

Medical students' use of Facebook to support learning: Insights from four case studies

KATHLEEN GRAY, LUCAS ANNABELL & GREGOR KENNEDY

The University of Melbourne, Australia

Abstract

Background: Recent research indicates that university students are interested and active in supporting their learning by using Facebook, a popular social networking website.

Aim: This study aimed to add to our understanding of how or how effectively students may be using Facebook for this purpose.

Method: Researchers surveyed the extent and key features of Facebook use among 759 medical students at one university, and explored in depth the design and conduct of four Facebook study groups.

Results: 25.5% of students reported using Facebook for education related reasons and another 50.0% said they were open to doing so. The case studies showed conservative approaches in students' efforts to support their development of medical knowledge, skills and attributes in this way. Both technological affordances and group dynamics were factors contributing to groups' mixed successes.

Conclusion: These cases indicate that using Facebook as part of learning and teaching is as much of a challenge for many students as it may be for most educators.

Introduction

Educators are becoming increasingly interested in how online social networking software can be harnessed for educational purposes (e.g. Gunawardena et al. 2009). Originally created for university students to socialise and now the best known social networking site, Facebook's (www.facebook.com) features make it easy for web users to set up and maintain personal 'profile' pages, connect to and remark on those of other individuals, publish content, contribute to groups and participate in communities online (Jenkins et al. 2006).

There is empirical evidence that social networking sites are popular among university students and that students are using social networking sites specifically in connection with their studies. Caruso and Salaway (2008) found that 49.7% of US students surveyed were using social networking sites to communicate with classmates about course-related topics. Ipsos MORI (2008) found that 37% of first-year UK students were using these sites to discuss coursework and 81% of these students found such activity useful for learning.

Technically, Facebook's features could provide useful support for student collaboration, student-generated content, student-student communication and the personalisation and socialisation of student work (Dalsgaard 2008; Huijser 2008; Pempek et al. 2009). There is conjecture that Facebook's features may encourage students to engage in creative and social learning processes that extend beyond traditional educational settings and institutions (Wiberg 2007, p. 10) and thus benefit from access to wide and diverse sources of information and opportunities for communication (Dron & Anderson 2007).

Practice points

- The use of online social networking software in medical education offers novel opportunities to support collaborative learning and related ICT skills for professional practice.
- Substantial numbers of students are trying to engage in peer learning through the use of Facebook, a popular social networking site, in preference to using universities' formal online Learning Management Systems.
- Educators who wish to encourage students to use Facebook study groups to best effect should provide them with some basic advice about leading, managing and moderating online groups.
- Educators can contribute more usefully to medical students' ICT skills development by introducing them to professionally oriented social networking sites than by engaging with them in Facebook.

However, it is unclear whether student use of Facebook for learning is effective or appropriate. Facebook use may blur the boundaries between socialising and studying in ways not conducive to learning (Mori 2008). The casual and personal aspects of student Facebook use may preclude or exclude teachers' involvement, so students may formulate learning goals that are tangential to formal curriculum (Selwyn 2007). Student Facebook users may create many weak connections with each other but find it difficult to develop these into more supportive peer relationships (Ellison et al. 2007). Facebook use may become addictive (Bugeja 2006).

Correspondence: K. Gray, Faculty of Medicine, Dentistry, and Health Sciences, Department of Information Systems, 202 Berkeley Street, Level 1, The University of Melbourne, Parkville VIC 3010, Australia. Tel: 61 3 8344 8936; fax: 61 3 9035 8873; email: kgray@unimelb.edu.au

Recent studies specifically focusing on medical students' use of Facebook report that 70.8% of UK medical students used social networking sites ($n=212$; Sandars et al. 2008) and that 64.3% of medical students at one US university had Facebook accounts ($n=501$; Thompson et al. 2008). UK medical students' uses of Facebook for learning have been reported (Sandars & Schroter 2007) and briefly described (Ipsos MORI 2008, p. 32 & p. 36).

