

Role of Social Software Tools in Education: A Literature Review

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Abstract: Purpose – The purpose of this paper is to provide a review of literature on the role of Web 2.0 or social software tools in education. The review has been written from an educator's perspective: the questions and challenges that an educator encounters when considering the use of social software tools for learning and teaching.

Design/methodology/approach – This paper is a critical and comprehensive review of a range of literature sources (until January 2009) addressing the various issues related to the educator's perspective of pedagogical effectiveness of social software tools.

Findings – The literature review is presented as answers to questions which educators may have about social software initiatives. The paper provides insights about the: educational goals of using social software tools; benefits to the students, educators and institutions; challenges that may influence a social software initiative; and issues that need to be considered in a social software initiative.

Research limitations/implications – It is hoped that the analysis, as captured in this paper, will highlight the different pedagogical roles of social software: communication, nurturing creativity and innovation, and collaborative learning. The paper will be of interest to researchers in the areas of social software and technology-enabled learning environments, in general. Further, this paper demonstrates how the analysis of academic literature sources has been combined with commentaries and opinions on the Web to develop this literature review.

Practical implications – The analysis of the literature review in this paper is presented as answers to questions which educators may have about social software initiatives. The findings in this paper will influence the learning and teaching strategies in higher and further education – specifically institutions that are considering the use of social software.

Originality/value – The paper presents theoretical underpinnings related to pedagogical role of social software tools. In this paper, we have also analysed the practical issues and challenges for educators and policy makers, who are considering the adoption of social software tools in learning and teaching. The paper has consolidated a variety of literature sources from academic publications, recent reports on social software (2007-2009), and commentaries and views on social software within the social media itself (blogs, wikis, YouTube).

Keywords: Web 2.0, social software, social networking, peer-learning, collaborative learning, learning theories

Article Type: Literature review

Introduction

The term Web 2.0 or 'social software' covers a range of software tools which allow users to interact and share data with other users, primarily via the web. Blogs, wikis, social networking websites, such as Facebook and Flickr, and social bookmarking sites, such as Delicious, and 3D environments such as Second Life are examples of some of the tools that are being used to share and collaborate in educational, social, and business contexts. The key aspect of a social software tool is that it involves wider participation in the creation of information which is shared.

In this paper, we present a literature review from the educator's perspective on the subject of employing Web 2.0 or social software methods and tools in education. We have used the term 'educator' to imply any colleague who has adopted social software tool(s) in an educational context and led the initiative. This educator could be a tutor, a lecturer, or a module leader, or a learning and teaching manager in different contexts.

Necessarily, what has been published in print and on the Web is comparatively current, since the term Web 2.0 itself was coined in the title of O'Reilly's Media conference only in 2004. We do not attempt to cover what has already been extremely well documented by, for example, Mason and Rennie (2008). Instead this review analyses the papers that have been published in academic journals and, perhaps inevitably given the subject, the material that has been written and presented in blogs, wikis and online videos on the World Wide Web, the natural place for discussing social software.

The review is written from the viewpoint of an educator and aims to answer the following questions:

1. What are the characteristics of Web 2.0 or social software methods and tools that make them 'social'?
2. What are the theoretical underpinnings of using Web 2.0 or social software methods and tools in education? How does the 'social' nature of the tools align with standard learning theories (eg constructivism, behaviourism etc.)?
3. What are the benefits to students and educators of using social software methods and tools in learning and teaching, respectively?
4. What are the issues/problems/disadvantages of using social software methods and tools? For example, are some students hesitant to blog because of fear of loss of privacy or what others might think of them?
5. Which social software methods and tools are most appropriate for which kinds of activities?
6. Is there a link between the student skills and social software methods and tools? For example, skills of communication, writing, team-working, group-working, collaboration, and so on.

In an attempt to address these questions in a systematic manner, the paper itself is structured into five sections: an assessment of the use of social software methods and tools in education against an analytical framework of Kipling's six "serving men"; an assessment of the reported experience of uses

of educational social software in higher education; a consideration of the risks and opportunities presented by adopting social software into educational practice; an examination of quality issues from three perspectives 'achieving quality', 'controlling quality' and 'preserving quality', and in the final section, we will consolidate the answers to the original six questions (listed earlier) based on the review and analysis in the preceding five sections of the paper.

