

Social Networking in Education

*Niall McCarroll, School of Computing and Intelligent Systems, University of Ulster,
Londonderry, Northern Ireland, UK*

*Kevin Curran, School of Computing and Intelligent Systems, University of Ulster,
Londonderry, Northern Ireland, UK*

ABSTRACT

Social networking has become one of the most popular communication tools to have evolved over the past decade, making it a powerful new information sharing resource in society. To date realising the potential of Social Networking Sites (SNSs) beyond their leisure uses has been severely restricted in a number of areas. This paper focuses on the application of SNSs in a learning environment and the impact this could have on academic practices. While undoubtedly, due to the very casual nature of social networking, there are serious concerns over how it could be integrated in a learning environment; the potential positive outcomes are many and varied. As a communication tool, its effectiveness is already manifesting in the millions who use these networks to communicate on a daily basis. So it is conceivable that educators should be able to create a learnscape - an environment for formal and informal learning - that adheres to educational guidelines, but also harnesses the social support system of these on-line communities. This paper examines the risks involved in the creation of this new learning ecology, and explores the challenges faced by both technology experts and teachers in delivering a truly innovative and effective new approach to education.

Keywords: *Education, Learnscape, Online Learning Communities, Social Networking, Social Networking Sites*

1. INTRODUCTION

Online learning communities are as old as the Internet itself. The internet started life in 1969 as the U.S. Department of Defence's ARPANET. This was the first global computer network and it allowed government engineers and scientists to conduct research anywhere on the network. In 1989 the World Wide Web (WWW) was created at the European Particle Physics Laboratory in Geneva. The Web facilitated learning by enabling scientists to share information more efficiently over the internet using hypertext documents. Since then Web technology and

knowledge communities have radically evolved. Web 2.0 and social networking tools are changing the environment and possibilities for education. Much of the focus of Web 1.0 activity was publishing static content for users to passively absorb. But with the rapid development of Web 2.0 tools and social computing, users can now be active participants in the construction of their own learning experiences. Technologies like blogs, wikis, media-sharing services, mashups and collaborative editing tools are harnessing the "collective intelligence" of students and teachers, promoting collaboration and the sharing of knowledge (Mason & Rennie, 2008). Modern students are already fully engaged with Web

DOI: 10.4018/jide.2013010101

2.0 technologies and confidently use social networking tools and online social spaces in their personal lives. This presents an opportunity for educators to harness this enthusiasm for technology and utilise these resources within an educational framework. Four Web 2.0 principles that are central to the development of a Web-based education infrastructure (O'Reilly, 2007) include:

1. **The Web as a Platform:** There should be a shift of focus from computer-based education to web-based education. The web is a platform for knowledge publication and sharing, referencing learning materials, conducting assessment and communication and collaboration between teachers and students.
2. **Harnessing Collective Intelligence:** This essentially is the underlying principle of all Web 2.0 activity. Users are no longer passive observers and have become collaborators and contributors to new content and sites. Hyperlinks connect to and from this new content as the Web grows organically through the collective activity of users. Both educators and students benefit from the new 'gift culture' of contributing as much as you take from your online experiences.
3. **Rich User Experiences:** The Web provides rich multimedia educational experiences for students. Lectures and other educational materials can be delivered in a variety of formats with the seamless integration of class-based and virtual learning content.
4. **Data is the Next Intel Inside:** As more people use the Web, more data is created and evolved. With more students and teachers involved in creating educational content, the quality, reliability and availability of information improves. Subsequently every browsing session now becomes a continuous learning experience for the user.

Social networking is well established as a significant part of the world's communication structure. Social Networking Services (SNSs)

such as Facebook, Google+, and Twitter, connect people through shared activities. SNS members can create personal profiles, join interest groups and upload videos, pictures and music. Social networks grow as user profiles are linked to friend profiles and other social groups. Online Communities with communal message boards can evolve from school networks, employment networks and other shared interest groups. A social network user can search for friends, add friends, share ideas, and events through posting public comments and sending private messages. SNSs incorporate recommendation systems linked to rating or 'like / dislike' preferences allowing users to make informed decisions when sourcing information. The advantage of social networks, as with all Web 2.0 tools, is the ease of use and accessibility. While these social information systems are essentially leisure focused, there is a growing emphasis on exploiting the tools for education and other productive pursuits (Olson et al., 2010). This paper begins by assessing the impact of social software on our changing relationship to knowledge. The Internet can now be seen as a research network, where knowledge is created through collaboration and shared experiences, and how this impacts the learning strategies of students shall be examined. Social software tools promote interactivity and create engaging learning environments, and two Web technologies that show great promise in the educational domain are wikis and blogs. The applications, advantages and disadvantages of these tools in an educational setting will also be assessed.