These studies reveal little about what might constitute appropriate and effective use of social networking software, by learners or teachers, in medical education. Facebook groups have been suggested as an environment to teach key information and communications technology (ICT) skills for professional practice (Boulos & Wheeler 2007). The need to inculcate professional conduct in the use of Facebook itself has been noted as healthcare applications of social networking and similar social web technologies increase (Eysenbach 2008). Facebook use may possibly prepare medical students to go on to use more professionally oriented social networking sites for lifelong learning and communication. Sandars and Haythornthwaite (2007, p. 307) assert that the use of social web technologies such as Facebook 'is here to stay in medical education but how it will develop in the future remains uncertain'.

The research reported here sought to investigate the extent to which medical students were using Facebook and to detail the approaches, experiences and outcomes in cases where they were using Facebook to support their learning. The aim was to gain insights into the benefits and challenges of using social networking software for learning and teaching in medicine and in higher education generally. Few studies to date have examined why or how students use Facebook for learning (Kolek & Saunders 2008), although such research could help to understand how online social networks fit into higher education (Silverman 2007).

Methods

Mixed methods research using a survey and case studies was conducted in the undergraduate medical school of a large metropolitan university at the end of 2008.

Participants

Participants were drawn from 1223 students in first-, second-, fifth- and sixth-year levels of the total 1749 medical student population.

In all, 759 students completed a questionnaire (response rate 62.1%). The respondents, 52.2% females and 47.8% males, were born between 1968 and 1992 (median 1989). Six volunteers belonging to Facebook study groups were interviewed: four were first-year students and two fourth-year students; two were graduate entry students (i.e. with a previous degree); five were males and one was female.

Measures

The questionnaire was modelled on related surveys (Conole et al. 2008; Ipsos MORI 2008; Sandars et al. 2008). It comprised

14 items regarding demographics, frequency and extent of Facebook use and experiences and perceptions of Facebook use for educational purposes. The latter questions gave examples such as for discussion, sharing resources or giving or getting help about coursework, clinical cases, assessment and student administration matters.

Data collection about Facebook study groups was based on adaptation of an analytical framework proposed by Liccardi et al. (2007, p. 229) as a way to understand factors influencing the use of social networks for learning. This framework enabled characterisation of each group in terms of its aims; membership; academic context; interactions with Facebook tools; activity patterns; rules about conduct; roles assumed by members; and outcomes.

Procedure

Paper-based questionnaires were distributed to students in exam waiting rooms on campus. Quantitative data were subjected to descriptive and comparative statistical analysis and free-text responses were summarised thematically.

Case study participants were recruited by advertisements accompanying the questionnaire and also placed on noticeboards and online. Volunteers belonged to multiple social and educational Facebook groups of the university's medical students, so researchers selected four case study groups that offered a cross-section of student activity (group descriptions are presented under 'Results'). Three semi-structured one-hour interviews were conducted, each involving two students. Students belonging to more than one case study group were questioned about each one in turn. To supplement interviews, researchers reviewed students' contributions to each study group, attending to ethics issues in keeping with Bakardjieva's (2008) recommendations.

The analytical framework was used as a template for describing and comparing cases. One researcher did initial data analysis and another reviewed the analysis to strengthen consistency and reliability.

Results and discussion

Extent of Facebook use for learning

The majority of students had used Facebook (87.0%, $n=759$). Most accessed it weekly or more often (90.5%) and over half (55.2%) daily. One in four students had used Facebook for educational reasons (25.5%, $n=660$). Of the 496 students who said that they had not done so, half indicated that they would consider using it for this purpose (50.0%). The combination of participants who had used Facebook educationally and those who would consider using it was 64.7% of Facebook users, or 54.5% of the total sample. Over one-quarter of students who had used Facebook for educational reasons had used the Facebook 'groups' feature specifically (27.7%).

Nature of Facebook use for learning

Key characteristics of four case study groups are summarised in Tables 1 through 4.

Table 1. Medical student Facebook study group A.

