Can technology help us realize the learning potential of a life-wide curriculum? Towards a curriculum for resilience

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Summary

The role of technology, and in particular social media, at the interface between formal and informal learning contexts is under scrutiny. In part this is because of the contested nature of the impact of technology within existing curricula and the opportunities it affords for epistemological innovation. One emerging area of interest is the role of technology in learning futures, and more especially in managing life-wide engagement in a world of increasing complexity and disruption. Here, individual and social resilience, or the ability to manage disruption, is important. This paper sets out to examine how technology underpins life-wide learning and how it might be used to help realize the learning potential of a life-wide curriculum, by framing a more resilient education. Key areas of interplay between individuals and technologies are identified: firstly, the learners' contextual control of the management of tools and social rules that underpin their performance of tasks; secondly, the learner's development of their own digital identities and agency, through their engagement in a range of social networks; and thirdly access to near real-time feedback and support for learning, and modelling the value of divergent approaches. As a result, technology can enable learners to engage with uncertainty and civil action.

Introduction

This paper sets out to examine how technology is involved in life-wide learning and how it might be used to help realize the learning potential of a life-wide curriculum. The place of educational technology in pedagogic discourse is a core element of Technology-Enhanced Learning (TEL) research and

development in higher education (Facer and Sandford, 2010; Joint Information Systems Committee (JISC), 2009a; Ravenscroft, 2009; Selwyn, 2010). In particular, work has focused upon the educational implications of such technologies for personalisation, informal learning and building resilience (Attwell, 2009; Hall, 2009a; O'Donoghue, 2009; Winn, 2010). It has been contended that the ability of users to work across a range of networks and tools, and to integrate them within personally-meaningful spaces, extends individual self-conception, self-presentation and self-knowledge (Parajes and Shunk, 2001; Franklin and van Harmelen, 2007). One hopeful outcome is that learners are able to negotiate and enhance their own digital identities in a range of social spaces, using a range of social media (University of Reading, 2010), in order to "pay particular attention to the epistemology of practice(s) in the social, professional and working worlds" and thereby deal with complexity (Jackson, 2008, p. 3).

However, there is a danger that some within the strategy or management of educational technology demonstrate uncritically determinist or positivist approaches, especially in framing how specific tools or media *are* revolutionary or *will* deliver specific benefits. Concomitant claims are made for the apparently uncontested opportunities for personal or economic growth that are afforded. The latter is demonstrated within, for example, the UK Government's approach to Higher Ambitions (Department of Business, Innovation and Skills (DBIS), 2009), or the Higher Education Funding Council for England's Online Learning TaskForce (HEFCE, 2010). There is a tendency for the "how" of technology to be elevated ahead of either the "why" or the constraints imposed by social or political economy.

These constraints have begun to be addressed at the level of both the institution and the programme. In terms of the former, Selwyn (2010, p. 67) has recently argued that educators need to address "educational technology as a profoundly social, cultural and political concern." For Hemmi *et al.* (2009), the use of educational technology is problematic because the institutionalisation of Web 2.0 technologies actualises a reclamation and regulation of innovation within traditional, safe paradigms. In this view, some of the opportunities for the re-invention of higher education are lost. In a more radical view, the institutional use of educational technology in the idea of higher education has to be seen in the context of wider societal disruption, in the form of massive public sector debt, climate change, energy security and peak oil (Hall, 2010; Winn, 2010).

At the programme-level, Ravenscroft (2009, p.1) argues that practitioners need to consider "the current technological innovations as players in an evolving paradigm, and not necessarily clear solutions to well-understood problems." Pachler and Daly (2009) go on to caution that practitioners need to know more about the specific strategies that are deployed by learners using social software, in order for the curriculum to be refined. Whilst Clark *et al.* (2009) stress that without such knowledge, practitioners cannot frame shared, co-produced epistemological strategies with learners, and thereby risk promoting 'digital dissonance'. Clearly, these authors see the deployment of social media within and beyond the curriculum as contested and complex, with marginal room for developing a curriculum modelled upon personal integration and social enquiry (FutureLab, 2009).

