built on Sakai[3] (called *Vula* at UCT) to make primary legal resources available to the students. The students in turn use the wikis in the LMS to build up their country resources. The forums in the LMS are used to negotiate treaty provisions with other States, to bring legal action one against the other and to make oral and written statements in plenary sessions of fictitious inter-State conferences. While the students still attend a few face-to-face lectures, the predominant activity takes place within the learning management system, students have even extended this by creating their own Facebook site – explicitly excluding the lecturer.

In terms of social openness the Inkundla yeHlabathi/WorldForum course illustrates the degrees of openness within one course starting with a few lecturer-centred face-to-face lectures through students using online materials on the LMS, to their participation in forums and contribution to wikis and even appropriation of social networking software for learning purposes.

There are plans to make this course more widely available to the broader community including other universities within South Africa and in the rest of Africa. Even given the willingness of lecturers and students to share their resources and processes, social openness depends on *technological openness* to instantiate this willingness.
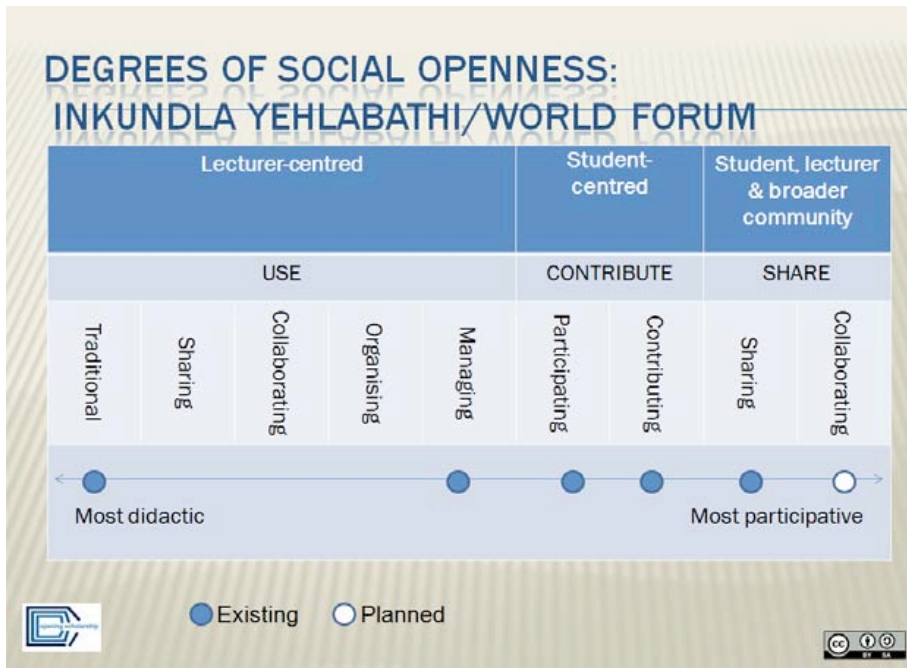
Figure 3: *Degrees of social openness: Inkundla Yehlabathi/World Forum*

Proprietary	Open
Learning management systems • *WebCT*	Learning management systems (which include forums, wikis, chats) • *Sakai (Vula* at UCT) • *Moodle*
Content management systems	Content management systems • EduCommons
Development tools and software	Development tools and software • Connexions • Python
Productivity tools • *MSOffice*	Productivity tools • *OpenOffice.org* • *Google docs*
Email	Social networking software • *Facebook*
Format • doc	Format • odp, html, xml
Static resource • Textbook, electronic textbook	Dynamic resource • Wiki

Most restrictive ◀━━━━━━━━━━━━━━━━━━━━━━━▶ Most accommodating

Figure 4: *Technological openness of OER*

TECHNOLOGICAL OPENNESS

In terms of making OER shareable, fundamental issues are the presence and use of interoperability standards and functionality. Tuomi notes that 'technical interoperability standards make it possible for independently developed systems to interact and co-exist' (2006:9) and highlights that these technical interoperability standards can be either proprietary or open. Examples of some of these proprietary and open software platforms, programs and formats are summarised in Figure 4.

