Adoption of Web 2.0 Technologies in Education for Health Professionals in the UK: Where are we and why?

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Abstract: This paper describes the findings about the use of Web 2.0 technologies in the education of health professionals in the United Kingdom (UK). The work is part of a wider study scoping the use of e-learning.

Its objectives were to:

- Explore issues influencing implementation and use by both early and late adopters

- Identify barriers to implementation and good practice

- Review the employment of e-learning within curricula representing a range of teaching models

In phase one, a postal survey obtained data from 25 higher education institutions relating to their uptake and development in this field. A second phase identified four case studies, two from early and two late adopters, reflecting the features identified from phase one. In the case studies, interviews and focus groups with students and staff were conducted to gain a deeper understanding of the issues which were significant to them. The main findings suggested e-learning development and use varies, with a spectrum of employment across the sector. The predominant engagement is with instructivist learning approaches managed through a Virtual Learning Environment with only limited experimentation in interactive learning online.
This paper will discuss the findings from the study where they relate to the limited use of Web 2.0 technologies. It will include a discussion on the moral, legal and ethical implications of current and future developments.

Keywords: Web 2.0, survey, case study, e-learning, web based learning

1. Introduction

This study was conducted for the Higher Education Academy, Health Science and Practice Subject centre (HEA HS&P), an organisation that supports higher education institutions provide the best learning experience for students. The study scoped the development and use of e-learning in health science and practice education in universities within the United Kingdom (UK). As part of the research we explored the development and adoption of Web 2.0 technologies.

Web 2.0 is a term describing the trend in the use of World Wide Web technology and web design that aims to enhance creativity, information sharing, and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based communities and hosted services, such as social-networking sites, wikis, blogs, and folksonomies. The term Web 2.0 became notable after the first O'Reilly Media Web 2.0 conference in 2004 (O'Reilly, 2005).

These technologies have increasing numbers of users and are finding a place in many areas including healthcare management, education and practice. Patient support groups, with or without the involvement of healthcare professionals, are adopting Web 2.0 technologies and identifying a range of advantages and potential risks (e.g. Frost & Massagli, 2008).

It has been argued that Web 2.0 technologies have the potential to change the education of healthcare professionals, at undergraduate and postgraduate levels, from a didactic one way process, in which information is transferred from the "expert" to the student, to a collaborative and participative process, empowering the student to be an equal participant in the learning process. However there are significant challenges and hurdles which need to be considered (Boulos & Wheeler, 2007).

The potential for e-learning to enable and empower healthcare students within educational programmes has been discussed for many years (Salmon, 2002), however this has been challenged with calls for moves from instructivist to constructivist learning approaches, built around "Communities

of Practice", which potentially provide the greatest scope for learning through interaction and discussion (Moule, 2007). More recent developments argue that behaviorism, cognitivism, and constructivism are unable to adequately address learning that occurs outside of people (i.e. learning that is stored and manipulated by technology). They also fail to describe how learning happens within organizations. Therefore connectivism has been proposed as the "integration of principles explored by chaos, network, and complexity and self-organization theories" (Siemens, 2004). It recognises that learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing (Siemens, 2004). Web 2.0 technologies offer online environments that can support both constructivism and connectivism.

Web 2.0 technologies are emerging as platforms to enable or encourage students to be collaboratively creating and sharing their own insights into current and emerging themes within their education. This "architecture of participation" has been described as "emphasising the pre-eminence of content creation over content consumption", (Boulos & Wheeler, 2007, p3) and the use of Web 2.0 applications as "mind tools to stimulate reflection and actively involve learners in their own construction of knowledge" which have been proposed as a way to yield powerful learning experiences (McLean et al, 2007). It may also be important for healthcare professionals to be aware of the emerging technologies, and their potential development not only for their own use to inform practice, but also because the trend for patient and client use is likely to continue and increase.

Whilst it seems Web 2.0 might offer the potential for online learning to support pedagogy in higher education there is little understanding of how and where it is being used to support healthcare education. In order to try and draw some understanding of current engagement this study aimed to explore issues influencing the implementation and use of e-learning by both early and late adopters and in so doing identified the level of Web 2.0 use.

2. Data collection

The study included two phases of data collection. Initially data were collected through a survey questionnaire developed from the Joint Information Systems Committee (JISC) funded Managed Learning Environment Study survey tool (http://www.mlestudy.ac.uk).