Aims	To facilitate exam revision by enabling students to ask and answer questions of each other: 'because people study different things at different rates... [a question] could just be answered by someone rather than trawling through a textbook for one small fact that may hold the key to an answer to something... it saves you a significant amount of time' [2-3-1].
Members	Open to and viewable by anyone in the university's Facebook network. Started by a pre-existing friendship group of seven students and peaked at over 140, all from one pre-clinical year. Initially, more graduate-entry than school-leaver students but soon reversed
Context	Frustrations over a particular lecturer were a specific discussion topic.
Tools	A discussion thread for questions and answers about each main study topic: 'a million times better than [the university's LMS] discussion threads' [2-3-3]. Photo album for posting diagrams. Main wall for general exam tips. Links to recommended websites posted throughout. Difficult to use for infrequent access: 'couldn't just log on and read through it all, it just gets confusing' [3-6-5].
Activities	Formed prior to the end-of-year exam period and very active for about 5 weeks. A total of 281 posts, some building up within hours, related to 10 discussion threads, 6 diagrams and 48 main wall posts.
Rules	If a member asked questions that were too broad or too simple, they might be ignored: 'you're not there to guide these people through' [2-4-3]. Posting unrelated material 'wasn't in the spirit of exam revision' [2-3-5] and such posts were immediately marked 'irrelevant' by group administrators.
Roles	About 15 members contributed heavily; one remarked: 'so many people... didn't contribute at all, it ended up being a siphon of information' [2-3-5]. Some who contributed little saw it differently: 'didn't want to expose my ignorance' [3-6-4]; 'intimidated by the level of complexity' [3-5-6]. Graduate-entry students were regarded as most helpful because their previous degrees made them more able to answer certain questions. 'In terms of organising a Facebook group devoted to study, you need to set down good guidelines and threads and have a moderator who's up for the job' [3-6-6].
Outcomes	Ongoing although over half of members left the group after the exams. Members interviewed considered that it achieved its objectives, thought that they would keep using it and expected that it would work even better in future semesters as others learned how to contribute.

Table 2. Medical student Facebook study group B.

Aims	To share students' marked essays on different topics to aid exam study: 'everyone could read through the different topics, and would then have to do less research' [3-5-6].
Members	Only by invitation from a group creator who 'picked and chose' [3-5-7]. A 'secret' group invisible to other Facebook users. Membership surpassed 30 at its peak, all in the same pre-clinical semester.
Context	Although each student had to write on only one essay topic during the semester, the exam required knowledge of multiple topics.
Tools	Group page for posting username and password of a dedicated Google email account (members then accessed the Google account to upload their essays and read others').
Activities	Formed prior to the end-of-year exam period, active for about 5 weeks and then deleted. In all, three members uploaded essays 1 week before exams began and two more contributed 1 day beforehand.
Rules	Individuals had a sense of right and wrong, e.g. 'I didn't want to upload my essay because I didn't do particularly well and I thought a lot of the information I may have had in it may have been misleading, and it focused on the wrong aspects of the topic' [3-6-7]; 'I didn't actually read any of it, because I thought I'm not going to try and benefit from these people's contributions if I'm not going to contribute myself' [3-6-8]. Lack of rules to protect intellectual property was raised: 'you put something up and there's so many people that access it and you don't know what other people are going to do with it' [3-5-8].
Roles	Expectations of engagement were an issue: 'if you set up the group, and you kind of expect everyone to start using it, it's not going to go anywhere' [3-6-9]. Lack of leadership: 'discourages people who want to participate from doing so' [3-6-8]. Some members' study habits were out of synch with the group: 'it depends on where you're up to in terms of study... for me it was a waste of time to be on there' [3-5-4].
Outcomes	Did not achieve level-of-contribution objectives. Some members still saw potential in the idea: 'if it worked out that the topics were going to be examined, then I think it would have been really beneficial' [3-6-8].