Framed by these concerns, this paper scopes some possibilities for utilising educational technology and social media to support learners and learning activities within a life-wide curriculum. It takes Jackson's (2008, p. 1) view that "a life-wide curriculum is the most appropriate concept for a higher education experience that sets out to help students develop themselves for a lifetime of learning in an infinitely complex ever changing world". The paper extends this view to develop the idea of a curriculum for resilience and coping with disruption as a way of adding value to the emergent concept of life-wide learning. The qualities of educational technology that underpin that curriculum are highlighted, with examples of practice from one UK higher education institution. At issue is whether the deployment of educational technology can enable users to develop their decision-making and agency, and underpin a life-wide experience across higher education.

Some qualities of educational technology

Across higher education, social media, in the form of off-the-shelf virtual learning environments (VLEs) or Web 2.0 technologies that can be accessed over the web on a variety of hardware, are strategic

elements of curriculum delivery. They are increasingly seen as tools that can be embedded, connected and aggregated within the curriculum at low cost in order to connect people, networks and information (O'Reilly, 2005). These technologies typically include the following functions: social networking; social bookmarking; user-generated content; virtual representation; the syndication of content including multimedia; and innovative approaches to content and application-handling, including augmented reality and aggregation. These functions or services can be accessed, increasingly, using a variety of personal and institutional hardware.

Their initial impact prompted practitioners to re-evaluate curriculum delivery, and led Sharpe (2006, p. 16) to claim:

> *As digital technology pervades everything around us, we can enrich each encounter to harness the global resources of the information world and of learning communities, to make it more appropriate in that moment to that individual.*

Moreover, it was asserted that the openness and malleability of these tools empowers users to express themselves to others, and to take part in shared activities, in a variety of contexts (Franklin and van Harmelen, 2007). However, the emerging reality is that the use of these tools is shaped by more complex pedagogic and personal concerns. Hemmi *et al.* (2009, p. 29) note

> *a tendency for both teachers and learners to 'rein in' these potentially radical and challenging effects of the new media formations, to control and constrain them within more orthodox understandings of authorship, assessment, collaboration and formal learning.*

These tensions occur within and beyond institutions, and impact the literacies developed by learners and tutors (JISC, 2009a; Trinder *et al.*, 2009), the relationships between those actors (Committee of Inquiry, 2009), and issues of identity, engagement, and marginalisation (Anderson, 2007; University of Reading, 2010). One outcome is an uncertainty about the effective use of Web 2.0 tools within traditional pedagogic spaces.

Recent curriculum design and delivery projects in the UK have begun a process of re-framing the pedagogic landscape (JISC, 2009b). One strand within these projects is developing an understanding of how institutional approaches to the use of technologies can be framed socially. For example, the Mobilising Remote Student Engagement project (MoRSE, 2009) is evaluating "the impact of fieldwork and placements on student learning and personal development through the integration of personal technologies and social tools", whilst the Information Spaces for Collaborative Creativity project (2009) is examining how learning technologies impact learner engagement with dialogic, 'creative conversations' in design courses. However, these programmes and projects need to be positioned relative to the personal and social contexts from which their outcomes emerge.

Technology in everyday life and the development of personal learning environments

The ability of technology to connect individuals and communities in a range of contexts has changed rapidly in the last decade. In the developed world, and areas of the developing world, access to networked, web-based tools is impacting agency. This is accelerated through our ability both to utilise these tools on personally-preferred hardware, and to re-structure them to reflect our personal identities. Our developing knowledge of and capability in the use of technology, has prompted the recognition that the learning literacies, or digital epistemologies, that enable us to search, interpret, evaluate, utilise and re-purpose information is critical to becoming an effective learner. Jackson (2010) concludes these to be a core outcome of a higher education, and moreover that new media literacies have moved from being marginal to the generic outcomes of an undergraduate education to being fundamental.

In enhancing new media literacies, technology is a catalyst for the development of personal learning environment (PLEs), and these are receiving more attention (Attwell, 2010). The Ravensbourne Learner Integration Project (2008) argues that a personal learning environment (PLE) is 'a learning environment that is assembled through learner choice'. It encompasses the personalised aggregation of tools,

networks and content from a range of formal and informal places, presented in a range of formats depending upon the nature of the personal tasks to be undertaken, and controlled by the individual user.

The PLE offers us a complex view of learning environments based upon differentiated user needs. The Ravensbourne Learner Integration Project (2008) has developed an assemblage model that focuses upon the individual's transition from private to public learning in the context of social software and communities of practice.