EXAMPLE OF TECHNICAL OPENNESS AT UCT: SIMULATION OF CHEMICAL PROCESSES

A lecturer in Chemical Engineering at UCT uses simulations to help students visualise the interactions of particles and molecules as well as the changes in structure of particles (particle breakage or agglomeration) and molecules (reaction) and changes in the state of energy (heat transfer). He and his open software programmer have custom-built this simulation in Open Source software, Python. Although it is mostly used for demonstration purposes during lectures, some post-graduate students have adapted and added to the simulation. Although not shared with anyone else as yet, the lecturer and especially the programmer are willing to share this simulation as an OER.

When endeavouring to analyse the level of openness that this simulation reflects, focusing on the technical openness is not sufficient and to appreciate the degree of openness we need to take both the technical and social attributes into account and acknowledge the gradual move socially from an already open technical product (Figure 5).
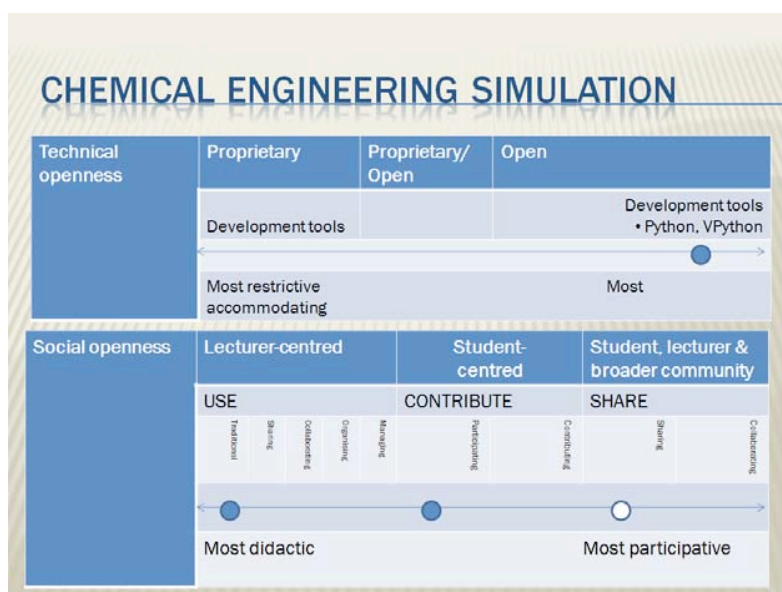
Figure 5: Degrees of technical and social openness: Chemical Engineering simulation

In terms of sharing this simulation more widely within the institution itself, as part of the OpeningScholarship project, we found a potential partner in the Department of Physics where they require students to use Python to create 3-D visualisations of physical models of abstract physics theory. Negotiations of a possible shared project are in progress.

LEGAL OPENNESS

In terms of intellectual property rights, there are a 'spectrum of rights'[4] from locked-down copyrighted materials through a range of flexible licenses offered by Creative Commons or the GNU Free Documentation License, to public domain materials (in some countries such as the USA, but not others such as Austria and Germany[5]). Creative Commons[6] offers the producer and end user the ability to make their choices on three key concepts: attribution, derivation and commercial usage. Based on a combination on these three key concepts there are six different kinds of licenses (Figure 6).

Copyright	Creative Commons Licences (Some rights reserved)					Public domain
All rights reserved	Attribution Non-commercial No derivatives	Attribution Non-commercial Share Alike	Attribution Non-commercial	Attribution No Derivatives	Attribution Share Alike	Attribution	No rights reserved

BY = Attribution   NC = Non-commercial   ND = No derivatives   SA = Share Alike

Figure 6: Copyright openness with Creative Commons licenses

For a detailed explanation and examples of each licence it is best to visit the Creative Commons site. Briefly, what these licenses offer is a spectrum of intellectual property rights that allow lecturers to offer their work to others under certain specified conditions, starting from the most restrictive license that allows others to copy, distribute, display and perform copyrighted work to the most accommodating licence which allows others to copy, distribute, remix and extend the original work – even commercially – as long as the original author is acknowledged. A key condition for all these licenses is that acknowledgement, or what Creative Commons terms 'attribution', is required for each license which means that the originator's contribution is always recognised legally.

To ensure that these licenses are applicable in various legal jurisdictions around the world, the Creative Commons site offers lecturers the option to choose a licence applicable in their own country. This licence is then made available in three ways:

• Commons Deed – which is a simply worded summary of the licence

• Legal Code – which is a more comprehensive document that ensures that the licence will stand up in court

- Digital Code – which is a machine-readable version of the licence that allows search engines to find materials with various licences.