The Managed Learning Environment Study survey tool was adapted for use in the current study with the permission of JISC. Some of the original sections were re-worded or removed, leaving a total of 62 questions. It was recognised that not all elements of the survey would not necessarily be completed by all respondents, depending on their institutional position.

An initial list was created from personal contacts. We also searched departments on the Quality Assurance Agency for Higher Education Major Review of healthcare programmes reports listing: (http://www.qaa.ac.uk/reviews/reports/healthReviews.asp and the Nursing and Midwifery Admissions Service institution listing: (http://www.nmas.ac.uk/instit/index.html). We added those HEAs not identified previously from the HS&P Subject Centre list of contacts. The HEA HS&P list contained a number of duplicates and no contact names. For reasons of confidentiality, names of key contacts from the HEA database were not divulged to the research team. A final sample of (n= 93) were sent a paper version of the survey.

A second phase included case study visits to explore questionnaire responses in more detail. Four case study sites were identified from the responses to phase one using the criteria to include both early and late adopters of e-learning. In this study the terms early and late adopters reflect both the numbers of staff and students involved in e-learning and the variety of e-learning activities undertaken. Our definitions are therefore not consistent with Rogers (1995) definition of early and late adopters that suggested the early adopters lead revolutionary change and risk taking.

At the case study sites visited we reviewed learning and teaching strategy documents and e-learning strategy documents for the faculty and university, interviewed key staff and viewed e-learning materials using an outline schedule. Focus groups were held with students in each site.

3. Results

3.1 Phase 1

Responses to the initial survey were received from 25 UK universities. The main findings suggest that e-learning development and use was variable. The pre-dominant engagement is with instructivist learning approaches managed through a virtual learning environment (VLE). Over 80% of the respondents used discussion boards, email, CD ROMs and DVDs, however less than half used blogs and wikis. Mobile phone usage and SMS texting had not yet been incorporated into the educational technologies employed.

E-learning technologies used by the respondents' faculties, schools and departments are shown in Table 1. E-mail (96%), CD Roms (84%), DVDs (80%), and discussion boards (84%) were used by the majority of the respondents' institutions, while SMS texting (8%) and mobile phones (16%) were used by a minority. Only a relatively small number of responders were using Web 2.0 technologies such as podcasting (32%), blogs (44%), wikis (28%) and virtual worlds (16%).

Table 1: e-Learning applications being used

	Number	*Percent*
email	**24**	**96%**
Discussion boards	**21**	**84%**
CD-ROMS	**21**	**84%**
DVDs	**20**	**80%**
Online videos and sound	**16**	**64%**
Blogs	**11**	**44%**
iPods	**8**	**32%**
Wikis	**7**	**28%**
Mobile phones	**4**	**16%**
Other	**4**	**16%**
SMS Texting	**2**	**8%**

3.2 Phase 2

The case study visits, undertaken as a second phase of the study, enabled us to explore some of the reasons behind these findings. The limited use of Web 2.0 technologies was affected by a number of issues such as lack of drivers, lack of information technology (IT) skills, development support and the reluctance of students to use social networking in education.

3.2.1 Lack of drivers

There was no pressure to use Web 2.0 technologies from the funding bodies, students or staff. Priority was given to the delivery of particular curriculum areas, such as biological sciences, where factual information takes precedence over discursive techniques used in the social sciences.

> *'they [purchasers] demand lots of other things and this [e-learning] isn't a priority*

Case study 4

3.2.2 Limited IT skills and development support

Many of the staff felt that they had limited skills to explore new e-learning approaches and lacked the requisite IT skills to engage. Although they generally felt fairly comfortable with "office applications" and had learnt to use their institutions VLE they felt this is where their expertise ended. They did recognise however that they may need to engage with Web 2.0 technologies in the future if student demand increased and a number of staff who might be viewed as 'champions' were making demands for blogs and other Web 2.0 technologies. It seemed however that there was little support for these developments from local and central IT development units, a position that compounded the situation and would not encourage Web 2.0 use

> *another area I think is a whole question of sort of [web2] social networking, collaborative approaches to e-learning I think that's a challenge that we are all going to face really and I think partly our students are pushing us in that direction, so, and you know how do we incorporate that sort of thing with these types of materials, they don't necessarily want the tools if they can't interact with in that way*

Case Study 11 respondent 2

> *well we have a few members of staff who have been asking for blogs, because they want to use it and was hard to convince the IT department, when it comes to e-learning then somehow the IT services think it is our responsibility in the centre for development of teaching and learning… I had to put a lot of pressure for them to make one available for me for a project so there is always a kind of tension.*

Case Study 4 – Respondent 1

3.2.3 Reluctance to use social networking tools for education

Although the majority of students engage with Facebook or other social networking tools in their daily lives, the use of these by the universities was limited, reflecting the wider situation in UK universities (Ipsos MORI, 2008). Interestingly, students stated a reluctance to use such tools in the course of their education, preferring to maintain these sites for personal use (Swain, 2007).

