

## **The relationships between technology and open education in the development of a resilient higher education**

Dr Richard Hall, University e-Learning Co-ordinator, Directorate of Library Services, De Montfort University, UK. LE1 9BH. Rhall1@dmu.ac.uk

Joss Winn, Educational Technologist, Centre for Educational Research & Development, Brayford Pool, Lincoln, Lincolnshire, LN6 7TS United Kingdom. jwinn@lincoln.ac.uk

**Keywords:** critical pedagogy; curriculum; disruption; higher education; open education; resilience; technology.

### **Biographies**

Dr Richard Hall is De Montfort University's e-Learning Co-ordinator. He is also a UK National Teaching Fellow and a Reader in Education and Technology. He is responsible for the academic implementation of Technology-Enhanced Learning [TEL] with the aim of enhancing the student experience. Richard has worked on several UK research projects that have investigated: mainstreaming Web 2.0 technologies across the University; the relationship between transitions into Higher Education and Independent Learning; Green ICT; and the use of technologies to support students studying remotely.

Joss Winn works in the Centre for Educational Research and Development (CERD) at the University of Lincoln (UK), where he undertakes research and development into the use of technology in Higher Education. He also runs the Lincoln Academic Commons where CERD evaluate open source software and provide information to staff and students about Open Access and Open Education. Joss holds degrees in Buddhist Studies (London, Michigan) and in Film Archiving (East Anglia). He previously worked for Amnesty International.

### **Abstract**

The place of technology in the development of coherent educational responses to environmental and socio-economic disruption is here placed under scrutiny. One emerging area of interest is the role of technology in addressing more complex learning futures, and more especially in facilitating individual and social resilience, or the ability to manage and overcome disruption. However, the extent to which higher education practitioners can utilise technology to this end is framed by their approaches to the curriculum, and the socio-cultural practices within which they are located. This paper discusses how open education might enable learners to engage with uncertainty through social action within a form of higher education that is more resilient to economic, environmental and energy-related disruption. It asks whether open higher education can be (re)claimed by users and communities within specific contexts and curricula, in order to engage with an uncertain world.

### **Introduction**

The place of technology in pedagogic discourse is a core element higher education (HE) research and development (Facer and Sandford, 2010; UK Higher Education Academy (HEA)/JISC, 2010; Ravenscroft, 2009; Selwyn, 2010). Emergent work focuses upon personalisation, informal learning, open education and latterly in building resilience (Attwell, 2010; Downes, 2010; Hall, 2009; Winn, 2010a). It has been contended that the ability of users to integrate a range of institutional and non-institutional networks, content and tools, extends their reflexivity and identity as students and citizens (Hall and Hall, 2010; University of Reading, 2010).

However, there is a danger that an uncritically determinist approach emerges, with a view of students-as-expert-consumers of technology (UK Department of Business, Innovation and Skills (DBIS), 2009; Higher Education Funding Council for England (HEFCE), 2010). There is a tendency for the "how" of technological implementation to be elevated ahead of the

“why” of its use, and for the imperatives imposed by the dominant political economy to be ignored. A developing critique of techno-essentialism highlights that educational technology must be seen as socially, culturally and politically-grounded. In this view, some of the opportunities for the re-invention of HE are being lost as the radical effects of technology are neutralised (Feenberg, 1999; FutureLab, 2009; Hemmi *et al.*, 2009; Selwyn, 2010).

In a more critical view, the institutional use of technology in HE has to be placed into a context of wider societal disruption, in the form of large-scale public sector debt and budgetary cuts, climate change, energy security and peak oil (Hall, 2010; Winn, 2009). By focussing on disruption, a more radical critique emerges that is tied to action, and which includes a fuller engagement with the possibilities of open education to build resilient responses to moments of crisis (Hopkins, 2009). Resilience is emerging as a major theme in discussions of the sustainability of HE (Jones *et al.*, 2010), with its focus upon the diversity and modularity of systems or environments tied to appropriate feedback loops.