Analytical Framework

According to Kipling (1865-1936):

*I keep six honest serving-men
(They taught me all I knew);
Their names are What and Why and When
And How and Where and Who.*

These six questions can be used to analyse the arguments, both for and against, relating to the adoption of social software in education. They have previously been used as one dimension for developing the Enterprise Architecture of Information Systems according to the Zachman framework (Sowa and Zachman, 1992).

Why – the motivating factors for using social software in education

According to Leslie and Landon (2008) students already use social software so if “you can’t beat them, help them” (quoted in Mason and Rennie (2008)). Trinder, et al (2008) discuss on the many ways learners (termed ‘digital natives’) are using technology to meet their needs e.g. using mobile phones to capture photographs for projects and then sharing them with fellow students. Students were found to be using popular communication tools such as Short Messaging Service (SMS), MSN Messenger, Skype and social networking sites such as MySpace, Bebo or Facebook. Meanwhile, many of the teaching staff (termed ‘digital immigrants’) may not be so familiar with the range of technologies available and Trinder, et al (2008) emphasise the need for developing the e-skills of teaching staff.

The rationale underpinning social networking is the virtuous circle of

- generating something of personal use,
- which benefits the larger network as a whole,
- which in turn creates additional value for the original user.

Leslie and Landon (2008) go on to argue that this approach aligns well with “learner-centricity”. Because people can communicate with other practitioners in the field, they can move beyond the more limited circle of their immediate contacts. Leslie and Landon observe that people desire to form groups in order to support their learning and that social networking helps to create both an environment and an infrastructure for “informal and borderless learning”. They quote Cross’s talk on YouTube (Cross, 2006) that although 80% of learning is informal, 80% of the educational budget is expended on formalized ways of teaching and learning, in order to argue for capitalizing on informal learning as representing a better balance of investment in education.

Anderson (2005) comments on the motivation for distance learners in particular to move from the lonely isolation of self-paced learning into a

learning community of inquiry providing mutual support. He describes Educational Social Software (ESS) as a set of networked tools that support and encourage individuals to learn together while retaining individual control over their time, space, presence, activity, identity and relationship. Butterfield (2003) in his personal blog similarly characterizes social software as tools that support communication using the five 'devices' of identity, presence, relationships, conversations and groups.

Distance learning is considered by Kamel Boulos and Wheeler (2007) who comment on how students can feel socially isolated if they are geographically distant from teachers or fellow students and/or studying during unsociable hours and that this isolation can pose a significant barrier for some learners. They state that social software encourages a more human approach to interactivity on the Web, supports group interaction better and fosters a greater sense of community. Social software encourages more active learning and enables feedback from tutors to learners, this tutor-student interaction further increasing student motivation.

Mejias (2006) describes the use of social networks to facilitate *distributed research*, having the advantages of both engaging students in 'learning to learn' and developing the practical research skills needed to make best use of online information networks. He makes the further point that 'the power of many' exposes an individual to far more research, resources and ideas than they could possibly generate on their own.

The underlying pedagogy is considered by Dalsgaard (2006) who argues that social software tools can support a social constructivist approach to e-learning by providing students with personal tools and engaging them in social networks, thus allowing learners to direct their own problem-solving process. Social constructivism emphasizes the importance of the learner being actively involved in the learning process, unlike other educational viewpoints where the responsibility rests with the teacher to deliver knowledge while the learner passively receives it.

Social software seems to match well with modern thinking about educational practice. In particular, it promises learners of new opportunities to be independent in their study and research. Social software tools encourage a wider range of expressive capability. They facilitate more collaborative ways of working and they furnish a setting for learner achievements to attract an authentic audience. To encourage these possibilities, Social software tools have evolved that create distinctive forms of support for learning and for independent research. Developing the skills of problem solving, research and collaborative working equips students well for the world of work.

The motivation for using social software tools and technologies is not restricted to higher education. Becta, the UK government's agency promoting the use of ICT (information and communications technology) published a report on the use of social software technologies for learning at Key Stages 3 and 4 (for secondary school students aged 11-16) in which "inter-subjectivity" was identified as one of the main human drivers for social software growth (Becta 2008). Web 2.0 or social software is seen to accord with modern views on the deeply social nature of human mentality, no matter what the age of students, as demonstrated in the 'Flat Classroom Project' (2006) and its

sister 'Horizon Project' (2008). The Flat Classroom Project was a collaborative venture between a grade 11 IT class at International School Dhaka in Bangladesh, and a 10th grade Computer Science class at Westwood Schools in Camilla, Georgia, USA, involving the successful use of photo tags, blogs, wikis and podcasting. By structuring the exercise with assessments and tight deadlines, the students were found to be more motivated; consequently learning was increased.