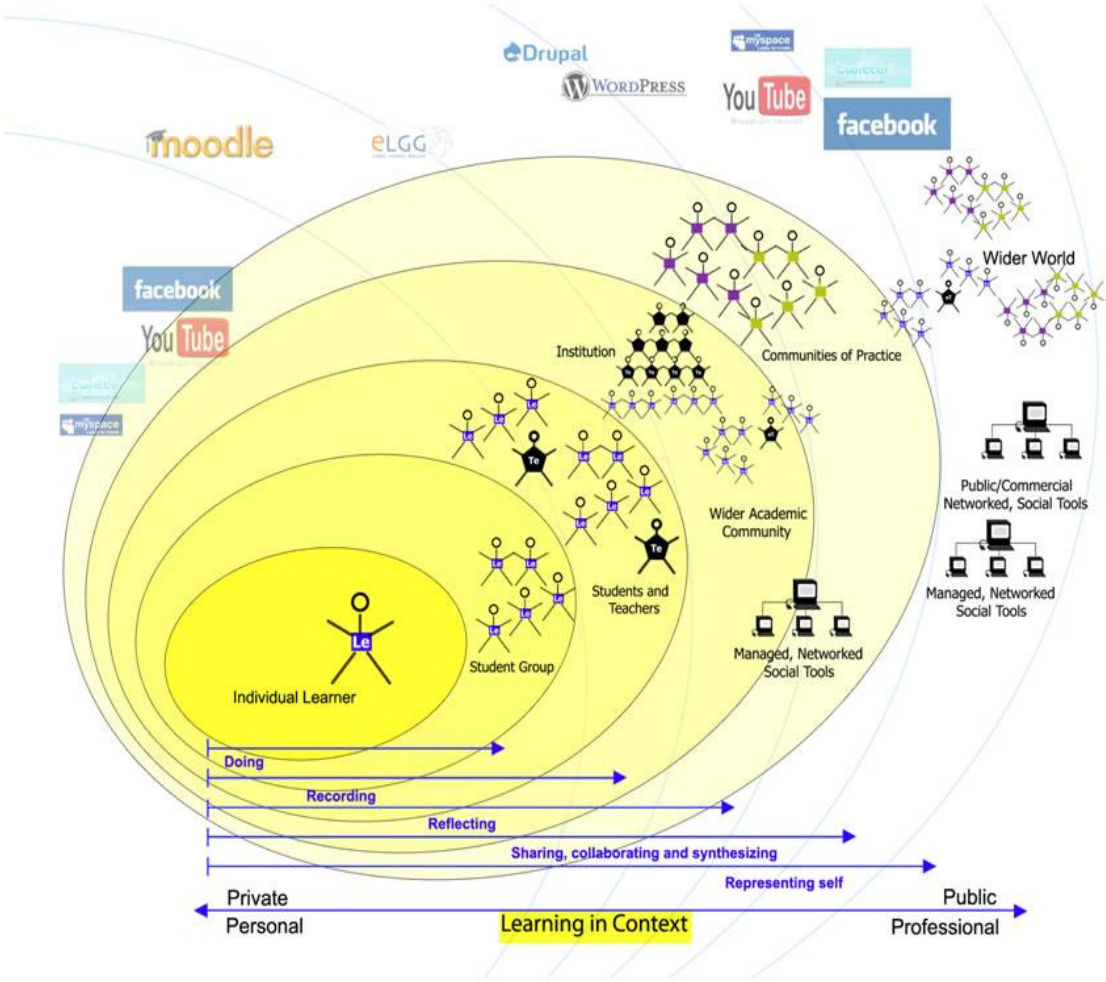

Figure 1:The Ravensbourne Learner Integration Model (RLI Project 2008)

The Learner Integration Model is important because it highlights the links between: personal mastery in specific domains; social learning in communities or associations of practice; and social media and technologies. It illustrates how self-education and critical literacy are enhanced through active participation with a range of media and within groups that make sense to the individual. This frames a constructivist paradigm where learners can situate themselves, in order to make and record actions, to reflect on those actions, to share decisions and thoughts with others, and to represent aspects of their identity within validated networks. By aligning the structures of PLEs to social contexts for learning, one can scope how users can manage the disruptions that impact life-wide engagement.