> *RF   what about things like, more social uses, do any of you use anything like you, I think you mentioned at one stage myspace or facebook. Do any of you use anything like that?*
>
> *2:   facebook yeah*
>
> *RF   would you welcome that being used by the university to tell you*
>
> *2:   no*
>
> *RF   no,*
>
> *1:   no, cos like that's separate*
>
> *2:   separate […]   and they say employers and everyone look on facebook about what [your profile is] and things like that and I wouldn't know, no I think it's separate like, I know nursing is like a vocation but I think you've got to draw a line like at the end of the day you go home and you switch off and I wouldn't want to check my facebook page and have an email by my teachers and everyone*

Case Study 11

> *one of the students was very, she didn't want to answer the question at all about social networking, she said 'well are you going to try and access it then, that's my, that's my personal diary' and so we have obviously got to be very careful about intruding like that,*

Case study 11 Respondent 1

It is obvious that these students had an online presence that they would rather keep separate from the formal university 'workplace'. They preferred to engage in social networking sites for pleasure rather than for study and wanted to keep the personal and professional separate.

Staff were also concerned that students were naive in their use of social networking sites and felt that they often presented an online presence that might expose them to risk. One member of staff stated,

> *'I know some institutions encourage the use of Facebook and Bebo within their learning and teaching. We have said "No, we're not going to do that" there's a number of issues regarding data protection, IPR, so …And I think it's also very important, I mean, you've obviously seen recent articles about Bebo and Myspace, people not understanding that you put stuff up there and it can actually be used in articles by journalists and things like this …*
>
> *… and I think we need to make our students much more savvy in this area.*
>
> *I think they're very, very naïve. A lot of students who come to us are very naïve about their digital identity and how they're promoting themselves on-line…*
>
> *and a lot of time I'm working with them I think, you know ,right, interview anyone, let along put them in Post, I'm always checking what they're doing on Bebo and Myspace and they look, sort of like, horrified.*

Case study 8 Respondent 1

4. Discussion

This study found that the VLE provided the mainstay of e-learning provision in most universities. This said, the range of possible functions offered by a VLE is not exploited and universities continue to limit use to repository functions, with poor employment of discussion forums. This finding echoes those results of previous research suggesting e-learning systems are still predominately used to provide digital information access and dissemination (Crook and Barrowcliff, 2001), including the provision of lecture notes, reading lists, journal articles and images (Levy, 2005). Given the reluctance of universities to exploit the full potential of VLEs it isn't surprising that experimentation with Web 2.0 technologies is limited.

Web 2.0 technologies allow users to not only retrieve information but to use the network as a platform to create and own the data (O'Reilly, 2005). This social software can support online reflection and interpersonal and community based interactions and knowledge sharing (Levy, 2005). A current European Union funded study aims to identify and analyse the existing practices and related success factors of major Web 2.0 initiatives in the field of learning in Europe, particularly in relation to the potential of social computing applications to (re)-connect groups at risk-of-exclusion (IPTS, 2008). In this study we found 11 of the responding universities were using blogs, eight were using ipods, seven were engaging with wikis and the use of SMS texting and mobile phones was limited. There may be a number of factors affecting this uptake, though it appears that the lack of drivers and demand of Web 2.0 technologies and the limited level of staff IT skills contribute to poor uptake and development.

The case study discussions revealed that there are issues around lack of drivers for e-learning development. It is interesting that e-learning, including Web 2.0 technologies have been seen as a way of meeting the growing global demand for education, negating the need to find sufficient resources to build new campuses (Brown and Adler, 2008). Given the potential to use e-delivery to capture national and international markets, one might expect that the provision of health care education to a global learning community might be a driver for e-learning and Web 2.0 developments. However, none of the universities included in this study rated inclusivity as a significant factor in their developments. None were planning to develop learning provision for national or international markets using IT. This reflected the positioning of the institutions at the time of the study. It appeared as if they were still focussed on using e-learning and Web 2.0 technologies to support blended learning and local populations, rather than aiming at markets further a field. It was apparent that they felt able to maintain current student support using limited functions of the VLE and long standing delivery methods used for distance learning and face-to-face provision.