A Learning Management System (LMS) is a software application for managing teaching content and assessment. In relation to delivering education programs LMSs are considered inflexible and teacher-oriented. A comparison of Social Networking Services and LMSs will be made in this paper, examining the benefits and limitations of both, and highlighting the need for greater integration between the two in the delivery of a more effective system. In the past number of decades the proliferation of technology has given rise to a tech-savvy generation of 'Digital Natives' (Prensky,

2001). The profile of the modern student and their educational needs will be detailed, underscoring the complexity of the challenge faced by educators in meeting those demands. At the core of this problem, there is evidence that educators have failed to fully embrace the emergent Web 2.0 technologies, leaving a gap in the potential application of social networking in education and the actual practical use of this medium. Therefore the factors influencing the poor uptake social software within education systems also merit examination. There has been significant research into the use of social networks as support structures for students within an educational infrastructure, and the use of social software for promoting student outreach, learning excellence, motivation and self-efficacy is reviewed. We also examine the increasingly important and relevant issue of mobile computing, focusing on its role regarding social networking and education, and the potential benefits and risks. Finally, we will conclude by looking at the way forward and new goals for sociotechnical infrastructures. Promoting social networking to cultivate civic responsibility and lifelong learning is the obvious desired goal, but the question remains, can educators and technical experts ever take a fully cohesive approach to tackling the many complex issues head on?

2. SOCIAL LEARNING

Social software is changing our relationship to knowledge. Academics and researchers have readily adopted Web 2.0 technologies as a way of sharing knowledge and collaborating with others in a distributed, global learning environment. Indeed much of the source material used in researching this paper on social networking and education is readily available online. As new digital forms of scholarship become more and more popular, there needs to be a way of evaluating them and recognising them as acceptable forms of academic work (Mason & Rennie, 2008). The Internet can now be viewed as a research network, where knowledge is created

and shared. Knowing how to find information has become more important than knowing the actual information itself. Web 2.0 tools support a constructivist approach to education where students discover and construct knowledge as opposed to acquiring it. This enables a two-way knowledge exchange where students can not only obtain information from the Internet, but also contribute and upload knowledge to it. Teachers and educators need to embrace this new approach in their teaching strategies, and provide an infrastructure to support the construction rather than the transfer of knowledge. Empowering students to take charge of their learning shifts the role of the teacher from instructor to learning partner. Learners are given greater choice by providing different ways of navigating through curriculum content (Beldarrain, 2006). Giving students ownership of their learning promotes a deeper understanding of concepts. However, there needs to be a balance between the freedom and creativity of developing your own learning experience and ensuring that some level of structure is adhered to, so that deadlines and goals are met (Mason & Rennie, 2008).

2.1. Collaborative Learning

Social networking encourages participation and collective contribution. Anderson (2006) examines the importance of "People Power" in the "age of peer production." Giving the examples of video sharing on YouTube and the power of user reviews on Amazon, Anderson highlights that the business models of the world's most successful Web companies are built on user-generated content. With the development of Web 2.0 tools, new practices of sharing information are constantly emerging (Flickr, YouTube, and Slideshare), entirely user led and user oriented, rather than just an information bank to be accessed when required. Along with these come new mechanisms of collaboration and communication including blogging, micro-blogging (Twitter), wikis, peer-to-peer mentoring and online debate. Assessing the impact of technology on collaboration, Johnson and

Johnson (2004) report that cooperative learning results in higher academic achievement than individual learning. They conclude that “Few educational innovations hold the promise that technology-supported cooperative learning does.” In an open-source culture, creativity becomes a shared experience. The sharing of online communal spaces and peer-to-peer communication is a “massive part of what excites young people and therefore should contribute to users’ persistence and motivation to learn” (Mason & Rennie, 2007).

2.2. Social Tools for Education

Social software helps users build communities of interest on a wide range of subject matter through collaboration. Two Web technologies that facilitate the creation of user-generated-content are wikis and blogs. Both these tools are used to build engaging learning experiences and show great promise in the educational domain (Beldarrain, 2006). Wikis are open editing web sites that allow a community of users to collaboratively add and update content, resources, and links to other internal and external web pages. Multi-participation leads to rapidly evolving content and helps to reduce inaccuracies and misinformation. Wikipedia (Figure 1), the online encyclopaedia, is the most famous example of a wiki community of more than

75,000 contributors sharing and contributing to vast amounts of information (Tsai et al., 2011).

Wikis empower students to be the co-creators of learning content. This fits in with the proactive approach to education promoting learning as an involving, shared experience as opposed to the passive absorption of fixed information generated by a teacher. As a wiki can be formed around any subject matter they are the perfect medium to develop group discussion projects for academic courses. Wikis promote collaboration and by sharing the construction of information, students as individuals gain important team-work skills. Creating a wiki requires little technical skill making the medium accessible to teachers and students from a variety of backgrounds. The information in a wiki is fluid and changeable to reflect the progress of knowledge and the changing needs of the users. By linking to and from other resources and related content wikis also contextualise knowledge and widen the scope of student understanding. Wikis preserve the history of a page allowing users to compare the most up-to-date version with previous revisions. This visibility can help teachers trace the activities of students and assess their overall contribution to a project (Kussmaul, 2011). Allowing all members of a wiki system the ability to modify all content has a number of drawbacks when applied to a classroom situa-

Figure 1. Wikipedia has over 75,000 collaborators creating articles in 10 different languages



tion. There will always be certain sections or pages, such as assignments or syllabus content that should only be modified by an instructor. This could be achieved by assigning ownership to a page or setting true/false modifiable attributes (Wang & Turner, 2004).