This paper begins to critique the place of technology in catalysing open educational approaches within HE, and in enabling students to understand the causes of societal disruption and thereby develop resilience. The critical use of technology within an open curriculum for resilience is one possible approach that may develop aspects of individual and communal action within HE. The qualities of technology that underpin the development of such a curriculum are highlighted. At issue is whether the deployment of technology in more open educational spaces can enable individuals to develop their decision-making and agency, and underpin a resilient form of HE that can persist in spite of crises.

### **Educational Futures**

Current thinking about technology in HE is generally positivist and limited in the depth of its critique. For instance, whilst the New Media Consortium (2010) argues that learning and teaching practices need to be seen in light of civic engagement and cultural complexity, it avoids questioning the impact of political economy on these possibilities. Leadbeater (2009) suggests that HE should offer students and staff disruptive curricula experiences, in order to reflect the complexity of the external world. The idea is to re-form the curriculum in light of a changing, life-world (Jackson, 2008).

More critically, Facer and Sandford (2010, p. 75) question “the chronological imperialism of accounts of inevitable and universal futures”, focused upon always-on technology, and participative, inclusive, democratic change. Such questioning highlights the structural and cultural complexities of the use of technology, linked to societal development and political economy, and asks us to consider deeper, ethical imperatives. Neary and Winn (2009) have amplified this demand for re-formation to describe more revolutionary possibilities embedded within the social relations of education. They stress the significance of the student actively producing her lived experience, with the production of intellectuality being a critical, pedagogic act of resistance, in opposition to the consumption of knowledge (Giroux, 2008). The student is encouraged to transcend and live in *excess* of her socially-defined role as a learner.

In this future, the student learns to become a revolutionary social being (Neary and Hagyard, 2010) breeding mass, social intellectuality (Neary and Winn, 2009). As a result, tensions in the following must be addressed: the interplay between social relationships and power; the management of anxiety and hope (Giroux, 2010); and, the tendency of economic imperatives to breed alienation. These tensions are amplified by societal disruption, and the development of responses requires a critique of the relationships between technology and open education.

## Technology, Open Education and Political Economy

Open education is a critique of institutionalised systems of education. An engagement with the possibilities for open education enables us to examine our “power-to” change our social relations, rather than to exist in a state where some-one or some-thing has “power-over” both our work and ourselves (Holloway, 2002). As a form of praxis such engagements are hopeful, and Giroux (2010, p. 1) notes that hope is a critical value in this process: “Hope makes the leap for us between *critical education*, which tells us what must be changed; *political agency*, which gives us the means to make change; and the *concrete struggles* through which change happens.”

The hopeful possibilities of open education include:

- enhancing our ability to create spaces for reflecting upon our participation in the activity and labour of (self-) discovery and (self-) invention (Attwell, 2010);
- catalysing a culture and set of values that offer spaces for cultural reinvention; and
- re-fashioning democratic and participative social relationships.

However, participation is an often co-opted word, de-based to a form of therapeutic engagement between individuals whose power-to govern and create in a situation/activity is markedly different (Anstein, 1969; Hall, 2006). These differences impact how work is constructed, and how it is perceived and valued. As a result, it is possible that the institutionalisation of open education becomes alienating precisely because “it is just another way of creating capital out of immaterial labour” (Winn, 2010b).

This is also true for the development of open education in the form of open educational resources (OERs), which appear to be innovatory, only to be a re-hashing and reinforcement of many of the defining attributes of mass production: automation and standardisation; efficiency; and the reification of the resource as product. This is strangely regressive and promotes pedagogy-as-production, curricula-as-distribution and learning-as-consumption. In this institutionalised form, OERs-as-open-education refer to the free movement and regeneration of reified commodities protected by liberal property laws (Creative Commons) that guarantee a level of autonomy to digital objects over and above the rights of teaching (labour) and learning (apprenticeship) from which they are abstracted. In parallel the labour that produced them is placed under the control and supervision of quality assurance, through impact measures. Here technology is the cause of our educational provision rather than being a variable of its production (Noble 1984).