The findings reported here about medical students' general use of Facebook are consistent with previous research, moreover, they offer new evidence that substantial numbers of medical students are giving time and attention to using Facebook for study purposes. The precise extent of use is still unclear as there was a disparity between the educational use that students reported in the survey and that which was observed in the case studies, even allowing for overlapping group membership. Of students surveyed, 127 reported that they were using Facebook educationally, however 185

members were counted just in the four case study groups – Group A alone had more than 43% of first-year students as members at its peak. Possible explanations as to why students under-reported their educational use of Facebook are: they found it ineffectual or counterproductive; they did not wish it known that they were doing something that might be academically improper; or they worried about being stigmatised as 'nerds' or 'swots' for making academic use of a social tool.

The case studies of four groups of medical students using Facebook deliberately for educational purposes paint a picture

Table 3. Medical student Facebook study group C.

Aims	To supplement a pre-clinical tutorial group throughout the semester: 'help each other out with research' [3-5-1], 'share a few files and that sort of thing' [3-5-2].
Members	Set up by one student as a 'private' group for 10 students from a 12-student tutorial group (two had no Facebook accounts).
Context	Tutorial group met face-to-face twice a week and never met otherwise to study or socialise.
Tools	Wall posts to welcome members and discuss topics. Photo album for photos taken during final tutorials. Group page for members to find and 'friend' each other on Facebook and to shift between study and socialising: 'it's a conduit for social interaction... I don't think it's that beneficial for people trying to utilise it as a learning tool' [3-6-3].
Activities	Created at the beginning of the semester, low level activity for 15 weeks, then deleted.
Rules	No stated rules but recognition of need: 'it just comes down to the individuals... people have to have the interest and... the mutual benefit of helping others' [3-6-3].
Roles	'No one really stimulated any serious discussion' [3-5-2]. In the end the creator, 'couldn't be bothered following it through' [3-5-2].
Outcomes	As the semester progressed members found that meetings and individual study were sufficient: 'because... it's so much faster. I just don't like sitting around waiting for an answer on Facebook' [3-5-3]. Although members did not find this group helpful they maintained a belief in its potential: 'Facebook definitely has the capacity to facilitate our learning experience' [3-6-3].

Table 4. Medical student Facebook study group D.

Aims	To keep in touch while studying in different locations: 'not only to chat to people but also to give each other updates in terms of learning' [1-2-1]. To compare clinical schools, discuss elective choices, share exam tips, arrange face-to-face exam practice: 'lets organise a time for OSCE catch up session. me thinks a weekend when ur all here. how about say... the 22nd or 23rd in a PBL room at [Clinical school A] or [B]?' [Wall post 06-Nov-08].
Members	Set up as a 'private' group exclusively for five students in the same clinical semester. Subset of a social group that formed at the start of medical school.
Context	Three members were based at two different metropolitan clinical schools and two were based at a rural hospital.
Tools	Wall posts, photos, videos and web links for a mixture of educational and entertainment content. Messaging and wall posts for daily multilateral communication: 'everyone can chat and you don't have to get a response straight away' [1-1-4].
Activities	Compared Facebook to the university's LMS, which they saw as lacking features and less convenient. Formed prior to the end-of-year exam period. A total of 18 wall posts, 2 news topics, 24 photos and 3 web links.
Rules	Purpose of posting to the group was 'predominantly based on our clinical school stuff because if we wanted to ask how things are going, we probably use the phone or write on the [other person's] normal wall' [1-1-4]. 'If there are disagreements about medical information we usually just agree to disagree and go check a textbook or something. I don't think we fight over it or challenge it' [1-2-6].
Roles	All members discussed and requested information from each other but one was regarded as academically superior so others usually followed his contributions. Contribution levels varied due to varying levels of computer access in different clinical schools; rural students had more access time while a student in one metropolitan hospital had limited access.
Outcomes	Ongoing, with members planning to keep using the group throughout clinical school, but unsure of its continuation once they became interns. Not essential: 'had we not created the Facebook group I think we still would have done it, just would have called up everyone' [1-1-11] but nevertheless 'helped us in ways and provided us with links and... resources to get good information' [1-2-9].

of modest expectations, that Facebook groups would be a convenient and intrinsically motivating way to support peer learning, and of mixed experiences, in terms of the quantity and quality of learning activities that ensued.

