Learning and new technologies: moving beyond the technology

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Abstract

This paper aims to assess whether critical discussions about the shift in society and culture brought about by the emerging new online technologies need to be at the core when defining successful elearning strategies for engaging learners. It will propose that applications and processes provided by emergent technologies and the subsequent associated activities and behaviours they promote in their users can provide a rich environment upon which to build teaching strategies that encompass online applications to support and develop effective knowledge acquisition and enhance learning.

In particular, it will focus on contemporary online forms whose concepts have heralded the arrival of Web 2.0 (Web strategically positioned as a platform whose core competencies include service, participation, user as contributor, rich user experiences). It also assesses whether these technological tools that support social networking and collaboration provide an appropriate context for engaging cognitive processes.

Key words: social networking; collaborative learning; user participation.

Introduction

eLearning strategies in higher educational establishments that seek to integrate new technologies into learning and teaching practices focus on issues such as access, cost-effectiveness, engaging learners, increasing enrolment and serving diverse student populations. Commercially designed virtual learning environments (VLEs) seeking to facilitate these strategies integrate repositories of content where teacher guides, lesson plans, interactive online assessments and assignments can be accessed with methods of record-keeping and internal messaging services facilitating administrative tasks. Yet does this approach in the use of online resources and applications focus only on the technological medium rather than engaging meaningfully with the technology?

As lecturers and instructors, we are encouraged to integrate the use of such learning environments to support and supplement our teaching. Yet without knowledge and understanding of how virtual spaces are culturally and socially providing forms of engagement – that are meaningful to our learners – the manner in which the technology is implemented can present methods of learning that contemporary pedagogies strive to prevent in offline spaces: forms of learning that are artificial and contrived.

Recent changes in emergent online activities brought about by new technologies reveal a rethinking of the relationship between technology and social and cultural practices, in particular, the manner in which these digital technologies are providing, specifically young people, with new forms of cultural and social exchange. McCurry (2000) warns that integrating technology into institutional practices in an effort to enhance individual attainment and learning may in fact prove meaningless if pedagogies do not build upon these social and cultural changes that new technologies offer. Ergo, ignoring the technology perspective of efficiency and focusing on how participants understand and meaningfully engage with the media form and its characteristics, may lead to the provision of a framework for cognitive models that impact upon pedagogies and present alternative discourses for developing elearning strategies.

Education and technology

The advances in technologies in the early years of the twenty-first century have prompted critical discussions about the emerging new online technologies that are rapidly transforming our work and leisure practices. Yet while the rest of society has used technology to transform the way in which we do things, the manner in which new technologies are integrated into educational practices and methodologies often merely

reinforces traditional conventions of teaching, or occurs when saturation of the market is so complete that it cannot be ignored (McDoughall, 2006). In much of the pedagogical literature, many of the discussions on the implementation of technology focus on the larger debate of commercialisation in education (Hawisher and Selfe, 2000) and the marketing of products and services to institutional markets, rather than focusing on the technology as a means to enrich, expand or change current education practices.

Government-led initiatives for integrating elearning strategies in educational establishments are aimed at supporting our learners in the complex challenges that they will face in digitally rich social and work environments and the meta-skills and meta knowledge that are likely to be required in these new contexts[1]. In response, government and private sector support has seen the investment of millions of pounds in computer technology and the training of instructors to ensure the successful integration of these mediated environments into teaching and learning methodologies.

Yet current educational practice focuses on the notion of key skills – key knowledge that is essential for the use of such applications and digital or media literacy – the competence to exploit effectively the tools, symbols and systems made available by digital technologies. By focusing on competencies in application, subsequent pedagogical strategies have viewed technology as *a tool* and used the technologies primarily to advance the dominant forms of pedagogy (McCurry, 2000) while ignoring contemporary critical discussions about the shift in society, culture and media brought about by the emerging technologies.