Critics argue that user-generated knowledge platforms such as wikis and blogs undermine the role of the expert. Information that is generated in this open and unmonitored environment can't undergo the same rigorous critical evaluation that a peer-reviewed journal paper would receive. To ensure accuracy there may need to be a consensus on who is allowed to edit the content of a wiki. This could be enforced with the use of registered user groups with passwords to access editing functions. Tsai et al. (2011) developed a wiki based software engineering project for undergraduate students to support group discussions on project planning and requirements analysis. Students found the approach to be a rewarding experience increasing student motivation, self-directed learning and peer support for learning. However, the authors did note that there was difficulty ensuring that peer-to-peer evaluation was impartial with many students stating that they were uncomfortable evaluating other students' work. There was also difficulty guaranteeing that only quality work was published on the student wiki. Given the level of incorrect information being detected in the final submissions, the authors conclude that too much emphasis is placed on sharing and collaboration and not enough emphasis is placed on quality control. Quality and accuracy are necessary for information banks such as wikis. Without proper evaluation, inferior or incorrect knowledge creeps into the knowledge structure and becomes incorporated into the 'collective intelligence.' A blog (weblog) is more dynamic than a personal home page. It is a form of online diary or journal allowing a user to post entries of interest in reverse chronological order (most recent at the top). Blogs can include links to other sites or articles of interest, and other users can post comments enabling themed discussions and sharing of related information. Teachers can use blogs to reinforce themes that have been covered

in the classroom and extend knowledge with additional information and links to resources. Students can use this medium to share ideas and provide feedback on how they are progressing within a course. Blogs enable quick access to new resources, encourage writing skills, and independent learning through discovery of new knowledge. Students can follow blogs of the various experts in their field of study placing what they learn in class into context with real-world activity. Peer feedback allows bloggers to evaluate the accuracy and quality of their contributions thus filtering and refining the information being made available. There are issues of motivating students to exchange opinions and ideas. As blogs are in the public domain, less confident students may be less willing to express themselves or their opinions. Blogs can provide a rich learning experience provided the sources are reliable and trustworthy, and some experts believe that students must be allowed the opportunity to make judgments on the worthiness and accuracy of online information. Other educators feel that students lack the critical skills to evaluate the legitimacy and reliability of this vast amount of unauthenticated digital content (Mason & Rennie, 2008).

2.3. Learning Management Systems

The rapid development Web 2.0 and social networking tools presents a challenge for the proprietary Learning Management Systems (LMSs) that are implemented by universities and higher education institutions. LMSs such as Moodle or Blackboard are software applications for managing and administering teaching content and assessment for education and e-learning programs. Initially designed for the individual user, access they have gradually evolved to include collaborative and social features, allowing users more interaction with peers as well as top-down instruction. Even with the addition of the new social interaction features, LMSs are considered inflexible and teacher-oriented. They are predominately used by teaching staff as information repositories for

course materials such as lecture presentations and supplementary material (Bubas et al., 2011; Ryan et al., 2011). The one advantage of using a LMS is that all learning content is stored and organised in a single Virtual Learning Environment (VLE). The content created by students on different Web 2.0 systems such as blogs or wikis can be fragmented and distributed throughout poorly organised web spaces. This fragmentation prevents easy access to information and has a negative impact on peer-to-peer learning and knowledge distribution (Ryan et al., 2011). Bubas et al. (2011) propose a more integrated environment merging a Moodle system with built-in wiki tool and Mahara e-portfolio system. The authors found that the separate artefacts created by the different tools were more effectively managed within the integrated system. The authors conclude that integrating these current learning platforms with Web 2.0 functionality has the potential of creating more personalised learning environment for students. This is of particular value in hybrid or blended learning environments that combine traditional face-to-face classroom-based learning with online learning environments Ryan et al. (2011) highlight the limitations on the mobility of Learning Management Systems compared to SNSs. Moodle is only available for iPhone devices (not Blackberry or Android). Blackboard must be facilitated by every university establishing and maintaining a mobile service application package to provide mobile service to students. Blackboard have attempted to redress this by offering a Facebook Application featuring some Blackboard functionality. While SNSs are not always ideal in all learning situations, in general *“student educational, cultural, and social adaptation can benefit from the characteristics provided by an SNS.”*

2.4. Educating the Digital Native

There has been extensive research in higher education on the learning characteristics of ‘Millennials’ (students born since the early 1980’s). Prensky (2001) believes that the makeup of these students has radically changed and that outdated

education systems can no longer facilitate them. A distinction is made between ‘digital natives’ (the Net Generation who have grown up with technology and to which all things digital are natural) and ‘digital immigrants’ (those who have had to familiarise themselves with technology as mature adults). Prensky believes that modern students have had such a wealth of interaction with technology that they “think and process information differently from their predecessors.” There have been a number of studies on the behaviour and attitudes of students who have grown up with digital media. This research attempts to measure the impact of a ubiquitous technological environment on the learning habits of Millennials. Modern students exhibit the following learning characteristics.

- Multi-tasking and parallel processing.
- Preference to learn from multimedia (pictures or video) rather than text.
- Preference for interactive networked learning rather than individual study.
- Preference for experiential learning activities.
- Non-linear learning.
- Millennials have good visual-spatial skills, crave interactivity and seem to prefer teamwork.

The research also highlights that there are negative aspects to these learning characteristics including short attention spans, poor literacy and a lack of ability to evaluate the reliability of online content (Oblinger & Oblinger, 2005).