In overcoming alienation, debating and fighting for the *idea* (but not the form) of the University, infused with and by a culture of openness, is vital. Such resistance might usefully be centred on deliberating the social relations that enable learners and tutors to manage societal and environmental disruption, rather than situating open education within neoliberal business models (HEA/JISC, 2010). Developing democratic or open practices in education is critical, and this underpins radical re-conceptualisations of educational practice, for example mass intellectuality (Hardt and Negri, 2000), a pedagogy of excess (Neary and Hagyard, 2010) and student-as-producer (Neary and Winn, 2009).

These re-conceptions are founded upon deeper understandings of the socio-cultural contexts within which technology is deployed (Selwyn, 2010), underpinned by political economy (Hall, 2010), and a critique of the neoliberal educational project that promotes HE-as-consumption (Amsler and Cnaan, 2008; Neary, 2010; Noble, 1998). In the latter, the use of technology for humanist ends is subsumed within an essentialist discourse of efficiency, value-for-money and more-for-less (DBIS, 2009; Willetts, 2010). In contrast, critics like Noble (1984) and Bijker (1995) argue that technological development and deployment is social and

consists of an evolving range of possibilities whose revelation is socio-culturally determined. Thus, both technological development and emerging educational forms, which are seen as catalysts for unsustainable discourses of 'innovation' and 'efficiency', demand critique through the lens of political economy. In the face of disruption, sustainable discourses of the idea of HE are critical.

### **The Impact of Disruption and Resilience on Open Education**

The dominance of the neoliberal form of high technology rests on the extent to which it conceals the complexity and destructiveness of its modes of production and distribution. The “disarming disguise” (Noble 1998) of high technology is at its most effective, magical and seductive, when it abstracts our human condition from our socio-cultural environment. Yet the very real, physical impacts of climate change and energy depletion fundamentally undermine this comfortable position, affecting the ways in which we provision HE. The imminent threat of peak oil (The Oil Drum, 2010), and the impacts it will have *both* on production-led notions of 'progress' *and* on our energy security and availability (Natural Environment Research Council, 2009), alongside the link between oil production and economic cycles of growth and contraction (Winn, 2009), requires a radical re-evaluation of the form, complexity and commercial orientation of our universities. A future scenario of energy scarcity equates to a future scenario of economic and technological impoverishment that in-turn affects HE.

Education and technology do not exist in a vacuum, and just as their relationship is pragmatically bounded by energy availability, security, and the impact of debt on HE teaching budgets (Guardian, 2010), there is also an ethical imperative for HE to discuss the impacts of its activities on its wider communities and environment. One of the cracks or interstices in the formal education system that open models of education demonstrate is the hope for pedagogic partnership and co-governance between different community actors in shared practices, which in-turn positively impacts our lives and the environment we live in (DEMOS, 2009a). In widening this crack, the development of resilient approaches to HE is critical.

Resilience denotes the ability of *individuals* and *communities* to learn and adapt, to mitigate risks, to prepare solutions to problems, to respond to risks that are realised, and to recover from dislocations (Hopkins, 2009). For Hopkins (2009), resilience is “the capacity of a system to absorb disturbance and reorganise while undergoing change, so as to retain essentially the same function, structure, identity and feedbacks”. This focuses upon defining problems and framing solutions contextually, around our abilities to change and adapt rather than control and manage, in ways that are shared, reciprocal and self-reliant. Resilience is fundamental to sustainability, in enabling individuals and communities to manage crises and disruptions, and to find alternatives.

Hopkins (2009) identifies three elements to resilience, with implications for the relationship between technology and open education. Firstly, resilience comes through diversity within networks or associations, and encompasses a broad base of livelihoods, skills and capabilities, resource use, and access to human and energy systems. Secondly, modularity within communities or networks underpins increased self-reliance. Thus, the ability of communities to tap into ‘surge protectors’, such as diverse areas of expertise or resource-supply, can help them to achieve their aims. Thirdly, tightness of feedback loops, so that people are not divorced from the outcomes of their decision-making and actions, ensures enhanced planning and delivery.