[1] Executive summary of Futurelab's, Social Software and Learning Paper, which explores the relationship between education and technologies, available online from: http://www.futurelab.org.uk/research/opening_education/social_software_01.htm

Any idea that a medium can be reduced to a technology is strongly resisted by mainstream media and cultural studies (Williams, 1974, 1983), and more contemporary research and discourse acknowledge that knowledge creation and forms of learning can be revolutionised by investigating how digital technologies are transforming social and cultural exchange. Such evidence is provided by the I-Curriculum project development, a project that brings together researchers from Germany, Greece, Romania, Spain and the UK, in an attempt to define the meta-skills and cognitive processes required in a digitally rich environment. The theoretical framework for its proposal works upon the premise that digital literacy amongst our students needs to move beyond an understanding of how to use computers, to implementation and use of computer-mediated communication within a social framework.

Technology, and culture and society

Early cultural theory surrounding the Internet and its applications that facilitate computer-mediated communications consider issues including human forms of association, the creation of identities and user behaviours. These critical discussions measuring the social effects of the Internet were concerned with how individuals tried to develop ways of substituting the absence of face-to-face communications on the Internet (Holmes, 2005); issues surrounding trust and integrity in online social relations in which knowledge and identities are absent (Slevin, 2002); the opportunity to abandon the confines of the limiting self (Burnett and Marshall, 2003); and concerns that virtual communities were places built on irony and play, unlike real communities that are places of obligation and responsibility (Stallabrass, 1996).

Yet the web is a very different place today and emerging technologies are impacting on traditional computer-mediated forms of communication, moving cultural discussions away from generalised debates about the technology and online behaviour. There is also an ideology of technology that exists in contemporary culture that serves to reduce public debate about the technology and shifts the discussion to a functional level of how to expand, integrate and implement the new technology into our everyday lives. This ideology of technology creates a desire for the cultural transmission promised by technology; the new technologies are not only natural and normal for the culture, but also are what is needed to make society better (Burnett and Marshall, 2003). This power of technology over society, or 'technological determinism' (*ibid*.) has provided critics with unique insights when trying to make sense of contemporary technologies and their associated communication theories.

Media theorist Marshall McLuhan whose work focuses on the emergence of new media technologies and their subsequent use and control identifies social and cultural shifts that these technologies bring. Although McLuhan's major publications appeared before the advent of the personal computer, his ideas concerning the relationship between societies and media forms and the then emerging electronic culture have useful correlations with the contemporary computer mediated communications. The central insight of McLuhan (1967) was that the 'medium was the message'; that understanding media was nothing to do with investigating the content. 'Societies have always been shaped more by the nature of the media by which men communicate than by the content of the communication,' (McLuhan, 1967 p.1). Ergo, attaining an understanding of the technology of the web implies that the real message of the technology is the change in patterns and behaviours that it introduces to human communication; what we do with technologies, the contexts in which we apply

them, rather than what they do to us, is more important and has a bearing on social and cultural change. This ideology is echoed by empirical research testing effective learning through new technologies which found that although technology can greatly enhance a student's learning experience (Leidner and Jarvenpaa, 1993; Serva and Fuller, 2004), it is the effective use of media that is important; the media must be appropriate to the learning context (Serva and Fuller, 2004).

Constructing knowledge and learning in online spaces

At a most basic level, interactivity is one of the key characteristics of online practices; where traditional media offer passive consumption, new media technologies offer interactivity. The term stands for a more powerful sense of user engagement with media texts, a more independent relation to sources of knowledge, individualised media use, and a greater choice. Being interactive, online environments are navigated through using associations and directions indicated by hyperlinks and the subsequent narrative that is generated is specific to the user; the audience for this new media form becomes the user rather than the viewer or reader of texts. Interactive multimedia texts require the user to actively intervene as well as viewing or reading in order to produce meaning; this intervention submerges other modes of engagement such as 'playing', 'experimenting' and 'exploring' under the idea of interaction. This engagement with media devices, some critics argue, is expanding children's imaginations: according to William D. Winn, Director of the Learning Centre at the University of Washington's Human Interface Technology Laboratory, children who are highly engaged with technological forms of entertainment: 'think differently to the rest of us…they develop hypertext minds. They leap around. It's as though their cognitive strategies were parallel, not sequential,' (Gross, 1996). Child psychologists critical of these claims (Oppenheimer, 2003) argue that as a computer is a