Disruption, educational technology and higher education

Technology and media literacies are becoming critical in the development of agency in the world (Hall, 2008), and in making sense of disruptive experiences. In terms of civil action, Non-Governmental Organizations such as Amnesty International regularly use social networking software like Facebook, MySpace and Bebo to lever individual agency for their campaigns (Amnesty International, 2010). Political parties have also engaged in the use of social media for associational gains

(MyBarrackObama.com, 2010), or have seen such media actively used against them (mydavidcameron.com, 2010). The interplay between organizations or associations and technologies enables individuals to associate voluntarily to discuss, make decisions and act. As a result, differences in beliefs, values and histories, and the complexity of life-wide agency, are amplified.

This is important for higher education because studies have indicated that young people in particular are engaging with social media through personal technologies, as part of their everyday lives in civil spaces (Green and Hannon, 2006). In this way, life-wide learning automatically embraces the continuum of meaning-making that exists in both personal and private contexts, catalysed by technology. An outcome of life-wide learning is the development of a sense of being, and technology can underpin this through the creation of networks of identity (University of Reading, 2010) in multiple environments.

In thinking about the social contexts for educational technology, Attwell and Costa (2009) focused upon the development of "reality learning", where personal learning and working environments could be integrated, and where access to open education can be facilitated. This is important for them because of the nature of societal change. Selwyn (2010) also argues that higher education needs to develop deeper understandings of the socio-cultural contexts within which educational technology is deployed, and how it connects into potential disruptions to our socio-cultural fabric, and our political economy. In the view of these authors, educational technology or social media cannot be divorced from their life- and community-wide contexts.

Some authors see disruption as central to these contexts. Winn (2009) raises issues of climate change and the need to reduce carbon emissions, linked to what higher education will look like in a world that needs to reduce its energy use. Some of the key thinking in this area is focused upon consumption of energy rather than the production of carbon. This is important for two reasons: firstly, the growing threat of peak oil (The Oil Drum, 2010) and the impact that will have on our ability to consume/produce, and on our energy security and availability (Natural Environment Research Council, 2009); and, secondly the need to own the carbon and energy we emit/use, in order to combat climate change. It might be argued that these problems are being amplified by energy availability and costs (The Guardian, 2009), public sector debt and the affect of a zero growth economy (new economics foundation, 2010).

Educational technology and social media do not exist in a vacuum. Alongside the fact that our use of technology within and beyond institutions is pragmatically bounded by energy availability, security, and the impact of debt on HE teaching budgets (Guardian, 2010), there is an ethical imperative to discuss the impacts of our use of technology on our wider communities and environment. This is a highly complex issue that frames personal and economic growth, affluence, technology use and our impact on the environment. The Horizon Report 2010 (New Media Consortium, 2010) highlights the importance of openness, mobility, cloud, collaboration but argues that learning and teaching practices need to be seen in light of civic engagement and complexity. Facer and Sandford (2010, p. 75) move this much further in looking at technology futures, and they ask critical questions of "the chronological imperialism of accounts of inevitable and universal futures", focused upon always-on technology, and participative, inclusive, democratic change. Such questioning then accepts the structural and cultural complexities of the use of technology, linked to societal development and political economy, and asks us to consider some of the deeper, life-wide ethical imperatives.

Developing resilience?

One way in which the role of educational technology might be used to address the creation of a life-wide curriculum that can help individuals and societies overcome disruption, is through the development of shared values. This connects to the role of social media in the idea of higher education, and what higher education is for. Leadbeater (2010) has developed ideas around personal strengths and capabilities, focused upon personalisation of the curriculum, and the need for educators to develop disruptive approaches to the curriculum before they are themselves disrupted. One aim is to move education away from simply improving formal experiences, to re-form them (Jackson, 2008). This highlights issues of

relationships and power, of anxiety and hope, of social enterprise and community-up provision, rather than centre-down imposition. These are all areas that might be catalysed by technology and which impact upon notions of resilience.

Resilience is socially- and environmentally-situated, and denotes the ability of *individuals* and *communities* to learn and adapt, to mitigate risks, prepare for solutions to problems, respond to risks that are realized, and to recover from dislocations (Hopkins, 2009). For Hopkins (2009), resilience is "the capacity of a system to absorb disturbance and reorganize 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 develop adaptability to work virally and in ways that are open source and self-reliant, rather than reliant on third parties. Resilience is, therefore, more important than sustainability, in enabling communities to manage shock, disruption or vulnerability, and to find alternatives. This means working at appropriate scale to take civil action.