We live in an information economy where knowledge is the driving force of social and economic development. The technology that a society adopts moulds what a society becomes, therefore individuals who do not participate in the information and knowledge network “will be left behind” (Johnson & Johnson, 2004). Educators must adopt this technology in an effort to connect with the new and engaging learning styles of young students. While some commentators emphasise the superficiality of social software and informal learning, Kapp (2006) warns that failure to embrace this fast

growing social phenomenon and recognise its potential as a teaching tool, will result in education systems that do not satisfy the needs of their students. “Conducting traditional classroom lectures for these gamers isn’t going to cut it and neither is our multiple-choice question, e-learning module format. We better stop bad mouthing Web 2.0 or eLearning 2.0 and start using these technologies or by passed up by the ‘digital natives’” (Kapp, 2006).

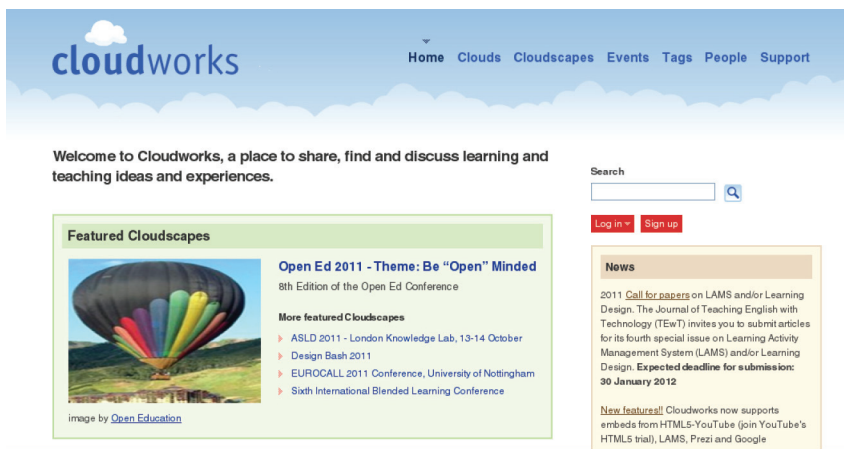
2.5. Educating the Educators

There is evidence from the literature that educational systems are failing to fully exploit the real affordances of Web 2.0 technology. Conole and Culver (2010) identify a gap in the potential application of technologies in education and their actual practical use. They principally focus on the limitations on new technologies aimed at providing new methods of learning on-line. They maintain that teachers themselves lack the expertise required to fully utilise these technologies, and even the awareness of their potential as learning tools. And compounding this, they call for a radical overhaul of the learning design process. To simplify their approach to the argument they divide the technologies into three phases, according to timeframe. Starting with Computer Assisted Learning and multimedia developments from the 1980’s to the emergence

of the Internet in the 1990’s, and the increasing popularity of gaming and virtual world technologies over the past decade. They essentially argue that while each so-called innovation is defined by different technological features, a similar pattern of use eventually emerges. And each of these developments demonstrate little true innovation and instead result mainly in the repetition of mistakes, failing to live up to their initial premise. At the core of this failure are a number of features, they argue, including the current educational system itself which is confined by curriculum and assessment practices not developing in tandem with emerging new technologies. Another major impediment lays with the teaching staff who lack knowledge about these emerging technologies, and how to appropriately apply these new learning tools in the classroom. A lack of support and education for our educators can only result in such technological developments entirely losing their impact. They demonstrate their argument by outlining the social networking site Cloudworks (Figure 2), which aims to provide a dynamic environment to assist teachers in sharing and discussing teaching ideas and designs.

They argue that all these Web 2.0 tools have their ‘social uses’, but are not as effective in an educational context. While these tools have become the norm through the increase in

Figure 2. The cloudworks social networking site for teachers and course designers



communication devices being used in our everyday lives, this is not reflected in education. The authors of the paper aimed through their examination of Cloudworks to identify what new patterns of Web 2.0 user behaviour are emerging, and use them to understand more about the design of learning activities. Ultimately they hoped to identify new ways of utilising Web 2.0 technologies in an educational context. In conclusion regarding Cloudworks, the authors found it challenging to fully utilise the Web 2.0 technology to comprehensively achieve their goals, facing both social and cultural barriers. They recommend an entire overhaul of current practices that is teacher focused, and specifically geared towards educating the educators (Conole & Culver, 2010).

2.6. Creating Support Networks for Students

Despite massive success, Facebook's use in an educational setting has been poorly charted and the use of social networking in general as an educational tool is under explored. Therefore, social networking may be more beneficial as a support tool for new students hoping to adapt socially, academically and culturally to a new learning and social environment, such as a new college. Ryan et al. (2011) examine the impact of social networking sites on the cultural adaptation of PhD students to their new educational environment. The high rate of attrition among PhD students can be attributed to feelings of social isolation. Due to the intensity of the academic work carried out in isolation during their first year, many students drop out they argue, without the necessary social support. The authors stress that socialisation leads to a more inclusive and supportive environment for new students, therefore it is important for educational establishments to provide social, as well as academic, support mechanisms amongst the students themselves and with the faculty.