linear mechanism, these processes tend to exercise only the left hemisphere of the brain, where primarily sequential thinking occurs, making the right brain, the part that works on different kinds of information simultaneously, redundant. However, the graphical interface presented online does invite non-linear content consumption through hypertext navigation; text and other content is received and read by linking one source, page, image and so forth to another. Hypertext ultimately readdresses what it is that we do when we read; it is constructed partly by writers who create the links, and partly by the readers who decide which threads to follow. By offering multiple paths through a body of information, it allows users to make their own connections and produce their own meanings. It is essentially a network of links between words, ideas and sources: 'one that has neither a centre nor an end through which users navigate by experiencing digressions and generating narratives through the resources encountered' (Snyder, 2002 p.119).

Although hypermedia-based learning environments may provide learners with flexible learning programmes that allow opportunities for discovery and exploration according to individual needs, this type of interpretation and knowledge construction is complex and requires a certain level of sophistication and skill on the part of the user in order to bring together the 'collage' (Slevin, 2003 p.65) of information and other symbolic content from a wide variety of dispersed resources produced from a wide variety of contexts. Established methodologies for thinking about the way in which meaning is produced between readers and a text assumes not necessarily a stability of text but a fluid interpretation, and in non-linear environments the requirement for a fluid interpretation calls for learners to take a more active role in organising the information in the instruction. McManus's (2000) empirical study investigating the degree to which learners are able to construct learning in non-linear web-based environments found that students with high levels of self-regulation

(those that actively control their interactions between themselves, their learning and their environment) benefit from the ability to organise and structure information presented in non-linear environments. Low self-regulating learners, who are motivationally and meta-cognitively passive in their reception of knowledge, functioned better in the more linear approaches, or where non-linear programmes include advance organisers to help learners activate prior knowledge and the information to be presented.

Web-based teaching and learning strategies that also exploit possibilities presented by the medium's ability to integrate audio and visual elements, in the shape of video streaming, podcasts and games, have generated a new consciousness about the use of visual signs and symbols that are redefining literacy and are in turn giving rise to a culture of images. These audio and visual elements that integrate modes of communication through the combination of images, sounds, text and data in a single medium, may help develop better mental skills more effectively than old media (Van Dijk, 2006).

However, as hypertext and non-linear patterns of discovery expose students to a wide variety of resources and perspectives, there is the potential for cognitive overload (Rouet and Levonen, 1996). Access to multiple cross-references on related topics across several documents or screens demands cognitive flexibility to enable integration and consolidation of knowledge (Kasper, 2000) gleaned from a variety of sources. Chen (2002) identifies that some cognitive styles such as those posed by Field Dependent Learners (individuals who tend to seek out external referents for processing and structuring information and are better at learning content with human contact) may not be able to follow hyper-mediated learning environments independently. While Chen's research advocates that design and implementation of such programmes build upon principles of usability established in

human-computer interaction design (Holzschlag, 2002; Neilson, 2000; Preece, 2000), the product is measured by its efficiency; ease of use is paramount; time to learn features is short; components within the product are understandable and consistent. Chen also recommends that the need for social orientation in such learners should be framed by instructor guidance.

Yet the responsibility for providing learning content using human contact does not only rest with instructors, there is also the potential for knowledge to be constructed through negotiation with other learners by applications and devices that allow for interaction and collaboration.