Within the Transitions movement (Hopkins, 2009) there are three elements to resilience that may have implications for the use of technology to enable a life-wide curriculum. Firstly, resilience comes through diversity, which encompasses a broader base of livelihoods, resource use, and access to enterprise and energy systems within networks. 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 they are not divorced from decision-making and action, ensures enhanced planning and delivery. In this way, it is vital that networks or communities develop and share the skill-sets of their members, and that those members become agents in the world.

DEMOS (2009) recently highlighted that we live in brittle societies, with over 80 per cent of Britons living in urban areas and relying on dense networks of public and private sector organizations to provide them with essential services. As a result, our everyday lives and the national infrastructure work in a fragile union, vulnerable to even the smallest disturbances in their networks, and both are part of a global ecosystem that is damaged and unpredictable. DEMOS argue that we have a choice between reliance on government and its resources, and its approach to command and control, or developing empowering day-to-day community resilience through engagement, education, empowerment and encouragement. Crucially, educational technology offers reach, usability, accessibility and timely feedback, and may be a key to developing these qualities, and as a result, life-wide learning.

How can social media help forge a curriculum for resilience?

Davis (2007) argues that empowerment may depend less on enhanced network democracy, which is managerial and driven by the power of specific cultures, than on strong independent community organizations capable of acting coercively [i.e. through lawful, direct action] against elites. He terms this an exit-action strategy that is developed and owned by communities, and which helps to overcome the colonisation of problems, resources and contexts by elites. The key for any debate on resilience is that defining a curriculum that is community-focused, may require institutions to become less managerial and more open to the formation of devolved social enterprises. This will need the encouragement of what Gramsci (1971) called organic intellectuals, who can emerge from within communities to lead action. Learners and tutors may emerge as such organic intellectuals, and in light of disruption, catalysing our learners' and staff teams' capabilities is vital. What power do they have to develop life-wide approaches towards resilience in an era of risk and threat? What is the role of educational technology in this process?

An important element here is what Davis (2007) terms "democratic 'co-governance'" within civil action, but which might usefully be applied to education, in the form of co-governance of the curriculum or of educational outputs. There is a complex interplay between the theoretical opportunities of educational technology for personal empowerment through engagement in contexts for narrative and authorship, and our understanding of how those tools are deployed and owned in reality (Hall, 2009b; Ravenscroft, 2009). One key issue is how technologies are (re)claimed by users and communities within specific

contexts and curricula, in-line with personal integration and enquiry, within an uncertain world (Futurelab, 2009).

It is perhaps this focus upon uncertainty that should drive the creation of a resilient curriculum. Barnett (2008) argues for the learner's engagement with uncertainty and anxiety, and he re-frames this around spaces for an individual's will to develop, and in which they can be, become and act in a meaningful way. Central to this project is engendering a curriculum for reflexivity in authentic contexts, and in ways that enable disruption to be overcome. The following questions emerge, and the place of educational technology underpins each one.

1. What sorts of literacies of resilience do people as social agents need, and what is higher education's role in framing them?
2. What sorts of relationships enable these resilient literacies and modes of being to emerge?
3. What sorts of knowledge/understanding do these learners need to be effective agents in society?
4. Are our traditional modes of designing and delivering curricula meaningful or relevant?

By addressing these questions it is possible to think about how to frame and deliver curricula that enable individuals-in-communities to learn and adapt, to mitigate risks, to prepare for solutions to problems, to respond to risks that are realized, and to recover from dislocations. This demands the production of:

- authentic and meaningful contexts for decision-making and agency;
- enquiry-based tasks, in which skills, approaches, decisions and actions are developed and tested in real-world situations that demonstrate complexity and context;
- cross-disciplinary approaches, linked to a guild or craft-style experience rather than a Fordist, factory approach;
- negotiated rules for the scope, governance and delivery of activities;
- accredited outcomes through the specification of expertise and experience developed within authentic processes and outcomes; and
- relationships framed by mentoring and coaching.

Some qualities of social media that support resilience

The specific outcomes from four curriculum interventions at one UK University help in assessing the qualities of a resilient, differentiated curriculum, which in turn enable the development of life-wide opportunities for both individuals and communities.