A SNS such as Facebook is therefore the perfect tool to improve both educational as well as cultural adaption. It provides an informal forum they argue for students and faculty to informally discuss personal and educational

issues. The authors found that using such sites was beneficial to students on a number of levels, facilitating knowledge exchange, alleviating apprehension, enabling socialisation and building community. They go on to make a series of recommendations to academic staff on the use of social networking in an educational context. Key issues such as privacy and the blurring of social boundaries between staff and students are addressed, with the authors stressing the need for strict privacy guidelines. They also state that students should be actively encouraged to participate in discussion on social networking sites due to the contribution they themselves can make in helping provide others with new perspectives. One way of doing this is to ask students to contribute once a week or a given number of times per semester as part of their course assessments. According to Heinze and Proctor (2006), students lack the motivation to communicate online unless there is some incentive, such as marks towards assessment. The authors suggest that in order to evaluate the effectiveness of SNSs as an educational tool, ongoing assessments must be carried out to establish their true impact. One method they suggest is the completion of an anonymous online questionnaire. Overall they found that the use of SNSs had mostly a positive impact on providing extra support and information for doctoral students, enhancing the delivery of the PhD programme. They aided knowledge exchange, supported international students trying to integrate within a new social and educational environment, alleviated apprehension, and helped combat social isolation.

2.7. Social Networks and Student Motivation

Social networking can also be used as a motivational tool to promote self-efficacy amongst students. In a study by Bowers-Campbell (2008) Facebook was used as an academic motivation tool for students in a developmental reading course. A system of virtual gifts was introduced as a reward system acknowledging the efforts of students on the course with the aim of improving the 'connectedness' between

student and instructor. For example, the first student to master an assigned vocabulary task received a 'congratulations balloon' on their public gift wall. The author concluded that two features of Facebook that show promise for building motivation in students were its' popularity amongst adolescents and the outreach potential for teachers. Another study by Mazer et al. (2007) examined the impact of the level of instructor disclosure on undergraduate students via Facebook. It found that the level of disclosure between instructor and student directly affected levels of academic performance, influencing motivation and affective learning. The majority of students who viewed a teacher with high-to-medium self-disclosure reported positive attitudes towards the openness and approachability of the teacher. The students' positive perception of their instructor's willingness to use the features of Facebook had a positive impact on their own willingness to utilise the features creating a positive classroom environment.

3. MOBILE TECHNOLOGY AND SOCIAL NETWORKS

1.2 billion mobile devices are produced each year. Devices such as smartphones and tablets have now become 'doorways' to the Internet offering ubiquitous anytime access to social networks and online learning content. With mobile manufacturer Ericsson reporting that up to 80% of people accessing the internet do so on mobile devices, attitudes about student access to portable technology will have to be re-examined (New Media Consortium, 2011). Cramer and Hayes (2010) report that in the US 93% of teens go online, 73% use social networking sites, 75% own a mobile phone, and 66% use text messaging. But there is a disparity between the widespread use of this growing communications infrastructure by young people, and the promotion of its use in schools, which fail to tap into this much used resource. The authors highlight that schools must navigate a complex set of issues when considering the use of mobile phones or other

portable devices. These issues are both financial and legal resulting in few educational applications being developed for the classroom. The biggest hindrance to the progression of these technologies in an educational setting are possibly schools' acceptable-use policies, which set boundaries for mobile phone and social media use in the classroom. Many researchers emphasise the advantage of 'anytime, anywhere learning' and are behind further research into the educational benefits of utilising social networking more effectively (Shuler, 2009). Students use their mobile phones and social networking on a daily basis to co-ordinate both their social and school lives, using internet resources to aid study and share resources with friends, and texting to communicate about their studies. *"Mobile technology can open up new possibilities for on-the-go and just-in-time learning"* (Cramer & Hayes, 2010). The authors highlight the benefits to children who can't attend school, by extending the influence of their peers via social networking from the classroom to the home. And they stress the importance of students' own contribution to learning based on exchanging information online, which serves as an extra support to adult-led teaching. The authors point out that often the skills used to partake in successful on-line interactions mirror those required to establish successful relationships in the real world, improving their performance in society. Therefore using these networked technologies in the classroom has a direct impact on their everyday lives. US schools remain torn between wanting to maintain the educational standards of the past, but hoping to discover more innovative ways of reaching out to students, namely through new technology (Cramer & Hayes, 2010). When weighing up the potential risks and benefits issues which will have to be addressed include security, privacy and message etiquette, they stress. And with more pressure being exerted by parents for mobiles to be allowed in case of emergency, a total ban is unrealistic they argue, so these regulations really should be in place. Concerns over sending sexually explicit material, or 'hate speech,' in particular highlight the need

for strict guidelines to be established by local school boards. The challenge which arises is how to maintain the legal right to free speech at school when establishing acceptable-use policies safeguarding students. The fact that these technologies are literally mobile also poses difficulties regarding where offences are committed, on or off school property, and whether schools are responsible for disciplining perpetrators.