EXAMPLE OF LEGAL OPENNESS AT UCT: INKUNDLA YEHLABATHI/WORLD FORUM

The site includes a number of copyrighted articles that are currently cleared through UCT's blanket license with the Dramatic, Artistic and Literacy Rights Organisation (DALRO)[7], however, this only covers access for UCT students, so opening the current site up immediately would infringe this copyright. In terms of lecture notes these could easily be covered by an Attribution-Share Alike (BY-SA), although this is not yet in place. However, there are a number of legal documents – court cases from the International Criminal Court – that are in the Public Domain and can be used without restraint (Figure 7).
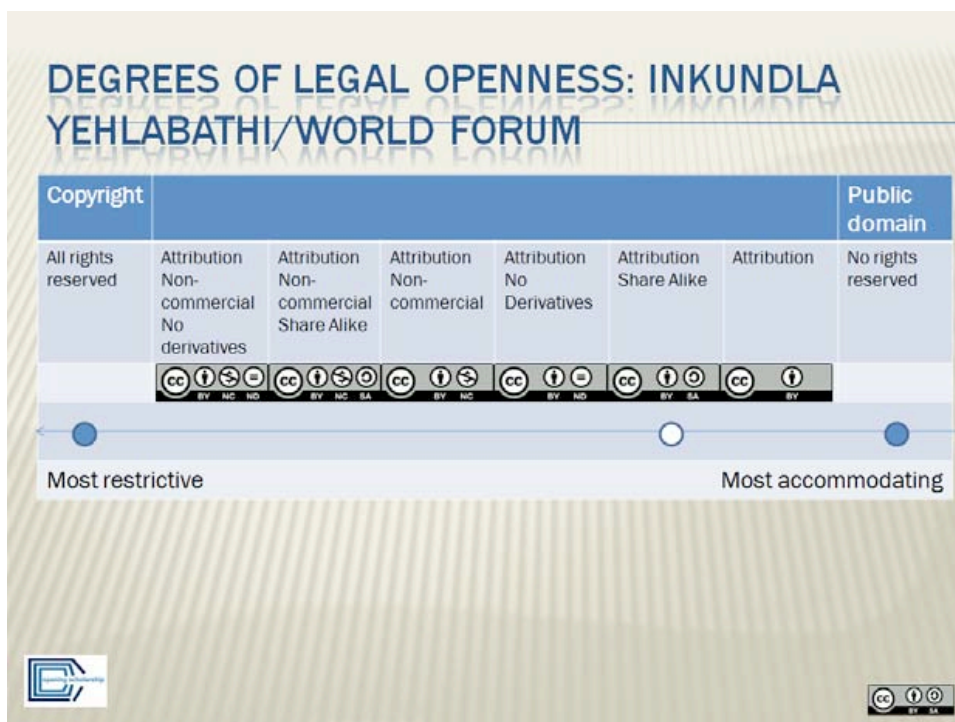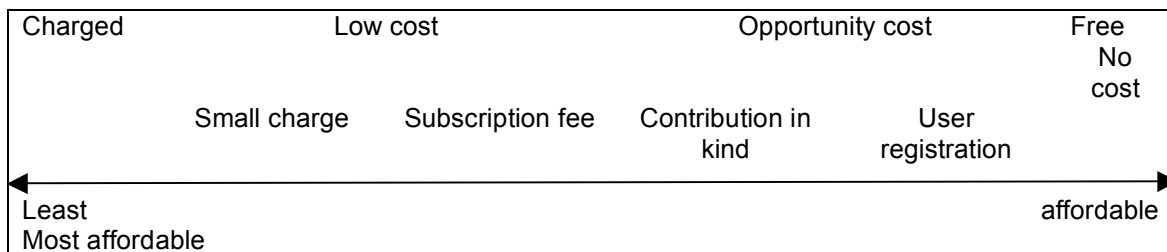

Figure 7: Degrees of legal openness: Inkundla Yehlabathi/World Forum

Financial openness

There is much debate around the cost of OER to the user ranging from 'free' to 'charged'. Activists such as Stephen Downes argue that 'the concept of 'open' entails, at a minimum, no cost to the consumer or user of the resource' and argues that 'even when the cost is low - or 'affordable' - the payment represents some sort of opportunity cost on the part of the user, an exchange rather than sharing' (2007:32). He queries whether 'some sort of payment by the user - whether that payment is subscription fees, contribution in kind, or even something simple, such as user registration, ought to be called 'open' [as the] requisite payment imposes [an] overhead on the distribution of the resource, mitigating the value of the resource' (Downes 2007:32).