What – exactly is Web 2.0 or social software?

MacDonald (2007) in his wiki entry at The University of Edinburgh entitled 'The Web 2.0 Advantage' identifies the distinguishing feature of Web 2.0 as being a bidirectional medium where content (text, image, audio or video) is contributed by people who interact with the website as well as people and organizations who manage the site; he terms Web 2.0 the "read/write web" and lists and describes the main tools available, including blogs, wikis, podcasts and social tags.

A blog is commentary or news on a particular subject or from a particular perspective in the role of an online diary. A typical blog combines text, images, and links to other blogs. The origins of blogging might in the Usenet; the term *blog* was coined in 1999 as a contraction of *weblog* a term itself first used in 1997. Franklin and van Harmelen (2007) include the following examples of the educational uses of blogs:

- A group of bloggers using their individual blogs to build up a body of interrelated knowledge via posts and comments. This might be a group of learners in a class, encouraged and facilitated by a teacher, or a group of relatively dedicated life-long learners.
- Educators using a blog for course announcements, news and feedback to students.

Certain social software tools allow more collaborative work than others. Dalsgaard (2006) considers that a blog primarily supports individual work on the web but when it is related to other blogs it becomes social; thus networked communities are formed. In his assessment, wikis are more collaborative and so are regarded as true social networking tools; the most famous being www.wikipedia.org. He argues that learners should be provided with a toolbox, allowing them opportunities to organize and participate in various collaborative networks for different contexts. He cautions against interpreting this to mean just letting students loose on the web, instead suggesting that different networks can be organised by an educational institution to facilitate collaboration between learners and tutors associated with the same course. However it is important that each student ultimately takes charge of their own learning as learning can be facilitated but not pre-determined.

Who – in education benefits from social software?

Becta (2008) describes how UK universities have been vigorous in adopting both blogs and wikis e.g. Newport University's 'Mylearning Essentials' (Newport 2008) provides an on-line learning environment for students, offering University news, course materials, e-mail, file storage, library resources, information about the university facilities and services and study skills materials plus facilities to blog, ask questions and share photographs.

Warwick University has been offering blog space since 2004 (Warwick blog 2008), which is available to all students, teachers and staff. These journals are openly readable. John Dale, Warwick's IT Manager, explained in a Guardian article (2006) "the idea behind it was publishing for all with the hope that once students start blogging it could build a community, foster collaboration and perhaps help with the personal development planning that students and tutors have to work on". These opportunities have been taken up by students for social use, with some using it to vent personal feelings, whilst others use it for more academic writing such as book reviews. However many students still choose not to blog and Dale concludes that it is sensible to keep an open mind about blogs. "There are lots of other ways of supporting reflection and personal development, or community and collaboration".

Davis (2007) at the University of Edinburgh considers it "natural that blogs should be attractive for education, not least since learning journals or diaries are considered valuable both for reflection and assessment, particularly as part of coursework and portfolio". However he argues that "it is far more than a tool for regular or irregular writing tasks, and for that reason teachers need to remember that blogging is *sui generis* [unique in its characteristics] – not online diary, nor e-portfolio, nor online newspaper, nor e-exercise book, though it can be used in any of those ways – and assert the manner in which they expect the blog to be used". The Becta report (2008) substantiates this view claiming that where blogging is linked to assessment it carries an external motivation.

Davis (2007) also argues that "In both real and virtual classrooms, wikis have a number of potentially exciting applications for hypertext/web essays and writing projects, particularly those encouraging collaboration among students". He acknowledges the old problem of 'one student doing all the work on a collaborative project'. However as he points out this is a difficulty whatever the medium and at least the wiki gives teachers the ability to watch changes to the wiki (through the wiki history feature) to get a clear understanding of student contributions"

Becta (2008) sees great potential in the use of podcasts in language learning and in successfully stimulating authentic experiences with foreign culture and dialogue.