4. RISKS TO STUDENTS

Cramer and Hayes (2010) outline a series of risks to students associated with social media that will have to be taken into consideration when forming school policy. These include sexual solicitation, online bullying, and cheating in the classroom. Schools face the challenge of implementing effective technology and procedures to combat these problems, and while tools such as internet filters can be effective in some cases, areas such as Cyberbullying and cheating can be more difficult to define and combat. Where this impacts on the well-being of a student schools must be liable, especially if it involves other students, and the authors stress that new trends in student harassment must be studied. Victims of on-line bullying tend to be individuals vulnerable to bullying off-line. Therefore, in some cases it could be concluded that SNSs can actually increase the likelihood of bullying by providing more opportunity for individuals to be targeted, making it essential that resources are placed at their disposal to cope with the problem.

Another negative aspect of using mobile devices in the classroom this time affects teachers, namely using mobiles to disrupt the class and distract from academic study. The authors go on to conclude that the only means of establishing truly effective strategies to tackle this raft of problems is by educators and technology experts collaborating and exchanging information. Only then can the concerns be properly identified and technology appropriately integrated into the classroom environment. They recommend that teachers embrace the distraction of mobile de-

vice use in the classroom, including this as extra input to class discussion. And they believe that social networking sites could be used to teach students about appropriate online behaviour. They also argue that acceptable-use policies restrict innovation in education via these technologies, and should remain “flexible enough to protect students and faculty while supporting innovative practices” (Cramer & Hayes, 2010). The NMC Horizon Project produces an annual report identifying emergent technologies and their impact on teaching and learning. There is evidence from the 2011 Horizon Report that education systems are starting to recognise the potential of incorporating mobile technology into the classroom. The Burrell School District in Pennsylvania now allows students to use cell phones in class to assist with assignments. They also report that other institutions are starting to incorporate portable devices into their technology planning. The report provides real world examples of mobile device and social networking use in educational practice. OurPlayground.org (Figure 3) is an ongoing ‘citizen science’ project from the University of Chicago. Students are encouraged to be amateur scientists, creating their own data collection projects using social networks and mobile devices.

The entire process incorporates STEM (Science, Technology, Engineering and Mathematics) learning into the students’ own areas of interest such as art or music, bringing science to students who aren’t necessarily comfortable with the subject area. Our-Playground.org provides students with social networking tools to collect information and find answers from fellow users. This encourages children to collaborate with fellow ‘scientists’ and create their own learning experiences (New Media Consortium, 2011).

5. MEDIA LITERACY AND THE WAY FORWARD

While the evolving social networking infrastructure is essentially leisure focused, there is a growing emphasis on using these tools for more productive purposes. Olsen et al. (2010)

Figure 3. The Our Playground citizen science project



identify five areas which would benefit from harnessing the tools available via SNSs. Their research focuses on the U.S. but is applicable and relevant on a worldwide stage. They suggest establishing interactive domain centres critical to society's interests that would facilitate the exchange of information on key issues including healthcare, disaster response, environmental research and education. They also propose developing a media literacy initiative, aimed at educating the public on the use of various forms of media. Establishing person-to-person diplomacy, promoting peace and preventing crime is also suggested, as well as an ongoing national snapshot to provide continuous information about the population. Finally they propose a study of the role social networking plays in innovation to determine how SNSs relate to success.

All of these programmes, they stress, are aimed at encouraging people to be more active social networkers in a bid to improve civic engagement on a number of levels. While each area of study is different the authors hoped that the programmes would complement each other and "*bring overall civic participation to a higher level.*" One key area is the establishment of what they term Critical Domain Centres, described as 'research centres without walls' where experts and staff can use social media to effectively exchange information for the greater good of a programme, such as healthcare or disaster relief.

These centres would bring the following benefits, they argue, for the US nation: "Healthier, safer and better off economically; more energy efficient and aware of energy saving practices; better educated and with less of a divide between cultures; more aware and understanding of social diversity; richer in political participation at the local, state, and national levels; and better able to enjoy international relations." Media Literacy is a key issue in education and the authors stress that all levels of society should be better educated in media use. Because we increasingly make media choices on a daily basis people must be aware of the most effective tools available to gain the most productive outcome and promote lifelong learning. They go so far as to argue that by simply improving people's skills in this area and increasing their media awareness empowers them to make informed decisions and ultimately contribute to government reform. At the core of such a programme, the authors stress, there must also be increased awareness of media law, and the responsible use of the internet. They suggest tutorials addressing many of the ethical issues such as plagiarism and use of copyright, be offered by educational establishments and internet service providers. The Horizon Report 2011 recognises the increasing importance of digital media literacy as a key skill for all disciplines. Media literacy is a new way of thinking and, without this ability, students will be limited in

their access to the wealth of learning resources available to them. Before digital media literacy becomes the norm, teachers will have to be supported and trained through proper professional development programs (New Media Consortium, 2011). While Social Networking becomes more and more widely used, users are still restricted in their knowledge of how to use these tools safely and effectively. It requires a national initiative to address the issue and create a new generation of fully competent social networking users.