Susan D'Antoni from UNESCO, on the other hand, suggests that OER should be 'affordable' (cited in Daniel et al 2006), thereby placing this still relative notion somewhere between the extremes of Downes and Bill Hornbeck, President of StreamerNet Corporation, provider of LearningPortal.com, whose vision is to enable the 'creators of knowledge-based content to have access to a distribution platform where the creators can actually be paid for their offerings … [that are distributed] … ' in the form of streaming or downloadable pay-to-view knowledge products (Hornbeck cited in Nash 2008[8]).
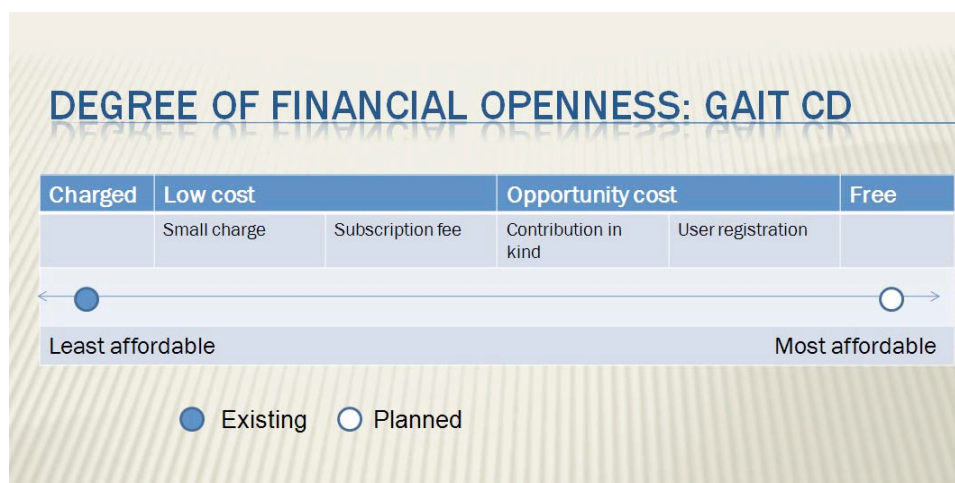
Quite clearly there are degrees of financial openness of OER (Figure 8), which need to be taken into account when contemplating the sustainability of OER over the longer term.

Charged	Low cost		Opportunity cost		Free No cost
	Small charge	Subscription fee	Contribution in kind	User registration	
Least Most affordable					affordable

Figure 8: *Financial openness of OER*

EXAMPLE OF FINANCIAL OPENNESS AT UCT: GAITCD

The Deputy Dean of the Faculty of Medicine, Prof Kit Vaughan, was originally prompted to develop a CD-ROM to support his publication *Gait Analysis Laboratory* way back in 1992. He recognized that access to expensive equipment in modern gait analysis laboratories was not possible for most students and saw the potential of using relatively affordable and easily accessible personal computers as a way to place some of the sophistication and power of a 3-D gait laboratory into the hands of those who would not normally have such an opportunity. While currently copyrighted and sold (at $49.95)[9], Prof Vaughan has indicated his willingness to have the entire GaitCD made available as an OER. A section of the CD-ROM, the 153-page GaitBook, is already available as a downloadable pdf (Figure 9).

DEGREE OF FINANCIAL OPENNESS: GAIT CD

Charged	Low cost		Opportunity cost		Free
	Small charge	Subscription fee	Contribution in kind	User registration	
Least affordable					Most affordable