In overcoming disruption, it is vital that networks or communities, such as HE providers and their own open/closed communities, develop and share the skill-sets of their members, and that those members become agents in the world (Neary and Winn, 2009). DEMOS (2009b) argue that communities have a choice between reliance on government and its resources, and its approach to command and control, or developing an empowering day-to-day, scalable resilience. Such resilience develops engagement, education, empowerment and encouragement. Resilient forms of HE should have the capacity to help students, staff and wider communities to develop these attributes. As technology offers reach, usability, accessibility and timely feedback, it is a key to developing a resilient higher education, with openness (i.e. shared, decentralised and accessible) at its core.

### **A Resilient Education?**

Sharing as a means of overcoming crises is founded upon co-governance, and this should be central to the development of openness in the idea of the twenty-first century university. This is exemplified by:

- the Really Open University's (ROU) emphasis on the need for praxis, in re-asserting the idea of the university as a site for critical action, resistance and opposition, led by students (ROU, 2010); and
- the Peer to Peer University's (2010) approach to sharing and accreditation.

This also aligns with the model for organic intellectual endeavour proposed by Gramsci (1971), in challenging institutional or state-legitimised power and hegemonic ideologies, through an engagement with, and challenging of values and attitudes, and by developing "good sense". It also develops Williams' (1961) view of the power of cultures that are publicly defined and fought for, and which enable a socio-educational transformation that critiques legitimisation and alienation, as well as the value of sharing and active participation in practical life. Through such an approach, the idea of the university might come to be re-framed as active, creative, self-aware and socially-constructed, rather than simply the production of diminished or controlled spaces, impacted by business models and metrics, and instrumental engagements.

A critique of the interplay between technology and open education, and the development of an open curriculum for resilience, highlights four risks.

1. There is a risk that individual rather than social empowerment is laid bare, and that within a libertarian educational structure, the focus is placed on access to technology as the driver for individual, economic emancipation. In this view, there is a need for constant innovation in technology and technological practices, in order to empower ever more diverse groups of learners, including those in developing countries (OpenCourseware, 2010; Rossini, 2010; Seeley Brown and Adler, 2008).
2. There is a risk that open technological solutions simply replicate or re-produce a dominant political economy in education, in-line with an ideology of business-as-usual (HEA/JISC, 2010). As a result, that which is claimed as innovatory becomes subservient to a dominant mode of production and merely enables institutions to have new power-over products and labour.
3. Academics and students risk fetishising the outcomes/products of their labour as a form of currency (Pfaffenberger, 1988). This is especially true in the case of *both* OERs *and* personal learning environments, which risk being disconnected from a deeper critique of open, higher education.
4. Academics and administrators risk fetishising students as autonomous agents, able to engage in an environment, using specific tools and interacting with specific OERs, rather than seeing engagement as socially emergent and negotiated (Hall, 2010).

Moving beyond these risks to develop an open curriculum for resilience is more complex than a technological fix or even more innovation, and requires us to recognise and engage in the critique of an assemblage of other activities or practices.

Harvey (2010) argues that there are seven activity areas that underpin meaningful social change.

1. Technological and organisational forms of production, exchange and consumption.
2. Relations to nature and the environment.
3. Social relations between people.
4. Mental conceptions of the world, embracing knowledges and cultural understandings and beliefs.
5. Labour processes and production of specific goods, geographies, services or affects.
6. Institutional, legal and governmental arrangements.
7. The conduct of daily life that underpins social reproduction.

These activity areas help educators and students examine how HE might deliver an open curriculum for resilience.