Different aspects of the academic context provided the rationale for students to form Facebook study groups. The structure of teaching and assessment motivated Groups B (piecing together individual work to prepare for a common exam) and D (learning in and about three separate educational settings). Perceived inadequacies in classroom teaching (Group A) and tutorial group learning (Group C) influenced the formation of these groups.

Groups had two different kinds of aims, both clearly aligned with curriculum. Groups A and B were set up with the specific purpose of revising for exams, one using question-and-answer methods and the other swapping completed assignments. In contrast, Groups C and D had a broader ambition to support

longer term learning, by creating new social connections or by reinforcing existing ones, respectively.

All groups started small but ranged from 5 to 140-plus members once established. Group membership was relatively limited, ranging from being open to all Facebook members in the university network (Group A) through to being invisible to any but group members (Group B). Interestingly, no educators were invited to participate in any group nor were any Facebook members from beyond the university, for instance medical students from other universities.

Notably, students turned to Facebook rather than the university's online learning management system (LMS) to support group study, although the latter offered the main utilities they wanted to use (group management, threaded discussion, file sharing and messaging). Groups did not use any of Facebook's more innovative tools, i.e. its 35,000-plus user-developed applications. Both in open-ended survey

comments and in case study interviews students commented, unprompted, that Facebook was more appealing than their LMS because it was simpler and easier to use.

Facebook made it easy for students to initiate a study group quickly and informally. Then groups deployed its tools with varying success to exchange learning resources, information and advice and to maintain a sense of being in a learning community through announcements, conversations and records of shared activity. In some cases, problems arose as students discovered that aspects of Facebook layout and functionality actually impeded educational activities. Its features to support socialising could distract students from studying. Infrequent users could find it hard to navigate large volumes of content. It was not possible to upload text files (Group B appropriated a non-Facebook tool as a work-around). Group C endured for the whole semester but with minimal member engagement. Of the groups established in the pre-exam period, A's many members accessed and shared frequently, as did D's few members, while in B fewer than 10% of members made a meaningful contribution.

In no case did Facebook's 'groups' feature alone create or sustain a group dynamic. For instance group management factors affected the operation of groups. The creators of group A were graduate entry students who not only contributed content knowledge but also exercised group moderation skills. Group D members ran their group collectively as an extension of their friendship of several years. The individual behind Group B established an online environment and populated it but took no further steps to animate it. In Group C, where students did not otherwise interact outside the classroom, no natural intellectual leader emerged.

The presence or absence of a code of conduct also affected members' trust and confidence in group participation, on two levels. With regard to the appropriateness of content, Group A moderators regulated for relevancy and Group D had a consensual approach to controversy, while members in Groups A, B and D self-censored publication of trivial or erroneous information. With regard to ground rules governing the exchange of information, members of Groups A and D described a shared sense of what was fair and just which was seen to be needed in Group B and which eluded Group C.

Conclusions

Why and how are students using Facebook to support learning?

These case studies showed a variety of rationales and aims, not unlike those that might underlie any informal in-person study group, for students' establishment of Facebook study groups. Understanding the contexts that give rise to them and their ambitions may give educators insights that are relevant to improving aspects of course structure or delivery. In particular, in light of disparaging comments that emerged during this investigation, educators interested in using online learning to enhance a course may need to review their current implementations of LMSs.

Even though students' functional requirements for their Facebook study groups appear to differ little from those

offered by a conventional LMS, the usability of the tools and the facility to decide when, how and with whom they wish to work online appear to be important points of difference for students. Contrary to some educators' expectations, these case studies showed that students used Facebook's affordances very conservatively to support their learning, not making major innovations in study techniques, nor going beyond their university to form learning networks. Further, the idea that technologies like Facebook can transform students from passive and disengaged to active and participatory learners was not well evidenced, with only a very limited number of the students in Facebook study groups contributing strongly to them.

How appropriate and effective is students' use of Facebook to support learning?