However, since there is no clear published evidence yet, it is difficult to gauge how widely online forums, wikis, blogs, podcasts, and so on, are being used in virtual learning environments (VLEs). There is also ongoing debate as to whether initiatives using social software should be concealed behind the structures of an institutional VLE, or whether they should be openly published on the internet for the benefit of students everywhere. The latter exposes students to greater opportunities for research and collaboration but it leads Becta (2008) to comment 'the Web 2.0 tension to be managed is one between welcoming the diversity of Web 2.0 publication, while recognising the need to help students navigate it with confidence and a critical attitude'.

Where is social software used? Its relevance to distance learning

Anderson (2005) reports on the use of Elgg (Sharma 2008) at Athabasca University, Canada's Open University. He discusses the problems faced

where distance education, allowing continuous enrolment and individual pacing, can be a lonely way to learn. The paper discusses how social network tools such as Elgg (a framework for social networking considered especially useful for education given its many e-learning features) will allow students to work cooperatively in learning communities. The paper also notes that previous models where groups of students, interacted, often asynchronously, through text conferencing with a teacher and other students were often not cost effective.

Anderson defines social presence as ‘the ability of learners to project themselves socially and affectively into a community of inquiry’ and finds that social presence is correlated with student satisfaction and higher scores on learning outcomes. Use of the Internet allows the learner several freedoms; freedom of space and time as with other distance education programmes, freedom to pace one’s learning, choice of learning medium, control over the subject and instructional style plus freedom to engage in a learning relationship with other learners. It is this last freedom which is enhanced by social tools facilitating both co-operative and collaborative learning activities.

How is social software used in education – methods and tools

Mason and Rennie (2008) present the following table showing the potential use of various media:

Media	Basic	Intermediate	Advanced
Text	One-way Print Interactive e-mail	One-way webpages Interactive Computer conferencing	One-way blogs Interactive Wikis, blogs
Audio	One-way Audio clips Interactive Telephone support	One-way Podcasts Interactive Telephone conferencing	One-way Ipod downloads Interactive audiographics
Images	One-way photographs Interactive Image banks, e.g. Creative Commons	One-way CD/DVD Interactive Share and edit e.g. Flickr	One-way animations Interactive Simulations/games

video	One-way Video clips	One-way Animations	One-way Vods
	Interactive Webcasts/TV	Interactive Skype	Interactive Videoconferencing

When – currency of knowledge

Franklin and van Harmelen (2007) point out that with dynamic content it can become difficult to refer to artefacts as they are subject to change. For example, a presentation on YouTube may be relocated, added to, edited or deleted, but as there is no version control, it is difficult to validate data from such a source. Similarly, whilst there is a general academic convention of adding “retrieved on <date>” to references to material on the web, the material referred to may change or may disappear from the web completely. This has led to the suggestion that it may be necessary to keep a copy of the page at the time it is referenced as proof that the reference is valid.

Walton et al. (2008) discuss the paradox 'how can I inquire about something which I don't know anything about?' Often the initial, tentative exploration about an unfamiliar subject will be deeper and faster when familiar social networks are engaged. The paper goes on to raise the issue that whilst much of the focus in social networks is on dialogue and communication in order to facilitate effective learning, it is essential that learners have access to good content and are supported in identifying good content and finding consistent and timely ways of accessing it.

Experiences of using educational social software

This section briefly analyses the experiences of using educational social software that have been discussed in the literature.

Franklin and van Harmelen (2007) report on the uses of Web 2.0 in higher education examining the practices at five universities implementing Web 2.0: Warwick, Leeds, Brighton and Edinburgh, and the University of Klagenfurt in Austria. They consider ways in which Web 2.0 impacts institutional policy and strategy, and analyse issues related to Web 2.0 in learning, teaching and assessment. The report could be used to help formulate policy and guidelines for Web 2.0 use in universities; as it identifies some of the risks associated with Web 2.0 implementation, including IPR (Intellectual Property Rights) and security issues. They conclude by recommending that institutions impose only minimal and necessary regulations in order to avoid unduly constraining experimentation with Web 2.0 technologies and related teaching methods. The University of Edinburgh (2007) has in fact published: ‘Guidelines for Using External Web 2.0 Services’

Alexander (2006) considers the role that social bookmarking can play a role in higher education. He quotes examples of collaborative research and notes the Penntags project at the University of Pennsylvania (2008) and Harvard’s H2O (Berkman Center for Internet & Society at Harvard Law School, 2008).