- I. How do educators and students prioritise the use of technologies that catalyse engagement with a broader, open context of learning and education, with trusted peers, and help to raise a literacy of openness, which legitimises sharing as social practice and as social process?
- II. Though education, how do educators and students use technology to enable the types of participatory engagement and re-production of groups like the Autonomous Geographies Collective (2009) or Trapese (2010), where the production of resources is a secondary outcome to the re-fashioning of social relationships and praxis that it enables?
- III. How do educators and students resist the increasing discourse of cost-effectiveness, monetisation, economic value, efficiency that afflicts our discussion of open education and technology (Lamb and Groom, 2007; Wiley, 2010), and which assumes that business-as-usual is sustainable?
- IV. How do educators and students disengage from activities that risk marginalising cultures through allegedly open education? Are non-Western cultures engaging in open education and the production of OERs through the languages of colonialism or by focusing on native socio-cultural forms (African Virtual University, 2010)? At what point does the use of technology in open education become part of a post-colonial discourse focused upon new markets?
- V. How do educators and students utilise OERs to open-up trans-disciplinary approaches to global crises, like peak oil and climate change? How can the emerging array of open subject resources be utilised across boundaries (be they personal, subject, programme, course, institutional or national), in order to challenge sites of power in the University and beyond?

These questions enable ways of challenging hegemonic, mental conceptions of the world and framing new social relations in light of developing crises. In turn, this requires curricula and socio-educational leadership.

## **Conclusion**

Open forms of HE are crucial in our overcoming of socio-economic disruption, and in framing spaces for personal and communal resilience. A key role for open curriculum development is the critique of hegemonic discourses and the contexts in which they emerge so that they can be challenged, and so that co-governance as well as co-production can be enabled and tested. A key role for technology, in a world of increasing uncertainty, where disruption threatens our approaches, is to enable individuals to engage in authentic partnerships, in mentoring and enquiry, and in the processes of community and social governance and action.

There is still a risk that the provision of frameworks for free associations between individuals will leave some people marginalised, and the creation of appropriate contexts that spark or forge opportunities for participation is pedagogically critical. Equally, the tensions evoked within institutions around, for instance: the ownership of technology; the openness of networks and practices; the structures of management data; engagement with communities at scale; and the validation/accreditation of curricula; need to be addressed. Despite these tensions, the capacity of technology to improve the opportunities for people to work together to shape and solve problems, and to further their critical understanding of themselves and of the world they live in, is significant.

Technology underpins the development of an open curriculum for resilience in three key areas.

- I. The enhancement of student-agency, in producing *both* relationships within and across open communities, *and* open, socially-situated tasks is important. The student's power-over the tools she uses and her power-to negotiate agreed socio-cultural norms is fundamental here, although issues to do with social anxiety, difference, self-conception and allegiance within closed groups, and the marginalisation of certain users, form potential risks. However, a modular approach to the use of technology for agreed tasks in meaningful networks is one aspect of defining resilience.
- II. Re-framing HE experiences as open, in order to allow learners to test their self-concept is critical. Educational technologies offer an array of supportive networking contexts where learners can model practice and self-expression. Formative development is ongoing and demands a range of open engagements on a range of tasks with a range of roles in a range of networks. This diverse learning approach is a second aspect of defining resilience.
- III. Feedback for learning from multiple perspectives underpins authentic personal development. Technologies facilitate near real-time feedback and enable the student to recognise the impact of her actions, which is a third aspect in the definition of resilience.

In this tripartite approach, the production and re-use of artefacts is of secondary importance to the social relationships that are re-defined by educators and students, and the focus on people and values that is in-turn assembled through open education (Lamb, 2010). In overcoming alienation and disruption, a resilient open education enables us to critique institutionalised forms of education. The challenge is to develop such a critique.

## References

- African Virtual University. (2010). *African Virtual University*. Retrieved from <http://www.avu.org/>
- Amsler, S. S., & Canaan, J. (2008). Whither critical education in the neoliberal university? Two practitioners' reflections on constraints and possibilities. *Enhancing Learning in the Social Sciences*, 1(1). Retrieved from: <http://bit.ly/bSQ8KY>
- Anstein, S. R. (1969). A Ladder of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216-24.
- Attwell, G. (2010). *Notes on open education and critical pedagogy*. Retrieved from <http://bit.ly/d3a2kK>
- Autonomous Geographies Collective. (2009). *Autonomous Geographies*. Retrieved from <http://www.autonomousgeographies.org/>
- Bijker, W. (1995). *Of bicycles, bakelites and bulbs: Toward a Theory of Sociotechnical Change*. Cambridge, MA: MIT Press.
- DBIS. (2009). *Higher Ambitions*. Retrieved from <http://bit.ly/aNOm5>
- DEMOS. (2009a). *The Edgeless University*. Retrieved from <http://bit.ly/15yRI9>