Interview data also revealed a perceived lack of staff IT skills for Web 2.0 technology development and use. This is a significant factor affecting the development and use of new Web 2.0 technologies. It is difficult to know if the perceived lack of skills was related to the age and gender profile or specific characteristics related to those entering healthcare professions (Wishart & Ward, 2002). It was clear that many staff felt unable to engage in Web 2.0 development and use. Those staff who were 'champions' trying to move these developments forward described being thwarted by the lack of IT support from learning technologists on site.

Students demonstrated engagement in Web 2.0 technologies for social use and were able to clearly articulate their use of social networking sites such as, Facebook and Youtube, in other aspects of their lives. Students were keen to maintain a distinction between their use of social networking sites and their use of e-learning to support professional development and education. Students wanted to keep their social networking activities separate from the university, seeing this as their social and 'off work' space. There were concerns expressed by university staff regarding the formal engagement of students through social networking sites. Staff commented that there is the potential for students to operate naively in these environments and place themselves at risk if they expose too many personal details or images in publicly accessible forums. This public profile it was suggested may also reflect badly on students when they apply for employment or in other formal contexts. Although not expressed during this study, other sub-conscious concerns may exist amongst staff about how much of themselves they should reveal in interactions mediated by Web2.0 technologies. Staff may also be keen to maintain a professional distance between themselves and the students, preferring to support students through the VLE and other more formal sites than through being ' friends' on Facebook.

Despite the concerns about the use of social networking sites, there are examples of engagement in blogs, wikis, podcasts and social networking tools by formal education providers. In an attempt to provide some protection for student users, universities can restrict access to particular groups of students and the sites are often "moderated" by a member of staff. Many students are also using such sites to take greater control of their own learning. There are also examples of students setting up their own mechanisms, sometimes via platforms such as Facebook, for both structured and "just in time" learning, to enable them to collaborate without the presence of academic staff (Hodges, undated).

These developments bring challenges to existing learning and teaching structures and power relationships, including those existing for e-learning. For many years, academic staff or experts have often had control over the learning process, providing learning materials for students and deciding on the modes of delivery and time and place of learning. The traditional approach to e-learning has been to employ the use of a Virtual Learning Environment (VLE), software that is often cumbersome and expensive - and which tends to be structured around courses, timetables, and testing. That is an approach that is too often driven by the needs of the institution rather than the individual learner. In contrast, e-learning 2.0 (as coined by Stephen Downes) takes a 'small pieces, loosely joined' approach that combines the use of discrete but complementary tools and web services, such as blogs, wikis, and other social software, to support the creation of ad-hoc learning communities (O'Hear, 2006).

The use of student led online sites may shift the control of learning, with students exercising more power over their learning as individuals or within groups. This may be challenging for many, both academics and students, and will require different perceptions of role, and possibly demand a rethinking of existing pedagogy. Students are able to use Web 2.0 technologies in this way because they are part of a new approach to learning, one characterized by a *demand-pull* rather than the traditional *supply-push* mode of building up an inventory of knowledge in students' heads. Demand-pull learning shifts the focus to enabling participation in flows of action, where the focus is both on "learning to be" through enculturation into a practice as well as on collateral learning (Brown and Adler, 2008). Thus, there is the potential for students to organise their learning online through Web 2.0 technologies and gain control of when, what and how they access information and views and opinions.

Perhaps the way forward is, instead of using enterprise learning-management systems which provide a VLE and record of student learning, to make use an interlocking set of open-source applications. While there is still an element of content delivery in these systems, there is also an increasing recognition that learning is becoming a creative activity and that the appropriate venue is a platform rather than an application. In the future it may be more widely recognized that the learning comes not from the design of learning content but in how it is used. What is needed is exploration of how learning content, whether professionally authored or created by students, can be used as the basis for learning activities rather than the conduit for learning content (Downes, 2005).

5. Conclusion

Within the health science domain the use of e-learning has developed significantly in recent years but there does not seem to be significant demand for Web2.0 technologies. Some staff have demonstrated a willingness to explore new approaches, but many still hold reservations about engaging with innovative pedagogical tools and have not yet realised what can be achieved with the tools.