Alexander (2006)) describes the usefulness of social tags as providing a location to store links that might be lost, finding people with related interests, thus learning from others and forming new collaborations. User-created tagging offers new perspectives and this ability to create multi-authored bookmark pages can be useful for team projects.

Alexander (2006) also considers how social writing platforms such as wikis, fit into the world of higher education and sees them as useful tools for a variety of needs, from student group learning to faculty department work to staff collaborations. He envisages writing exercises based on these tools, building on the established body of collaborative composition practice. The social nature of these tools means that collaboration between classes, departments, campuses, or regions is easily supported. He suggests an example in which a political science class could explore different views of a news story through traditional media using Google News, then from the world of blogs via 'Memeorandum' (Memeorandum, 2008).

Kate Mosse (2006) author of the best selling novel 'Labyrinth' used the Internet for a six-year on-line experiment to see if it were possible to share the process of writing a historical novel and to encourage new directions in on-line visitors' reading and creative writing.

Franklin and van Harmelen (2007) summarise the findings of university involvement with Web 2.0 technologies as:

- The University of Warwick found that there have been only a small number of offensive or inappropriate postings to the systems, and most of these are made more positive by the comments left by other users. This has meant that moderating has been less burdensome than expected.
- The University of Leeds found that offering the services via staff encourages take up beyond learning and teaching, to support research and management as well. They also found that that providing services via staff means that students see the services as part of their learning and teaching and are therefore less likely to abuse them.
- The University of Brighton found that take up can be slow, but having an institutional system can be extremely helpful in building a community. Integrating the services into the environment raises their visibility and makes them easier to use.
- The University of Edinburgh (2007) learnt that it is less important to choose the best possible system than to implement something that meets most of people's needs most of the time. There is no need to provide a university instant messaging capability as people are already using commercial alternatives such as MSN, Google Talk and Skype.

Risks and opportunities

Swain (2008) discusses the risks and opportunities to education presented by social networking in 'Web 2.0: boon or bane for universities?' For example, she points out that 'copyright and intellectual property issues involved in Web 2.0 remain vague, and it is not yet entirely clear how far students want

universities invading their online space'. She reports a survey carried out for JISC (Joint Information Systems Committee, <http://www.jisc.ac.uk>) in 2007 that showed that 65% of sixth formers hoping to go to university used social networking sites, but most failed to see how they could be used for teaching and resented the idea that academics could interfere in a forum they saw as primarily social. Furthermore, there are issues over who should be responsible if students or lecturers say something online that results in litigation against the university. The article also highlights the need for an institutional approach. Where it is individual academics that are driving innovative use of the technology in learning, this can present problems when those academics move on, or when they want support from their institution's centralized IT systems.

Franklin and van Harmelen (2007) highlight several problems arising from the introduction of Web 2.0 systems into higher education e.g. choice of types of systems for institutional use; external or institutional hosting; integration with institutional systems; accessibility; visibility and privacy; data ownership, IPR and copyright for material created and modified by university members and external contributors; control over content; longevity of data; preservation; information literacy; staff and student training; and appropriate teaching and assessment methods. Their report raises the questions:

- Host systems internally, or rely on externally (commercially) hosted systems?
- What types of tools to implement - wikis, blogs, e-portfolios, social bookmarking etc.?
- Whether to put the tools within the VLE or make them more generally available?
- How visible should the tools and their content be to the outside world? More particularly, how to allow/enable people from outside the university to contribute?
- How to monitor the systems for inappropriate and offensive use, and deal with such use?
- How to encourage uptake and use?
- Whether to automatically enrol all members of the University or do it by request?
- Whether to make activities student or staff led?
- How the use of Web 2.0 tools will affect learning and teaching?

These questions all have to take into account that the value of Web 2.0 is highly dependent on the size of the network.

There are those who advocate a balanced or blended approach to the development of education as it affects both course design and course delivery (Sharpe et al, 2006). In one way, this is analogous to synthesizing competing approaches to development of software, where Boehm (2002) puts forward the concept of a planning spectrum (Figure 1) that ranges from "hacking" to tightly specified contracts; the respective analogies in the sphere of education might range from uncontrolled searching on the Web for "knowledge" of doubtful provenance to programmed learning.