- DEMOS. (2009b). *Resilient Nation*. Retrieved from <http://bit.ly/b4N6WA>
- Downes, S. (2010). *Collaboration and Cooperation*. Retrieved from <http://www.downes.ca/post/53303>
- Facer, K., & Sandford, R. (2010). The next 25 years?: future scenarios and future directions for education and technology. *Journal of Computer Assisted Learning*, 26(1), 74–93. doi: 10.1111/j.1365-2729.2009.00337.x
- Feenberg, A. (1999). *Questioning Technology*. London: Routledge.
- FutureLab. (2009). *Enquiring Minds: Year 4 report: Innovative approaches to curriculum reform*. Retrieved from: <http://bit.ly/3MtrM2>.
- Giroux, H. A. (2<sup>nd</sup> edition, 2008). *Border crossings: Cultural workers and the politics of education*. London: Routledge.
- Giroux, H. A. (2010). When Hope Is Subversive. *Tikkun*, 19(4), 1-4. Retrieved from [http://www.henryagiroux.com/online\\_articles/Tikkun%20piece.pdf](http://www.henryagiroux.com/online_articles/Tikkun%20piece.pdf)
- Gramsci, A. (1971). *Selections from the Prison Notebooks*. London: Lawrence and Wishart.
- The Guardian. (2010). *University teaching budgets slashed*. Retrieved from: <http://bit.ly/cmpzpj>
- Hall, R. (2006). Battery-farming or free-ranging: towards citizen participation in e-learning environments. *e-Learning*, 3(4), 505-18. doi: 10.2304/elea.2006.3.4.505
- Hall, R. (2009). *Towards a resilient curriculum for HE*. Retrieved from <http://bit.ly/9Nxdvs>
- Hall, R. (2010). *The political economy of openness in HE: or what is the point of it all?* Retrieved from <http://bit.ly/b4c6ln>
- Hall, R., & Hall, M. (forthcoming, 2010). Scoping the pedagogic relationship between self-efficacy and Web 2.0 technologies. *Learning, Media and Technology*.
- Hardt, M., & Negri, A. (2000). *Empire*. Cambridge, MA.: Harvard University Press.
- Harvey, D. (2010). *The Enigma of Capital: And the Crises of Capitalism*. London: Profile Books.
- HEA/JISC. (2010). *Open Educational Resources Programme*. Retrieved from <http://www.jisc.ac.uk/oer>
- HEFCE. (2010). *HEFCE Strategic Plan, 2006-11*. Retrieved from <http://www.hefce.ac.uk/aboutus/stratplan/>
- Hemmi, A., Bayne, S. & Land, R. (2009). The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning*, 25(1), 19–30. doi: 10.1111/j.1365-2729.2008.00306.x
- Holloway, J. (2002). *Change the World Without Taking Power*. London: Pluto Press.
- Hopkins, R. (2009). *Resilience Thinking: an article for the latest 'Resurgence'*. Retrieved from <http://bit.ly/3ugobl>
- Jackson, N. (2008). A Life-Wide Curriculum: Enriching a traditional WIL scheme through new approaches to experience-based learning. *Proceedings of the WACE Symposium*. Sydney: WACE.
- Jones, P., Selby, D. & Sterling, S. (2010). *Sustainability Education Perspectives and Practice across Higher Education*. London: Earthscan.
- Lamb, B. (2010). *Open Contempt*. Retrieved from [http://wiki.ubc.ca/Open\\_Contempt](http://wiki.ubc.ca/Open_Contempt)
- Lamb, B., & Groom, J. (2010). Never Mind the Edupunks; or, The Great Web 2.0 Swindle. *EDUCAUSE Review*, 45(4), 50–8. Retrieved from <http://bit.ly/98zN1m>
- Leadbeater, C. (2008). *We-think: Mass innovation, not mass production: The Power of Mass Creativity*. London: Profile Books.
- Natural Environment Research Council. (2009). *"Significant risk" of oil production peaking in ten years*. Retrieved from <http://bit.ly/YoGC7>
- Neary, M., & Winn, J. (2009). Student as Producer: Reinventing the Undergraduate Curriculum. In M. Neary, H. Stevenson, & L. Bell, (Eds.), *The Future of Higher Education: Policy, Pedagogy and the Student Experience* (192-210). London: Continuum.