6. CONCLUSION

Student interaction is at the core of constructivist learning environments and Social Networking Sites provide a platform for building collaborative learning communities. By their very nature they are relationship-centred and promote shared experiences. With the emphasis on user-generated-content, some experts are concerned about the traditional roles of scholarly expertise and the reliability of digital content. Students still have to be educated and assessed within a framework that adheres to strict guidelines of quality. Every student has his or her own learning requirements, and a Web 2.0 educational framework provides enough resources, learning styles, communication tools and flexibility to accommodate this diversity. However, a balance must be struck between flexible strategies of learning and quality of teaching (Beldarrain, 2006). It is obvious that the Web 2.0 medium will only be as good as the educational strategy that it becomes integrated in to. A proper framework for development is required for the design of educational courses and materials. In the future, there should be more of an emphasis on involving students in the sharing and co-creation of knowledge and learning, while teachers take on the role of facilitators of a process that successfully blends formal and informal learning. There should be as much emphasis on designing activities that help students learn through interaction with multi-media and people, as there is on the

development of curriculum content. Educators must provide rich educational environments that promote individual and group activities through multiple channels of communication and collaboration. This approach will encourage students to be more fully engaged and interactive with their learning experiences. These are not new concepts; they have been enshrined in educational best practices for a many years (Mason & Rennie, 2008)

Utilising these technological advances helps make learning more available and more responsive. Social networking and social software tools represent an evolution in learning, as they are changing the way we access information. Knowing where to find information has become more important than knowing the information itself. The public forums provided via Blogs, Wikis and Social Networks, promote and agitate debate acting as a catalyst in the generation and refinement of information. And they provide a new framework for learning that implements a range of useful tools available to both academics and students, promoting greater communication and support. All of these culminate in improved academic performance and a more sophisticated educational environment encouraging deeper learning (Boettcher, 2007). The Web 2.0 tools of production are all generating information at an unprecedented rate, but the content created on blogs, wikis or podcasts can be widely dispersed and loosely connected. So to be of benefit to learning and education, there needs to be a process of consolidating this fragmented information. Integrating these tools into the established Learning Management Systems (LMSs) combines the advantages of both technologies (Bubas et al., 2011). The result would be a unified Virtual Learning Environment (VLE) that acts as a central repository for the products of shared collaboration and self-directed study.

The educational value of SNSs is still very much an unknown quantity with research in this area still in its infancy (Arnold & Paulus, 2010). Social networking is a developing technology that is on the brink of being much more than just a leisure facility, however teachers

are failing to exploit the full potential of these tools and simply use them to “mirror existing practices” (Mason & Rennie, 2008). The novelty of these emergent technologies, a lack of teacher understanding, and limitations within current education systems are to blame for the poor uptake of these tools. Training and support structures must be put in place to inform teaching staff about new technologies as they emerge, and clearly demonstrate their potential application in an educational environment. A perfect example of this is the fact that the promotion of mobile phone and social media technology in schools has been restricted by stringent ‘acceptable use’ policies and standards. The immense popularity of these devices and their potential for ‘anytime, anywhere’ learning cannot be ignored. Educational institutions will have to rethink their policies on mobile technology use, and develop approaches to incorporating these devices into their learning strategies. On a national level, there needs to be a digital media literacy campaign to encourage people to be more active social networkers. The tools available through Social Networking Systems may be used to facilitate the exchange of information, heighten social awareness and civic engagement, and promote lifelong learning. We all can become part of a movement – ‘research centres without walls’ – where scientists, experts, governments, educational facilities and members of the public collaborate and contribute to the general improvement of society. To date the educational value of SNSs has been largely unexplored and underexploited, and perhaps the real value of these systems, and what is key to their immense popularity, remains the ‘Social’ nature of social networking. Utilising this in an educational environment and creating an effective support network for students is probably the way forward, reaching out and establishing a sense of community in these institutions. While this takes the focus away from using SNSs as an academic tool, it instead supports students socially in a bid to improve academic performance through a variety of other strategies. Social networks create relationships which would never occur in the

real world, bringing together a wider spectrum of individuals and overcoming the barriers of geography, class and ethnicity. This provides a rich fabric of material based on a diversity of experience, and promotes learning opportunities that extend beyond both the classroom and our own communities. It is now up to the experts to make the most of this opportunity and turn it into the dynamic global learning resource it has the potential to be.

REFERENCES

- Anderson, C. (2006). People power. *Wired Magazine*. Retrieved from <http://www.wired.com/wired/archive/14.07/people.html>
- Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. *The Internet and Higher Education*, 13, 188–196. doi:10.1016/j.iheduc.2010.04.002
- Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, 27(2), 139–153. doi:10.1080/01587910600789498
- Boettcher, J. (2007). Ten core principles for designing effective learning environments: Insights from brain research and pedagogical theory. *Innovate Journal of Online Education*, 3(3).
- Bowers-Campbell, J. (2008). Cyber ‘pokes’: Motivational anecdote for developmental college readers. *Journal of College Reading and Learning*, 39(1), 74–87.
- Bubas, G., Coric, A., & Orehovacki, T. (2011, May 23-27). The integration of students’ artifacts created with Web 2.0 tools into Moodle, blog, wiki, e-portfolio and Ning. In *Proceedings of the 34th International Convention*, Croatia (pp. 1084-1089).
- Conole, G., & Culver, J. (2010). The design of Cloudworks: Applying social networking practice to foster the exchange of learning and teaching ideas and designs. *Computers & Education*, 54, 679–692. doi:10.1016/j.compedu.2009.09.013
- Cramer, M., & Hayes, G. (2010). Acceptable use of technology in schools: Risks, policies, and promises. *IEEE Pervasive Computing/IEEE Computer Society [and] IEEE Communications Society*, 9(3), 37–44. doi:10.1109/MPRV.2010.42