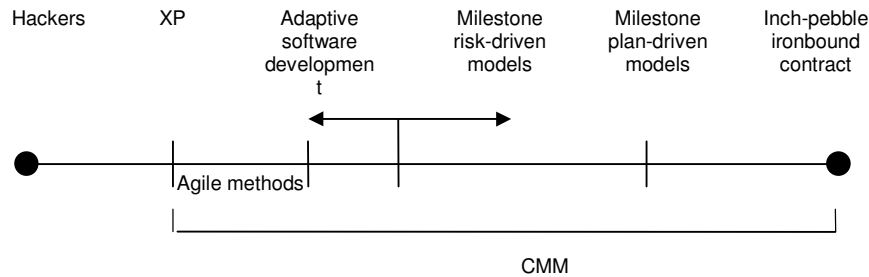


Figure 1 *The planning spectrum as in Boehm (2002)*

On the other side of the risk balance sheet, opportunities for advances in the learning process are to be found. For example, the main benefit of a blog (personal journal) is that it enables the authors to think more critically about what they are doing and gain useful feedback. A balance must be struck between the security/privacy risks and the opportunities to improve the quality of the learning experience gained by wider exposure (Mason and Rennie, 2008; Anderson, 2007).

Quality

The overriding objective of all forms of product development or service delivery is to provide a quality product or quality service, where quality is taken to be ‘the degree to which a set of inherent characteristics fulfils requirements’ (ISO 9000:2000). This section of the paper considers how the quality of educational products and services might be improved by engaging the methods and tools of social networking against an analysis model that uses a triad of quality achievement, quality control and quality preservation in the manner of Ould (1999).

Quality achievement

Product and service quality can be achieved by design, rarely by accident; in the context of education, this might be viewed as placing significant emphasis and effort on course design (Mason and Rennie, 2008). A quality approach to course delivery might be to keep open the possibility of the creative use of social software, provided that the course design itself was sufficiently imaginative. One way such a balanced approach might be achieved is with a stable, well-grounded curriculum architecture combined with greater flexibility in the design of individual courses. Indeed, Mason and Rennie (2008) claim that Larry Wall’s “onion” (the growth of outer layers of a “living” system) is an appropriate course design method, concluding that the art of course design is to “capture the essence of the informal uses of Web 2.0 tools while introducing structure and direction into students’ engagement with them”.

However, if the quality of an individual course is to be achieved by design, the next question that emerges is how to achieve quality in the design of courses. Recent research indicates that Learning Design (Mason and Rennie, 2008) is a method which encourages course designers to concentrate on designing

activities that facilitate learning as a result of interacting with sources, people and ideas.

Mainstream learning theories that underpin the development of educational material include behaviourism, cognitivism and constructivism (Mason and Rennie, 2008). Behaviourism, which regards observable behaviour as more important than any attempt to understand internal activities (the mind is treated as a black box) was challenged in educational psychology theory by cognitivism, which emphasizes the importance to the educator of attempting to understand the mental process of learning, so that the process can be improved. Both these schools of thought consider the learning process to involve a largely passive internalization of knowledge about an objective external reality as a result of experiencing that reality. Constructivism on the other hand emphasizes the active involvement of the student in the search for knowledge; as a consequence of this participation many authors related the use of Web 2.0 methods and tools as being in line with constructivist theory. Other educational theorists, however, comment that Web 1.0 is aligned with constructivism allowing the individual to search actively for information and knowledge. Siemens (2004) puts forward a theory termed connectivism, which addresses a number of issues such as organizational learning and technology support for learning and knowledge.

Quality control

A major, recurring, concern expressed by sceptics of educational social software is the inability to trust the quality of voluntary contributions without authentication. Whilst they are undoubtedly subject to a form of peer review, this is of a rather different order to that of submitting a paper to a research journal. Kamel Boulos and Wheeler (2007) in discussing the use of Web 2.0 in health care education caution that a significant proportion of health-related blogs are created by lay users, with the risk of misinformation but balance this concern by conceding that 'collaborative intelligence' helps ensure acceptable quality.