- Neary, M. (In Press, 2010). Pedagogy of Excess – an Alternative Political Economy of Student Life. In M. Molesworth, L. Nixon & R. Scullion (Eds.), *The Marketisation of Higher Education The Student as Consumer*. London: Routledge.
- Neary, M. & Hagyard, A. (In Press, 2010). *Pedagogy of Excess: an alternative political economy of student life*. In M. Molesworth, L. Nixon & R. Scullion (Eds.), *The Marketisation of Higher Education The Student as Consumer*. London: Routledge.
- New Media Consortium. (2010). *Horizon Report 2010*. Retrieved from <http://bit.ly/7sIBrj>
- Noble, D. F. (1984). *Forces of production: A social history of industrial automation*. New York: Alfred A. Knopf.
- Noble, D. F. (1998). Digital diploma mills: The automation of higher education. *First Monday*, 3(1). Retrieved from <http://bit.ly/cU1ml9>
- The Oil Drum. (2010). *The Science of Oil and Peak Oil Revisited*. Retrieved from <http://bit.ly/aabvUq>
- OpenCourseware Consortium. (2010). *The OpenCourseware Consortium*. Retrieved from <http://www.ocwconsortium.org/>
- Peer to Peer University. (2010). *About P2PU*. Retrieved from <http://p2pu.org/>
- Pfaffenberger, B. (1988). Fetishised Objects and Humanised Nature: Towards an Anthropology of Technology. *Man*, 23(2), 236-252.
- Ravenscroft, A. (2009). Social software, Web 2.0 and learning: status and implications of an evolving paradigm. *Journal of Computer Assisted Learning*, 25(1), 1–5. doi: 10.1111/j.1365-2729.2008.00308.x
- ROU. (2010). *The Really Open University*. Retrieved from <http://bit.ly/bS0tl8>
- Rossini, C. (2010). Access to Knowledge as a Foundation for an Open World. *EDUCAUSE Review*, 45(4), 60–8. Retrieved from <http://bit.ly/dfW0tA>
- Seeley Brown, J. S., & Adler, R. P. (2008). Minds on Fire: Open Education, the Long Tail, and Learning 2.0. *EDUCAUSE Review*, 43(1), 16–32. Retrieved from <http://bit.ly/Qggee>
- Selwyn, N. (2010). Looking beyond learning: notes towards the critical study of educational technology. *Journal of Computer Assisted Learning*, 26(1), 65–73. doi: 10.1111/j.1365-2729.2009.00338.x
- Trapese. (2010). *Trapese Popular Education Collective*. Retrieved from <http://trapese.clearerchannel.org/>
- University of Reading. (2010). *This Is Me project*. Retrieved from <http://thisisme.reading.ac.uk/>
- Wiley, D. (2010). Openness as Catalyst for an Educational Reformation. *EDUCAUSE Review*, 45(4), 14–20. Retrieved from <http://bit.ly/alspJ5>
- Willetts, D. (2010). *Speech to Universities UK Annual Conference*. Retrieved from <http://bit.ly/buESpV>
- Williams, Raymond (1961) *The Long Revolution*. London: Chatto & Windus.
- Winn, J. (2009). *Oil and the story of energy*. Retrieved from <http://bit.ly/6vtHBS>
- Winn, J. (2010a). *Resilient Education*. Retrieved from <http://bit.ly/9sexuE>
- Winn, J. (2010b). *Open Education and Sustainability*. Retrieved from <http://bit.ly/9BUv0t>

### Copyright Notice

This paper is licensed under the Creative Commons Attribution-Noncommercial-No Derivative Works License (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).