Cultural practices and social networks

Growing up in the digital era, today's adolescents are encountering online environments and using information and communication technologies in social contents and rituals in ways that are making these kinds of interactions meaningful to them. The subsequent cultural mores that are emerging from these interactions may offer instructors new and more meaningful opportunities and possibilities for advancing a critical pedagogy in educational practices. Emerging online technologies that have become the focus of media discussions today, are those generating new forms of social networking and information construction through collaboration in online communities. Although many of the debates surrounding these new online communities are still focused on issues surrounding the trust and integrity of such online social relationships, the trend in such networked environments may offer significant potential for the development of new approaches to pedagogies and point to broader implications for web-based learning; moving the focus from delivering

content to individuals, to the creation of communities where individuals can come together to learn, collaborate and build knowledge.

What we are currently witnessing online is an emergence of the tools, resources and practices that are seen by many as returning the web to its early potential to facilitate collaboration and social interaction. The possibilities for reciprocal bonding and collaboration, which are being expanded by these new tools, are creating behaviours and activities that were previously only associated with sharing of a common locale (Slevin, 2003 p.90). The main feature of these networked environments is the use of social software; tools for people to share, connect and inform; and allow individuals and groups an opportunity for expression and dissemination of their ideas.

At the forefront of this collective and cooperative online communication, are today's teens. Today's generation of young people living in the information society not only encounter and use information and communication technologies in the form of wikis, podcasts and blogs, but also have their activities shaped by these technologies through social networking sites such as Friendster, MySpace, Bebo and Facebook.

To their users, social networking involves communicating with others through engagement with various media forms. For example each Bebo user – or Beboer – is given their own mini-homepage that they use to represent themselves. Some list their favourite bands or movies or display their football allegiances; others set polls and arrange topical debates or simply wallow in the latest school gossip. Although essentially what Beboers are doing is nothing new: sending email, exchanging voice messages, sharing photos and, naturally for teenagers, trading insults, what is compelling is that for a generation of teenagers this

social networking is increasingly becoming as important as owning a mobile phone (Dodson, 2006).

These new forms of online collaborative communities, their associated activities and user behaviours have prompted critics and media commentators to announce the arrival of Web 2.0. The label Web 2.0 was first coined by the technologist Tim O'Reilly in 2005 to describe a new generation of sites and services that strategically position the web as a platform whose core competencies include service, participation, user as contributor and rich user experiences. Activities and new mechanisms of human association facilitated by the Web 2.0 era include: the growth of weblogs; wikis; social bookmarking; and sharing sites that encourage and promote reflective and open-ended interaction. These social networking sites are contributing to the fastest growing sector on the Internet, and to understand how these sites have given rise to the phenomenon of social networking, it is useful to understand some of the technologies that are transforming the way people are communicating.

For example, social networking sites often include or take the form of weblogs. A blog – short for 'weblog' – is a personal website where the author can post a chronological, up-to-date journal of thoughts, observations and links to other sites they find interesting. Their social potential lies within their interface functionality that allows readers to comment on postings and add content with links to other blogs. What differentiates a blog from a homepage in a journal format is a technology called RRS (Really Simple Syndication) that allows users to subscribe to the page and be notified every time that page changes. Added to this is the significance of 'permalinks' – technology that allows users to link and direct

others to a specific posting on a site, creates an ebb and flow of discourse that becomes a synchronous conversation built upon content construction and collaboration.

Other social networking sites include 'wiki technology'. Wikis are websites whose programming allows their readers to contribute, edit and amend any content, the most popular and familiar of which is the online encyclopedia, Wikipedia. The principle behind the application is simply that the knowledge of the group is greater than the knowledge of the individual. This changes the dynamics of content creation: the construction of digitised texts through collaboration and negotiation creates fluid meaning, representing a cultural transition from the dominance of a single-authored text with its hierarchical ordered system (Corso and Williamson, 1999). Research (Grant, 2006) into using wikis as a tool for collaboratively creating knowledge concluded that the software has the potential to support knowledge-building networks and is a useful tool in the shared repertoire of communities engaged in collaborative learning.

