Wikis, knowledge building communities and authentic pedagogies in pre-service teacher education

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Web 2.0 technologies including blogs, wikis, RSS, social bookmarking and a host of new and emerging applications are gaining popularity in classrooms at all levels of education globally. Such technologies are claimed to offer new ways of fostering interaction, community building, content creation and modification and knowledge building in the classroom. However, as with more traditional forms of technology that have been appropriated for the classroom, it is important that Web 2.0 technologies are not just used because they are the latest thing, but that authentic and pedagogically sound contexts are developed for applying these new applications in classrooms. This paper reports on initial attempts to integrate wiki technologies into a pre-service teacher education course as a way of fostering collaborative knowledge building networks within the classroom and to model an authentic way of integrating technology into curriculum. Pre-service teaching students were situated in a rich, problem-based learning scenario, delivered in a blended model of face-to-face and online modes, including wikis. Research into students' responses to the use of the wikis suggests that most students were highly engaged in the environment and that the use of the wiki facilitated group interaction and collaborative learning, but that there needs to be further work in instilling a culture of collaboration and collective knowledge creation to realise the full potential that wikis offer an educational setting.

Keywords: Web 2.0, ICT affordance, knowledge building networks, social software

Introduction

Digital literacies, or the ability to critically understand and use information that comes in multiple modes and from multiple sources, have gained prominence in recent years as a key goal of education. This has largely been driven as a reaction to the potential social and economic impacts of a 'digital divide' between those with and those without digital literacies. The rapid take-up of Web 2.0 technologies in many aspects of personal and professional lives, including blogs, wikis, RSS, social bookmarking and a host of new and emerging applications, has pushed the digital literacies agenda in education to new heights. The potential of these technologies to facilitate learning and knowledge building through increased participation and collaboration has lead increasing numbers of classroom teachers to grapple with and experiment with how these emerging technologies can be appropriated to the school classroom.

In pre-service teacher education programs, there is a strong desire to ensure that students emerge from their courses not only with well developed digital literacies, including current Web 2.0 technologies, but also an understanding of how these literacies might be harnessed to enhance learning and knowledge building in school education. Thus it is important to combine the development of pre-service teachers' own digital literacies with development of their understandings of how web 2.0 technologies can foster interaction, community building, content creation and modification and knowledge building in the classroom.

This paper discusses one approach taken in a single pre-service teacher education course at RMIT University in 2007 that attempted to provide an authentic and pedagogically sound approach to the development of digital literacies supported by the use of wikis as a tool to foster collaborative knowledge building and problem solving. An objective of this course was to immerse pre-service teaching students in a course that modelled a social constructivist pedagogy and that integrated technology in ways that enabled learning and teaching in new ways that were not possible without the technology.

Social learning and Web 2.0

Contemporary views of learning are strongly focused on ideas of student-centredness and social contexts for learning where learning occurs as a socio-cultural system, within which learners interact and receive scaffolding through the help of others (McLoughlin & Lee, 2007). These ideas are grounded in socio-cultural theories of learning of Vygotsky (Vygotsky, 1978) and more recently in communities of practice theories which posit that learning is an inherently social and participatory activity, conversational in nature, and where participation involves mutual engagement with other members of the group in negotiating meaning (Lave & Wenger, 1991). A community can provide the social interactions and relationships which are essential for learners to collaboratively construct shared knowledge (Choy & Ng, 2007). Socio-cultural theories of learning build on ideas of discovery and inquiry learning and "embrace learning environments and approaches where students take control of their own learning, make connections with peers and produce new insights and ideas through inquiry."(McLoughlin & Lee, 2007, p. 668).

The concept of knowledge building communities has emerged recently as a foundation for re-examining pedagogical approaches in education. Scardamalia and Bereiter (2006) contend that there needs to be a shift in locus of constructing knowledge from the individual to collective construction. They argue that education needs to be refashioned in a fundamental way so that students are initiated into a knowledge creating culture and see themselves as part of a global effort to advance knowledge.

Web 2.0 technologies can play a crucial role in fostering knowledge building in communities or networks (Jonassen, Howland, Marra & Crismond, 2008). The Internet "becomes the first realistic means for students to connect with civilisation-wide knowledge building and to make their classroom work a part of it" (Scardamalia & Bereiter, 2006, p. 98). Web 2.0 technologies mean different things to different people and encompass a large and diverse range of Internet applications. A growing number of these applications, including blogs, wikis, podcasting and social networking spaces are being referred to as social software (Jonassen, Howland, Marra & Crismond, 2008). At the core of social software is the capacity to bring people together in networks. Social software differs from earlier Internet technologies in that they are more participatory, more collaborative and more distributed, involving different kinds of social and cultural relations (Lankshear & Knobel (2006).