● Existing   ○ Planned
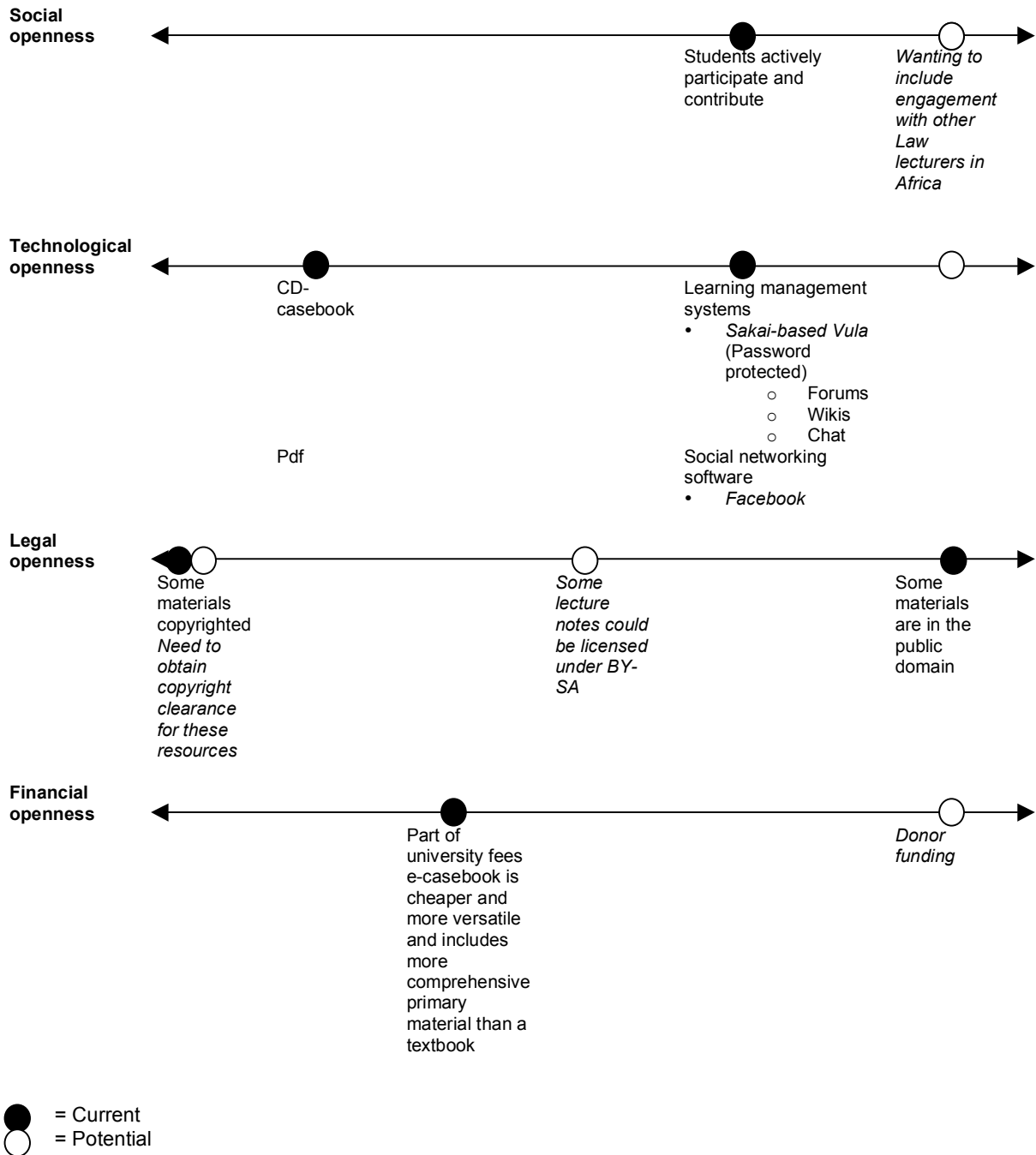
Figure 9: *Degrees of financial openness: Gait CD*

SUMMARY OF DEGREES OF OPENNESS

We suggest that identifying the key attributes of openness of existing teaching and learning materials and educational processes, can help lecturers and the educational technologists who are appointed to support them to identify where intervention needs to take place in order to realise the optimal value of OER – one degree at a time. As an example, we summarise all four attributes of the Faculty of Law's International Public Law online course. To contextualise these attributes of openness, we provide a more detailed summary of the social simulation, Inkundla yeHlabathi.