Other technologies include 'bookmarking'. This is the method of saving the URLs of frequently visited or favourite sites so addresses do not have to be entered each time before accessing the site. Social bookmarking software has expanded this practice by creating databases of these stored links to be accessible via the Internet, allowing the creator of the bookmarks to share the resource with other users. Sites that facilitate these bookmarking databases, such as del.icio.us, enable users to search through other people's bookmarks using *tags* (key words that provide a definition of the content found at that link). Tagging also allows for the kind of multiple overlapping associations that the brain uses itself rather than rigid categories: therefore, searching for relevant sites in communities tagged by those who share particular interests or purposes will produce more

appropriate search results and do much to reduce the randomness that hypertext navigation can sometimes deliver.

Social networks and collaborative learning

As the human mind is 'embodied, situated and social' (New London Group, 1996), collaborative online spaces which can facilitate learning, both within and beyond the classroom, offer powerful environments that may facilitate the creation, sharing and critiquing of students' own knowledge. In order to understand how these technologies might enhance learning environments, it is useful to draw from De Kerckhove's 'connectedness' principle. While analysing the major psychological change from polarised individuals to connected social environments brought about by online collaboration, De Kerckhove (1998) argues that a realm of 'connectedness' is brought about by the increase in personal and social interactions, self-organisation and increasing autonomy, by providing tools for emergent problem-solving skills, and methods of collaboration mediated by technologies akin to these. When this diffuse, shared self-consciousness is brought together at an effective level of semi-conscious organisation:

> What you know, what you don't know, what you don't know that you know, and what you don't know that you don't know, all seem capable of invoking a Lorenzian butterfly effect of the mind (De Kerckhove, 1998 p.144).

This potential for concentrating and multiplying human mental energy O'Reilly calls 'Harnessing Collective Intelligence' and it may be said to generate socially collaborated online environments where users are involved with building the sites and systems that they themselves use:

> As users add new content and new sites, [the information] is bound to the structure of the web by other users discovering the content and linking to it. Much as synapses form in the brain, with associations becoming stronger through repetition or

> intensity, the web of connections grows organically as an output of the collective activity of all web users (O'Reilly, 2005).

A key principle behind Web 2.0 is that the service or site automatically gets better the more people use it. Those sites identified as promoting this principle highlight this new functionality and evolution of content through user contribution; online users do not just buy books from Amazon, they rate them and write reviews, compile lists and resell their own books; they do not just upload photos to Flickr, they tag and re-use other people's pictures in all sorts of creative ways; Wikipedia's readers are also its writers, and so forth. Recognising that users add value and designing around an architecture of participation, O'Reilly predicts that these sites that promote and facilitate technologies which demonstrate networked effects will be those that dominate the market in the Web 2.0 era.

The ideology which suggests that collective knowledge can transform the way we conceptualise learning is not new. In education in the early twentieth century, there was still a strong focus on the instructor's ability to convey knowledge and the corresponding rote learning though the memorisation and recall of facts, poems and histories. Then practices were transformed through methodologies such as learning by doing (Dewey, 1959) and 'active learning' described by Bonwell and Eison (1991) as any activity that: 'involves students in doing things and thinking about things they are doing' (p.2). Constructivist (Huitt, 1997) and collaborative (Slavin, 1990) based learning models are both characterised by active approaches which imply that effective learning is attained through knowledge construction and collaboration with other learners. These cognitive models of learning that actively engage learners with the assimilation and processing of information promote better comprehension and recall of learning objectives (Rubin and Hebert, 1998). Accessing information and communication via web-based applications and

constructing learning through interaction with others give learners the opportunity to retrieve information and transform it into knowledge and action.