- Johnson, D. W., & Johnson, R. T. (2004). Cooperation and the use of technology. In Jonassen, D. (Ed.), *Handbook of research on educational communications and technology* (2nd ed., pp. 785–811). Mahwah, NJ: Lawrence Erlbaum.
- Kapp, K. (2006). *Gadgets, games and gizmos: Informal learning at Nick.com*. Retrieved from <http://www.kaplaneduneering.com/kappnotes/index.php/2006/12/gadgets-games-and-gizmos-informal/>
- Kussmaul, C. (2011, July 14–16). Wikis for education - helping students communicate and collaborate. In *Proceedings of the IEEE International Conference on Technology for Education*, Madras, Tamil Nadu (pp. 274–278).
- Mason, R., & Rennie, F. (2007). Using Web 2.0 for learning in the community. *The Internet and Higher Education*, 10, 196–203. doi:10.1016/j.iheduc.2007.06.003
- Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook: Resources for higher education* (1st ed.). New York, NY: Routledge.
- Mazer, J. P., Murphy, R. E., & Simonds, C. J. (2007). I'll see you on 'Facebook': The effects of computer mediated teacher self-disclosure on student motivation, affective learning, and classroom climate. *Communication Education*, 56(1), 1–17. doi:10.1080/03634520601009710
- New Media Consortium. (2011). *The Horizon report 2011 edition*. Retrieved from <http://www.nmc.org/horizon-project/horizon-reports/horizon-report-k-12-edition>
- O'Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *Communications & Strategies*, 65(1), 17–37.
- Oblinger, D., & Oblinger, J. (2005). *Educating the net generation*. Boulder, CO: Educause.
- Olson, G., Mark, G., Churchill, E., & Rotman, D. (2010). New missions for sociotechnical infrastructure. *Computer*, 43(11), 37–43. doi:10.1109/MC.2010.321
- Prensky, M. (2001). Digital natives, digital immigrants. *Horizon*, 9(5), 1–6. doi:10.1108/10748120110424816
- Ryan, S. D., Magro, M. J., & Sharp, J. H. (2011). Exploring educational and cultural adaptation through social networking sites. *Journal of Information Technology Education*, 10, 1–16.
- Shuler, C. (2009). *Pockets of potential: Using mobile technologies to promote children's learning*. New York, NY: Joan Ganz Cooney Centre. Retrieved from http://www.joanganzcooneycenter.org/upload_kits/pockets_of_potential_1_.pdf
- Tsai, W.-T., Li, W., Elston, J., & Chen, Y. (2011). Collaborative learning using wiki web sites for computer science undergraduate education: A case study. *IEEE Transactions on Education*, 54(1), 114–124. doi:10.1109/TE.2010.2046491
- Wang, C., & Turner, D. (2004, April 5–7). Extending the wiki paradigm for use in the classroom. In *Proceedings of the International Conference on Information Technology: Coding and Computing*, Las Vegas, NV (pp. 255–259).

Niall McCarroll is completing a BSc in Computing with the University of Ulster. He is experienced in aspects of computing such as web development, graphic and multimedia design. He has a strong interest in dynamic website development and web 2.0 technologies and uses many web based technologies such as HTML5, XML, CSS3, RSS, and client-side technologies such as Javascript and JQuery. He is highly proficient in application development using Java, C++, and C#. Niall is a professionally trained graphic designer with over ten years experience in prepress design using the Adobe CS5 suite. He also holds a First Class Honours degree in Psychology from Queen's University, Belfast.

Kevin Curran is a Reader in Computer Science at the University of Ulster and group leader for the Ambient Intelligence Research Group. His achievements include winning and managing UK & European Framework projects and Technology Transfer Schemes. Dr. Curran has made significant contributions to advancing the knowledge and understanding of computer networking and systems, evidenced by over 650 published works. He is perhaps most well-known for his work on location positioning within indoor environments, pervasive computing and internet security. His expertise has been acknowledged by invitations to present his work at international conferences, overseas universities and research laboratories. He is a regular contributor to BBC radio & TV news in the UK and is currently the recipient of an Engineering and Technology Board Visiting Lectureship for Exceptional Engineers and is an IEEE Technical Expert for Internet/Security matters. He is listed in the Dictionary of International Biography, Marquis Who's Who in Science and Engineering, and by Who's Who in the World. Dr. Curran was awarded the Certificate of Excellence for Research in 2004 by Science Publications and was named Irish Digital Media Newcomer of the Year Award in 2006. Dr. Curran has performed external panel duties for various Irish Higher Education Institutions. He is a fellow of the British Computer Society (FBCS), a senior member of the Association for Computing Machinery (SMACM), a senior member of the Institute of Electrical and Electronics Engineers (SMIEEE) and a fellow of the higher education academy (FHEA). Dr. Curran's stature and authority in the international community is demonstrated by his influence, particularly in relation to the direction of research in computer science. He has chaired sessions and participated in the organising committees for many highly-respected international conferences and workshops. He is the Editor-in-Chief of the International Journal of Ambient Computing and Intelligence and is also a member of 15 Journal Editorial Committees and numerous international conference organising committees. He has served as an advisor to the British Computer Society in regard to the computer industry standards and is a member of BCS and IEEE Technology Specialist Groups and various other professional bodies.