1. The development of programme-wide, rather than module-level, communities of practice in Game Art Design enables students to produce their own spaces and technologies, and to negotiate both the co-governance of projects and the co-creation of project deliverables. Through negotiation between more experienced peers, tutors and a wider, industrial community, novice learners are mentored in the production of authentic outcomes. Programme tutors frame tasks around the development of digital media, using the University VLE connected to external tools that include: synchronous classrooms; a blog; a wiki and podcasts. Students used Facebook and Lulu.com to share and critique artefacts that are then presented on personal, learning blogs. The key quality of educational technology developed here is enabling spaces for authentic co-governance and co-creation of the curriculum to take place, between learners, tutors and industry.

2. In the History programme, learners' engagements with technologies on a core module, Presenting and Representing the Past, were based upon a mix of technologies encompassing: the university VLE for access to resources and discussion forums; podcasts of lectures and seminars; word or tag clouds of key lecture and seminar concepts; and, a personal blog or learning log. The learning log is defined as a 'transitional object' (Winnicott, 1982) that enables student reflection on the process of maturation as a learner and a historian. The key quality of educational technology developed here is the fusion of affective and cognitive approaches to learning. This enables the student to

become herself, as a resilient performer and agent (Connecting Transition and Independent Learning (CoTIL), 2009).

3. The use of social media to support the development of peer-mentoring is vital as efficiency agendas impact contact time. The process of story-telling and facilitating therapeutic relationships between more experienced peer-mentors and their mentees, re-defines who has power to help and nurture in HE. Educational technology, situated within a culture that values devolved sites of power and authenticity, can develop motivation, self-efficacy and problem-solving within and beyond the curriculum. The choice of educational technology for delivery should emerge from a negotiation between mentors and mentees and not be imposed. In this way a mixed economy of institutional and personal technology can emerge. The key quality of educational technology implemented here is the formation of shared spaces for the development of communities of inquiry, focused upon differentiated skill-sets (Hall and Conboy, 2009).

4. The development of a University Certificate in Professional Development in work-based learning for Placement students in Pharmaceutical and Cosmetic Sciences begins to value explicitly the learner's reflection on her application of theory-in-practice, within a novel learning context. A different approach to accreditation, rewarding the affective and the reflective in a hard, experimental, scientific space, using industrial and academic supervisors as coaches is central. These learners are utilising both multimedia and text-based reflections, in order to re-think their actions in a practice-based setting, and to capture these within the relative security of an institutional e-portfolio connected to the University VLE. The key quality of educational technology utilised here is personal experimentation within a social space, framed by real-world tasks (MoRSE, 2009).

Readily available educational technologies are being used to enable solutions and responses to be developed within specific communities and at appropriate scale. Curriculum teams are defining and catalysing pedagogical and epistemological projects that are community-oriented, inclusive, negotiated, and enquiry-focused. Critically, the deployment of these technologies has implications for roles within higher education.

The role of tutor is as a more experienced other, able to provide good-enough support in context. Therefore, her digital literacy is a vital attribute in delivering mentoring and modelling, and in nurturing co-production and co-governance. This is an activist role and focuses upon helping a community to find its voice and exercise proper democratic engagement. This might include working in contexts and with people who are situated both beyond the institution, and beyond a specific subject. In the examples above, a key question is how tutors-as-mentors can use social media to broker engagement with communities beyond the university?

The role of institutions may be to facilitate social enterprise, affiliation, preparation, and resourcing for the transformation of communities. To create spaces within which a resilient curriculum is welcomed and actively encouraged, is a vital element, and as such institutions may need to re-think how open their educational technology and content can usefully be. This may mean that the 360-credit undergraduate degree becomes ever-more redundant in a world where we need skill-matching, sharing and problem-solving. The role of the institution will be to ensure that its technological infrastructure enables these socio-cultural opportunities for agency, community, decision-making, building relationships, and producing.

The role of the learner may become the ability to be, to co-exist, to survive and to thrive, within a range of communities, on a range of scales. In this context, Habermas' life-world (1987), or those informal, unmarketised domains of life, which are social, voluntary, and truly participatory are important in situating the individual within a life-wide curriculum for resilience. The key facets here are the ability to work with a range of peers to define problems and solutions, to make decisions and take action, and to receive feedback. For each of these facets, educational technology can support meaningful, developmental engagements, as noted in the following brief scenarios.