These case studies revealed students seeking to use Facebook groups to focus on topics relevant to developing medical knowledge, skills and attributes and trying to prepare for mainstream activities such as problem based learning tutorials, hospital rotations and objective structured clinical examinations. Moreover, group members demonstrated a tendency to control the quality, and to avoid the misuse, of shared resources and information. However, they made no connection with more professionally oriented social networking sites that might be worthwhile for their future professional learning, nor with other aspects of how social web technologies might support professional practice.

Facebook made peer learning convenient and enriching for some members of one group (A) and all members of another (D); but for two other groups it did not deliver as hoped, largely due to non-technical factors related to group organisation and member self-discipline. Nevertheless, students from all four groups spoke positively about Facebook's potential to support their learning even though this was not realised in what some had experienced.

In this investigation, students' under-reporting of their education-related Facebook use leaves open the possibility that appropriate and effective use may be overall less certain than these four cases show.

What are the benefits and challenges for learners and teachers?

Individual students' differing expectations about the balance between socialising and academic activity in a Facebook study group, and group mechanisms to maintain this balance, must be raised, negotiated and resolved for a group to function successfully. Three of the four study groups did not separate academic information and communication from non-study-related socialising. Group D found using Facebook for study was helpful by virtue of the way that it built on existing social relationships. Group C's experience was that in the absence of pre-existing social relationships and without committed leadership, Facebook did not foster socially supported learning as hoped. On the other hand, some students felt that the blurring of studying and socialising detracted from individual and group learning. Group A tried to constrain blurring of

the boundaries, and Group B succeeded by minimalist use of Facebook.

These findings may suggest that medical educators could have a role in advising students on how to conduct online study groups so as to get better value from them, or even in monitoring or guiding their activities. However, educators should exercise caution about intervening directly in Facebook. Students in this study consistently regarded Facebook as a social study space beyond the reach of university staff. It appears problematic for staff to try to formalise Facebook use in education, considering this student attitude and the issues of privacy (the sharing of personal information that Facebook entails) and equity (the not-insignificant number of students who do not wish to use Facebook to support their learning).

If students have an open mind about using Facebook educationally, there is an opportunity and some prospect that they can use it to good effect during their studies. If students are motivated to maintain contribution, interest, regulation, social ties, a knowledge base and a structured approach to educational objectives, then the unique environment that Facebook offers has the potential to enhance their learning experience. This is a worthwhile message for students who are experienced Facebook study group members to share with their peers, since the findings reported here suggest that using Facebook as part of learning and teaching is as much of a challenge for most students as it may be for educators.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Notes on contributors

KATHLEEN GRAY, PhD, is a Senior Research Fellow in Health Informatics at the University of Melbourne with a research interest in the role of new Web technologies in learning and decision-making by health professionals and healthcare consumers.

LUCAS ANNABELL is a Medical Student completing clinical studies at the University of Melbourne. The research reported in this article is based on an Advanced Medical Sciences project he conducted in the Biomedical Multimedia Unit under Dr Gray's and Dr. Kennedy's supervision in the research year of his degree.

GREGOR KENNEDY is an Associate Professor in the Graduate School of Medicine at the University of Melbourne doing research into educational simulations. He led the University's Biomedical Multimedia Unit for over a decade and is internationally recognised for his expertise on educating the 'Net Generation' in universities.

References

- Bakardjieva M. Ethics 2.0: Balancing privacy, publicity and prudence, Paper presented at Virtual Knowledge Studio, 2008 June; Amsterdam, Netherlands.
- Boulos MNK, Wheeler S. 2007. The emerging Web 2.0 social software: An enabling suite of sociale technologies in health and health care education. *Health Info Libr J* 24(1):2–23.
- Bugeja MJ. 2006. Facing the Facebook. *Chron High Educ* 52(21):C1.
- Caruso J, Salaway G. 2008. The ECAR study of undergraduate students and technology: Key findings. Boulder (CO): EDUCAUSE Center for