Jupp *et al.* (2006) highlight the importance of learning and inquiry skills in today's business world as workers are increasingly called upon to contribute collaboratively; the knowledge economy represents a more fluid and uncertain organisational environment that will require generic skills and qualities in areas such as information management, reflection and evaluation, learning how to learn and progressive problem solving. As knowing how to learn and how to participate in creating new knowledge are increasingly becoming essential life skills, knowledge creation in a knowledge economy will mean that the use of online environments that facilitate such content creation will have to be recognised by education as having significant potential.

Social networking and regulation

Social networking sites have attracted much negative media attention in past months, with claims that these sites pose a threat to the security and privacy of the community members. Rachel O'Connell, government adviser on Internet safety, warns that the younger community members are particularly vulnerable; their names, ages, school details and photographs are widely available through the social networking environment and are an easy prey for bullies and paedophiles. Yet while there is a need for educational establishments, government legislation and Internet Service Providers collectively to protect members of these communities, there is also the potential for these networked societies to empower their members to become self-regulating and self-policing against errant members and encourage strong norms of reciprocity and social trust (Johnson, 2005; Berger, 2004; Preece, 2000). The new generation will grow up with the technology

as educated and responsible users; as they grow older, those unsavoury elements that seem to flourish online: 'will become just as marginalised online as they are in the offline world', (Berger, 2004). The Internet reflects society; our successes and our failings as moral citizens are mirrored in the virtual community and although it would be dangerous to submit to utopian ideals of a community where governance has no place, members of society have always played a part in ostracising individuals that do not conform to their communities' values. The new generation of users may do much to eradicate errant behaviour through their developing sense of online ethics. These utopian theories concerning the emergence of online communities were first developed by the critic Howard Rheingold (1994), who anticipating this latest social revolution, argued that the virtual gathering of groups who shared particular interests or purposes would themselves develop strategies for coping with risk and uncertainty by fostering new forms of solidarity and identity.

Conclusion

Today's generation of teens appear comfortable and competent with the new non-linear and interactive forms of media but there is a disconnection between their engagement with the technology socially and practices inside the classroom. While established pedagogical strategies focus on issues such as competency and digital literacy, social and cultural practices are revealing online behaviours that allude to the potential of collaborative spaces and learning through knowledge sharing and negotiation.

At the core of this discourse is the hypothesis that technology may do much to assist the transition from didactic, teacher-centred models of instruction to leaner-centred forms of education. Emerging technologies and their associated online behaviours represent a

cultural shift towards social networking and collaboration in the generation of content for the information age and these network-based technologies may offer opportunities for web-based methodologies and pedagogies that complement and enable cognitive approaches that embrace constructivism and collaborativism. Vygotsky (1978) believed that intellectual development could not be understood without reference to the social and cultural context; higher mental processes have their origins in social processes, and mental processes can only be understood if we understand the tools and signs that mediate them. Social networking and its associated collaborative infrastructure reveal a consciousness through negotiation that may empower individuals to take charge of their own learning and re-enchant education.

While the new technologies offer much, there is still much discourse to be addressed: how collaborative technology supports the author's authority and intellectual property; ethical dimensions and the teaching of tolerance; and the potential for cognitive overload. Not least are concerns that the teachers and instructors themselves are caught between the desire to enhance the use of technology in the classroom, on the one hand, and the concomitant need to transform the pedagogical areas allocated to teaching and learning on the other.

In response to these challenges created by new media literacies, teachers need to recognise that solutions will be found in cultural as well as pedagogical investigations. Maximising the potential of technology enhanced learning requires a rethinking of curriculum and pedagogy that moves beyond the simulation of traditional classroom teaching, to adopting wider cultural practices that include the potential of learning in socially-networked environments. In order to unlock the top-down imposition of technology,

teachers and instructors need to strengthen their curricular and teaching practices by addressing instruction in online spaces that facilitate collaborative and negotiated learning. Teaching paradigms that include collaborative and constructivist learning methodologies integrated with e-mail, chat, discussion boards and real-time communication tools, and the sharing of these best practices may improve initiatives that endeavour to evolve contemporary pedagogies relevant to the digital world today.

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