A variety of barriers to further implementation of Web 2.0 technologies in this field have been identified including; student maturity, the inherent risks of reducing the educational structure and shifting the balance of power between academics and students. These along with a blurring of the boundaries between personal and professional online activity may require significant changes in attitudes and culture before potential benefits can be achieved.

The potential offered by Web 2.0 technologies in the education of healthcare professionals, is significant, however these developments need to be balanced with the inherent risks and challenges, and further research undertaken to explore these.

Acknowledgements

References

Anderson, P. 2007 What is Web 2.0? Ideas, technologies and implications for education. JISC Technology & Standards Watch. [online] http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf [accessed] 29.5.08

Boulos, M.N., Maramba, I. & Wheeler, S. 2006 Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. BMC Medical Education. 6(41) doi:10.1186/1472-6920-6-41[online] http://www.biomedcentral.com/1472-6920/6/41 [accessed] 29.5.08

Boulos, M.N. and Wheeler, S. 2007 The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal* 24 2-23

Brown, J.S. and Adler, R.P. 2008 Minds on Fire: Open Education, the Long Tail, and Learning 2.0 [online] http://net.educause.edu/ir/library/pdf/ERM0811.pdf [accessed] 29.5.08

Crook, C. and Barrowcliff, D. (2001) Ubiquitous computing on campus: patterns of engagement by University students. International Journal of Human Computer Interaction. 13, 245-258

Downes, S. 2005 E-learning 2.0 elearn magazine [online] http://www.elearnmag.org/subpage.cfm?section=articles&article=29-1 [accessed] 29.5.08

Frost, J.H. and Massagli, M.P. 2008 Social Uses of Personal Health Information Within PatientsLikeMe, an Online Patient Community: What Can Happen When Patients Have Access to One Another's Data. *Journal of Medical Internet Research 10(3):e1* doi:10.2196/jmir.1053 [online] http://www.jmir.org/2008/3/e15/ [accessed] 29.5.08

Higher Education Funding Council for England (2005) HEFCE strategy for e-learning. London: HEFCE, p5 [online] http://www.hefce.ac.uk/pubs/HEFCE/2005/05_12/ [accessed] 30.11.07

Hodges, J.P. (undated) Unofficial Student Online Discussion Boards: Enhancing Learning or Encouraging Cheating? [online] http://35.9.119.116/papers/MCPAJrnl_OnlineDisBrds.pdf [accessed] 2.7.08

Ipsos MORI, 2008 Great Expectations of ICT: how Higher Education Institutions are measuring up. Report for JISC available from http://www.jisc.ac.uk/publications/publications/greatexpectations

IPTS, 2008 Learning 2.0: A Study on the Impact of Web 2.0 Innovations on Education and Training in Europe [online] http://is.jrc.ec.europa.eu/pages/Learning-2.0.html [accessed] 29.5.08

Levy, P. (2005) Editorial. Health Information and Libraries Journal. 22 (s2), 1-7

McLean, R., Richards, B.H. & Wardman, J.I. 2007 The effect of Web 2.0 on the future of medical practice and education: Darwikinian evolution or folksonomic revolution? *eMJA The Medical Journal of Australia.* 187 (3): 174-177 [online] http://www.mja.com.au/public/issues/187_03_060807/mcl10181_fm.html [accessed 29.5.08

Moule, P. 2007 Challenging the five-stage model for e-learning: a new approach. *ALT-J, Research in Learning Technology.* 15(1). 37–50

O'Hear, 2006 e-learning 2.0 - how Web technologies are shaping education. Read Write Web [online] http://www.readwriteweb.com/archives/e-learning_20.php [accessed] 29.5.08

O'Reilly, T. (2005) What is Web 2.0? http://www.oreilly.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html Accessed 20.08.06

Rogers, E. M.(1995) Diffusion of innovations. 4th Edition. London : The Free Press/ Simon & Schuster Inc

Salmon, G. 2002 *E-tivities The Key to Active Online Learning.* Routledge, UK

Siemens, G. 2004 Connectivism: A Learning Theory for the Digital Age. ElearnSpace [online] http://www.elearnspace.org/Articles/connectivism.htm [accessed] 29.5.08

Swain, H. 2007 Networking sites: Professors - keep out

The Independent Oct 2007 [online] http://www.independent.co.uk/student/student-life/technology-gaming/networking-sites-professors--keep-out-397100.html [accessed] 13.6 2008

Wishart, J, Ward, R (2002) Individual differences in nurse and teacher training students' attitudes toward and use of information technology, Nurse Education Today 22(3) 231-240

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