- Applied Research. [cited 2009 February 1]. Available from <http://www.educause.edu/ecar>
- Conole G, De Laat M, Dillon T, Darby J. 2008. 'Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology. *Comput Educ* 50(2):511–524.
- Dalsgaard C. Social networking sites: Transparency in online education. Paper presented at EUNIS Congress, 2008 June; University of Aarhus, Denmark.
- Dron J, Anderson T. 2007. Collectives, networks and groups in social software for e-learning. In: Bastiaens T, Carliner S, editors. *Proceedings of world conference on e-learning in corporate, government, health-care, and higher education 2007*, Chesapeake (VA): Association for the Advancement of Computing in Education. pp. 2460–2467.
- Ellison N, Steinfeld C, Lampe C. 2007. The benefits of Facebook 'friends': Social capital and college students' use of online social network sites. *J Comput Mediat Commun* 12(4):1143–1168.
- Eysenbach G. 2008. Medicine 2.0: Social networking, collaboration, participation, apomediation, and openness. *J Med Internet Res* 10(3):22.
- Gunawardena CN, Hermans MB, Sanchez D, Richmond C, Bohley M, Tuttle R. 2009. A theoretical framework for building online communities of practice with social networking tools. *Educ Media Int* 46(1):3–16.
- Huijser H. 2008. Exploring the educational potential of social networking sites: The fine line between exploiting opportunities and unwelcome imposition. *Stud Learn Eval Innovat Dev* 5(3):45–54.
- Ipsos MORI. 2008. Great expectations of ICT: How higher education institutions are measuring up: Research study conducted for the Joint Information Systems Committee. June 2008, London: JISC.
- Jenkins H, Clinton K, Purushotma R, Robison AJ, Weigel M. 2006. Confronting the challenges of participatory culture: Media education for the 21st century. John D. & Catherine T. MacArthur Foundation. [cited 2009 March 3]. Available from: http://digitalllearning.macfound.org/atf/af/%7B7E45C7E0-A3E0-4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF
- Kolek EA, Saunders D. 2008. Online disclosure: An empirical examination of undergraduate Facebook profiles. *NASPA J*, 45(1):1–25.
- Liccardi I, Ounnas A, Pau R, Massey E, Kinnunen P, Lewthwaite S, Midy MA, Sakar C. 2007. The role of social networks in students' learning experiences. *ACM SIGCSE Bull* 39(4):224–237.
- Pempek TA, Yermolayeva YA, Calvert SL. 2009. College students' social networking experiences on Facebook. *J Appl Dev Psychol* 30(3):227–238.
- Sandars J, Haythornthwaite C. 2007. New horizons for e-learning in medical education: Ecological and Web 2.0 perspectives. *Med Teach* 29(4):307–310.
- Sandars J, Homer M, Pell G, Croker T. 2008. Web 2.0 and social software: The medical student way of e-learning. *Med Teach*. DOI: 10.1080/01421590701798729. [cited 2009 March 3]. Available from: <http://www.informaworld.com/smpp/content~db=all~content=a790769081?words=homer|pell|croker&hash=989907555>.
- Sandars J, Schroter S. 2007. Web 2.0 technologies for undergraduate and postgraduate medical education: An online survey. *Postgrad Med J* 83(986):759–762.
- Selwyn N. Web 2.0 applications as alternative environments for informal learning: A critical review. Paper presented at the OECD-KERIS International expert meeting – Session 6 – Alternative learning environments in practice: Using ICT to change impact and outcomes, May 2007, Cheju Island, South Korea. [cited 2009 March 3]. Available from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.117.9470&rep=rep1&type=pdf>
- Silverman SC. 2007. Creating community online: The effects of online social networking communities on college students' experiences. How can student affairs professionals best respond to this emergent phenomenon [Unpublished doctoral dissertation]. Los Angeles: University of Southern California.
- Thompson LA, Dawson K, Ferdig R, Black EW, Boyer J, Coutts J, Black NP. 2008. The intersection of online social networking with medical professionalism. *J Gen Intern Med* 23(7):954–957.
- Wiberg M. 2007. Netlearning and learning through networks. *Educ Tech Soc* 10(4):49–61.