INKUNDLA YEHLABATHI / WORLD FORUM

The lecturer in this case study, Salim Nakhjavani, has developed a series of simulated tasks in his International Law course, which is part of the preliminary year of the Bachelor of Laws (LLB) degree; being the second year of the undergraduate stream and the first year of the postgraduate stream. His experience at the International Criminal Court, in which legal work is conducted electronically, placed him in good stead to see the value of using ICTs to enhance the discipline of Law. He observed that outside Europe and particularly North America, and in South Africa in particular, the discipline of Law is not as yet aware of the benefits of electronic support. He recognizes that future potential lawyers are going to need to operate within an electronic environment, for example making submissions electronically, finding cases and reviewing the submissions of the parties and judgments. This lecturer suggests that students at UCT have tended to perceive International Law as being remote from their experience and proposes that the use of authentic primary sources in the form of original treaties, declarations, judgements etc. may help counter this sense of remoteness. Instead of using a textbook, he has opted to create an e-casebook which includes the primary sources or extracts from primary sources hosted on *Vula* the institutional LMS. In order to help students engage meaningfully with the primary sources hosted on *Vula* the lecturer has devised a series of authentic activities to simulate the work of an International Law practitioner in the 21st century. The 2008 cohort of 195 students has been divided into 10 tutorial groups, each representing legal advisers to a different country in Africa. They have to undertake various activities, such as summarising a number of cases to advise the fictitious Minister of their respective country. In doing so they have to read the primary texts and summarise them in a very limited number of words in a fairly short space of time – mimicking the real-life tasks of a young lawyer. Other tasks include negotiating treaty provisions with other States, bringing legal action one against the other and making oral and written statements in plenary sessions of fictitious inter-State conferences.

The lecturer explains that he had always envisaged sharing this course publicly and singles out universities in Africa in the first instance. He explains that he has a vision of creating a type of clearing house for African cases and materials, where academics from Africa can send him the original documents and other materials they wish to use to support teaching and learning, and he would arrange for these to be scanned and added to a list of potential cases. He imagines that each academic participating in this online collection, will then be able to select in a type of checkbox, the ones that he or she would like his or her students to read so that Law Faculties in Africa would have access to their own cases and materials on International Law – this upholds a healthy diversity in the content of curricula while allowing academic staff to draw on a pool of high-quality primary source materials from a variety of conceptual approaches to the law.

Social openness

Students actively participate and contribute

Wanting to include engagement with other Law lecturers in Africa

Technological openness

CD-casebook

Pdf

Learning management systems
• *Sakai-based Vula* (Password protected)
  ○ Forums
  ○ Wikis
  ○ Chat
Social networking software
• *Facebook*

Legal openness

Some materials copyrighted
Need to obtain copyright clearance for these resources

Some lecture notes could be licensed under BY-SA

Some materials are in the public domain

Financial openness

Part of university fees e-casebook is cheaper and more versatile and includes more comprehensive primary material than a textbook

Donor funding

● = Current
○ = Potential

Figure 10: *Summary of analysis of openness: Inkundla yeHlabathi*

In terms social openness, the students participate actively using Forums and even their own (lecturer-excluded) *Facebook* site and contribute materials to the LMS space. The most complicated issue is the legal openness as the Vula site and the e-casebook contains

copyrighted materials for which copyright royalties have been paid as part of UCT's blanket license to DALRO as well as many public domain materials from the International Criminal Court and other sources. In order for this simulation to be made more widely available, funds will need to be sought for the copyright clearing process. As noted by MIT, 'IP clearance is a time-consuming process and because of the level of effort and risks involved, it is one of the biggest barriers to faculty participation' (MIT OpenCourseWare Story)

What is of real value in this social simulation is the sharing of the pedagogical process, what we see as 'open pedagogy'. Salim Nakhjavani has presented his ideas at a number of UCT seminar and workshops and achieved a well earned second place in the international Teaching with Sakai Innovation Award[10] which aims to highlight innovative or transformative examples of educational applications of Sakai. Hopefully this will inspire others to teach aspects of their own disciplines – where appropriate – in a similar way.

CONCLUSION

Information and communication technologies (ICTs) provide a range of opportunities to share educational materials and processes in ways we have not completely envisaged as yet. An analysis of existing educational materials and processes can provide some ideas of what can be done to make these more readily available beyond the confines of an individual teaching and learning space. The simple term "open" hides a reef of complexity and endeavouring to unravel the degrees of openness of the key attributes, will hopefully make the task of identifying where alterations will need to be made to existing teaching and learning materials or processes a little easier for the lecturer and the educational technologist alike.

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