Whilst the potential benefits to the quality of cooperative working are significant, it has been observed from research in domains such as software development (Brooks 1975), and industrial design, that increasing the number of people collaborating can have a detrimental effect on quality. There have been widespread concerns expressed about the quality of Wikipedia entries, even by one of its co-founders (Wales 2006). Wikipedia was intended above all to create and distribute a free encyclopaedia "of the highest possible quality" and to do so, in part, with the concept of featured articles which are selected by the Wikipedia community as "the best articles in Wikipedia," according to criteria such as accuracy, neutrality, completeness, and style. Wilkinson and Huberman (2007) analysed Wikipedia's quality seeking a correlation between editing and article quality by comparing the numbers of edits and distinct editors on 1211 Wikipedia featured articles to similar counts of all other articles. They found that, there is a strong correlation between the number of edits, the number of distinct editors and article quality, that is, the wider the network of participants, the higher the quality of the Wikipedia entry. This appears to be contrary to the view espoused by some of the most

influential members of the Wikipedia community that a few dedicated and exceptional, editors produced the best articles in Wikipedia.

Quality preservation

Change is inevitable. Having designed quality into the course or the curriculum and having been assured that the quality is there, the challenge then is to keep it there by careful management of change. Many of the potential and actual difficulties and risks of social software come down to the management of change, at least from the educator's viewpoint. For example, how might we best realise a return on the investment in previous forms of educational material, much of it still on paper, if at all?

In education, the need for courses to change arises for a number of reasons

1. to correct flaws in the course design or faults in the course content

There does not appear to be a great deal in the literature on the management of errors in educational material – perhaps teachers do not like to admit the possibility they might be wrong? One of the worries raised about deploying social network methods and tools is that learners will not be able to discern errors made by unauthenticated sources; such concerns are mentioned by many authors including Anderson (2007). On the other hand, it is possible that the network effect observed in other areas (e.g. Raymond, 1999) allows many more eyes to scrutinize material and, with many more and speedier error reports and challenges to clarity of presentation, the quality of that material will be enhanced.

2. to reduce the gap between course content and the external environment

The quality of many courses deteriorates through age as a result of the explosion of new knowledge in the external environment (Siemens, 2004). Furthermore, Mason and Rennie (2008) point out that there will be a need for rapid re-design of courses, as the learners' needs become better understood. Theoretically, the more modular the course design, more quickly modifications can be made and the quality of the course recovered.

3. to enhance the quality of the course design or the course content

The quality of a course will be improved as its content and style are kept current. Trinder, et al (2008) argue the need to embrace the thinking behind the use of social technologies in formal learning contexts and to devise new assessment practices more appropriate to 'learning as collaboration and participation'. Dubious arguments that a course is "not broken so don't fix it", perhaps because student pass rates are acceptable, are clearly out of tune with the enthusiastic engagement of "digital natives" in the educational process.

4. to reduce the "chaos" introduced by previous changes

If a course has been carefully designed, then accommodating change (to correct errors, to adapt to the changing environment or to enhance quality) may impinge on quality perhaps by introducing further errors or undermining the course design. The problem then is to manage change to optimize benefits and reduce the risk of failure. As was previously observed, Mason

and Rennie (2008) argue very strongly on the need for careful course design to achieve the desired quality of the course; the question then arises as to what constitutes a good course design. Whilst they do not address this question directly, it might reasonably be extrapolated from their cogent exposition that the concept of quality in the design of courses can be assessed by an ability to accommodate change in the course whilst preserving the original quality designed into the course.

Conclusions

This review of the existing literature may appear to have posed as many questions as it has answered but we conclude this paper by revisiting the original questions:

What are the characteristics of social software methods and tools that make them 'social'?

The essence of Web 2.0 is its 'read/write' nature permitting it to be interactive. This is what primarily differentiates it from web 1.0. The interactivity of Web 2.0 or social software provides two-way communication and so lends itself to collaboration, co-operation and the development of a learning community. This is in contrast with the more traditional approach of individuals working in isolation and often in competition with each other.

Anderson (2005) considers that social software offers a learner freedom to engage in a learning relationship with other learners and facilitates collaboration between individuals who are separated by location and time. The latter advantage is a tremendous benefit to learners engaged in distance learning programmes.

What are the theoretical underpinnings of using social software methods and tools in education? How does the 'social' nature of the tools align with standard learning theories (e.g. constructivism, behaviourism etc.)?

Siemens (2004) amongst others characterizes the main traditional learning theories as behaviourism, cognitivism and constructivism, commenting favourably on constructivism as involving the student in active participation in the process of learning. Mason and Rennie (2008) accept his proposition that social software 2.0 methods and tools permit the educational process to transcend constructive theories by moving on from isolated, individual activity to interactivity amongst a community of collaborating learners (i.e. 'collaborative constructivism' or 'connectivism').