Scenario 1: journalism students work with civil engineering students, and a range of experienced mentors, to develop a communication plan, and action plan, and a lessons learned report for a flood-threatened town, in liaison with community activists. In this instance, mobile technologies are used to capture live images and updates, and to report actions and decisions on the ground. These can be developed using collaborative, web-based project management tools and wikis, and then disseminated via a blog. Local community activists can tag their own resources and contribute to the development of the wiki and blog, in real-time. As accredited assessors, student mentors and community activists are enrolled onto institutional systems, and act as critical friends throughout the process, providing formative assessment through an institutional e-portfolio. The use of social media enables collaborative engagement to be mapped, and then tied to the assessment of an individual's summative claim for their role in the project's process and outcome.

Scenario 2: Historians working through more experienced peers define projects within local, national or international communities. These projects focus upon contextualising specific community issues and scoping development or renewal projects, in terms of different histories and solutions, which are presented on a community blog. This approach involves engagement in decision-making and negotiation with external agencies, such as NGOs, local government, businesses and community groups, in order to frame authentic action. Social bookmarking and networking are used to capture and analyse past decisions and actions, which are enhanced through a process of commentary on the blog. As projects develop, they expand in scope to engage business studies students and community activists in the development of business cases and project plans for new solutions. Wikis are used to develop proposals, and social work students then take the lead on appropriately engaging and representing the user voice in decision-making, through a mix of mobile and social media. An on-line publishing tool, social networking technology and the blog are used to disseminate the outcomes to a wider audience. An institutional e-portfolio enables learners to share and critique their own content and decision-making with accredited mentors.

In both of these brief scenarios, a mix of face-to-face engagements, user-generated content and community-driven social media, prioritises an integrated and social approach to delivering community-focused processes and solutions. Central to this strategy is a life-wide pedagogy that can respect the different skills and aspirations that individuals-in-communities offer, and which then prioritises meaningful and developmental agency. Educational technology is simply a means to enable a new vision for the curriculum. The qualities that it brings are contested but include:

- providing secure or open spaces, or a mix thereof;
- enabling the (re-)creation, augmentation, sharing and critiquing of user-generated content, in multiple formats;
- catalysing and maintaining relationships that enable skill-sets to be negotiated and aggregated; and
- defining relationships that inform and re-cast power structures.

Conclusion

A key in building a life-wide curriculum that enhances personal and communal resilience is engaging with uncertainty through projects that involve diverse voices in civil action. Clearly discourses of power will impact the values that are placed on certain skills, relative negotiating positions, and the nature of the projects that should be undertaken. A role for HE curricula is framing an understanding of these discourses and the contexts in which they emerge so that they can be challenged, and so that co-governance as well as co-creation is enabled and tested. In a world of increasing uncertainty, where disruption threatens our approaches, technology might enable individuals to engage in authentic partnerships, in mentoring and enquiry, and in the processes of community and social governance.

The networked opportunities opened-up by educational technologies offer educators the opportunity to reshape their pedagogies, to focus on a differentiated, personalised curriculum housed within a social

learning approach. There is still a risk that the provision of frameworks for free associations between individuals will leave some people marginalised, and the creation of meaningful contexts that spark or forge opportunities for participation cannot be ignored. Despite this risk, the capacity of technology to improve the opportunities for people to work together to shape and solve problems, and to improve their beliefs in their own capabilities, is important.

Therefore, technology can underpin meaningful pedagogic opportunities in three key areas:

I. It is possible to give learners contextual control in the management of tools and social rules that underpin their performance of tasks, through negotiation with them. In this way students can build spaces that align with their own personal schemas and strategies. However, issues to do with social anxiety, difference, self-conception and allegiance within closed groups, and marginalisation of certain users, all pose a risk to the successful performance of tasks and decision-making.
II. Learner's value developing their own digital identities facilitated by a range of internal and external, non-academic associations or social networks. For formative development framing these types of engagements enables students to develop their self-concept and agency through experience in safe spaces, which can then be levered into new situations. Educational technologies offer an array of supportive networking contexts where learners can model practice and lever self-expression.
III. Educational technologies facilitate near real-time feedback and support for learning, and modelling the value of divergent approaches. This creates an environment where they can be engaged and motivated, as long as assessment and support is given equitably and openly, and where they can see that participation is relevant.

One of the cornerstones of the use of social media is its ability to open up playful and trustful engagements in ways that were outlined by Bloom *et al*. (1960, p. 18) when they argued that "Education helps the individual to explore many aspects of the world and even his own feelings and emotion, that choice and decision matters to the individual". It may be that by extending these playful types of opportunities using educational technology, staff can help to empower students in developing their own self-concept and life-wide learning.

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