What are the benefits to students and educators of using social software methods and tools in learning and teaching, respectively?

From the teachers' viewpoint, Web 1.0 allowed knowledge to be disseminated electronically and accessed widely. However, the interactive nature of social software allows students to participate in collaborative work, for example, creating a group report where the quality of the whole may well exceed the sum of its parts. In addition to higher quality learning outcomes, participants in the process benefit from both peer recognition and peer review, both excellent preparation for more modern collaborative teamwork (Crook et al, 2008). Social software methods and tools actively engage learners both

individually and in groups whilst still providing opportunities for differentiation since the individual contributions may be identified and tracked.

Kamel Boulos and Wheeler (2007), in studying the use of social software in health and health care education, confirmed that it supported group interaction and fostered a greater sense of community. They also confirmed that social software methods and tools encouraged more active learning and the tutor-student interaction further increased student motivation.

What are the issues/problems/disadvantages of using social software methods and tools? For example, are some students hesitant to blog because of fear of loss of privacy or what others might think of them?

The use of social software methods and tools constitutes change and change has to be managed to minimize a fear of the unknown that throws up a combination of resistance and inertia. Such fears include invasion of privacy, exposure to ridicule, cyber-bullying, production of inappropriate material as well as the fear that some learners will be penalized by lack of prerequisite computer skills (Crook et al, 2008).

Armstrong and Franklin (2008) discuss some of the barriers, for example:

- institutional and network restrictions
- lack of money to invest in technical infrastructure
- lack of knowledge of some senior managers
- inadequate ICT strategy
- using different social tools can involve endlessly logging on to a multiplicity of accounts and the consequent difficulty of remembering and managing passwords
- some mature academic staff are resistant to having to learn new Web 2.0 tools, and fear losing control to the students.

However Crook et al (2008) point out that even with increased “learner centredness”, there will still be significant demands on teachers to provide structure and facilitate the learning. It could also be argued that Web 2.0 places mature students (or “digital immigrants”) at a disadvantage but a counter argument is that everyone needs to be computer literate and able to work collaboratively in the workplace. Therefore being exposed to the latest technology as a student is excellent preparation for work and provides an opportunity to acquire additional skills.

Institutions that have encouraged the use of Web 2.0 tools appear to have found it to be a positive experience and are continuing to develop their provision. There may be a ‘peak of inflated expectations’ as discussed by Armstrong and Franklin (2008) but hopefully the enthusiasts continue to work towards the ‘plateau of productivity’ while keeping an open mind about the benefits, the barriers and the unexpected rewards.

Which social software methods and tools are most appropriate for which kinds of activities?

The many forms of Web 2.0 were considered in the section *How is Web 2.0 used in education – methods and tools*. In summary, these are some of the common applications:

- blogs which support reflective practice, active learning and learning journals;
- wikis which support collaborative group work;
- podcasts whereby learners can listen and/or catch up on talks or lectures at their own convenience; and
- social bookmarking which supports collaborative research projects.

Most UK universities have embraced blogs and wikis in particular. For example, Warwick has offered openly readable blog space since 2004, allowing potential students to read the comments of current and past students.

In a JISC-funded project in 2008-2009 which investigated the use of social software in higher and further education in the UK, twenty six case studies were consolidated (see <http://tinyurl.com/5a8zu3>). These case studies demonstrate the usage of social software tools in further and higher education in the UK.

Is there a link between the student skills and social software methods and tools? For example, skills of communication, writing, team-working, group-working, collaboration, and so on.

Crook et al (2008) conclude that “there is little doubt that Web 2.0 learning practices encourage a more collaborative approach to study. This may fit with a feeling that the present world of work is more collaborative than solitary.” However there can be a problem of assessment in that teachers are expected to mark the work of an individual learner but it is not clear how this is to be done for collaborative work.

Another tension to be managed is the conflict between the opportunities provided by exposing learners to open Internet content and the comparative safety of the “walled garden” VLE of the institution. Armstrong and Franklin (2008) also acknowledge “a blurring of the boundaries of institutions” as virtual learning environments allow access to those outside the organization; this is aptly illustrated by the Open University’s OpenLearn website (<http://openlearn.open.ac.uk/>).

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