Wikis are an example of social software that is being used in knowledge building networks, both within and beyond education. A wiki is a collection of web pages that can be contributed to or modified by anyone able to access it. Wikis act as a repository of the shared knowledge of the members of the wiki with the knowledge base growing over time (Godwin-Jones, 2003) as members add to and edit the wikis pages.

Affordances of wikis

Web 2.0 technologies afford members of a network or community or indeed a classroom with the potential to communicate and collaborate with each other and with others beyond the classroom in ways previously not possible. Wikis emphasise the pre-eminence of content creation over content consumption and the collaborative production of knowledge (McLoughlin & Lee, 2007). These occur through a shared goal of developing and sharing ideas publicly with peers, offering critiques and alternative explanations (Grant, 2006). Individuals who can access a wiki can shape the content created within the wiki by contributing and editing and in doing so help to shape the knowledge that is generated from the interactions within the wiki environment. Wikis provide a medium for storing, organising and reformulating the ideas that are contributed by each community member (Jonassen, Howland, Marra & Crismond, 2008), a repository of the artefacts produced by a community of practice, but one that can evolve as the community, its practices and its knowledge evolves. Thus wikis are touted as an important tool in supporting knowledge building networks.

Whilst all these things are afforded by wikis it is questioned whether the wiki alone is sufficient to foster this type of social construction of knowledge in classrooms or whether other things need to be present. Scardamalia and Bereiter argue that students need to be initiated into a knowledge creating culture (Scardamalia & Bereiter, 2006). This suggests that teachers play a critical role in designing tasks that foster collaborative practices and that engage students in collaborative knowledge construction. Grant suggests the social and cultural practices of collaborative working need to accompany the use of the software in order to take advantage of the functional affordances of the tool to maximise the potential of a knowledge building network (Grant, 2006).

Studies of the use of wikis in schools to date suggest that the affordances of the technology alone are not sufficient to generate knowledge building along the lines suggested. In one example, Grant (2006) found that in his study of Year 9 students who worked in teams on a history project using a wiki to research and present their findings, students did not view the affordance of editing the content of each other's work as useful or desirable. The students he researched felt it was better to write their own page than edit another person's page. Grant (2006) argues that "underlying these comments is the discourse of the individualised, written assessment that pervades school" (p. 6).

Lund and Smordal (2006) also found that learners preferred to go on creating extensions indefinitely rather than rewriting or editing their own or a classmate's contribution. This continued a practice where the individual ownership cultivated by the school persisted. Many of the students in this study were reluctant to "interfere with somebody else's material" and when they did it was more on a language level than a content level (Lund & Smordal, 2006, p 41).

These examples suggest that there is more at play than simply using a wiki in a classroom setting in order to develop collaborative generation of knowledge that characterises a knowledge building network. Studies of the use of wikis in higher education echo some of these findings, and suggest that students need to be made explicitly aware of the affordances of wikis for collaboration rather than just another communication tool; and that the design of the learning tasks that require the use of wikis need to be authentic and require negotiated meaning such as group projects and problem based tasks (Choy & Ng, 2007).

Wikis in a pre-service teacher education course

Context

This paper reports on initial attempts to integrate the use of wikis into a second year course in the Bachelor of Education (Primary) program at RMIT University in 2007, comprising approximately 150 students. The course was one that had traditionally focused on integrating literacy, numeracy and information and communications technologies in ways that emphasised critical literacies, delivered in a traditional face-to-face lecture and tutorial mode. In 2007 the teaching team chose to change direction substantially and to immerse the pre-service teachers in a collaborative problem-based learning scenario, delivered in a blended learning mode of some face-to-face workshops and online learning, but no lectures. The online environment comprised flat web pages delivered to students progressively as the problem was revealed via the University's learning management system, *Blackboard*, as well as a series of wikis created in an extension pack for *Blackboard, Campus LX Wiki*. Most students had used *Wikipedia*, however none had had direct experience in contributing to a wiki themselves.

The problem-based learning scenario was constructed as a mystery – one that was improbable, contained a degree of fantasy but also an element of possibility and that would appeal to and engage tertiary students. Students were allocated a character with a specific role to play in the mystery and were formed into teams. Each week, an activity would be set for teams to complete or a clue 'released' to be analysed either in class or outside class time. Teams were asked to post their findings or solutions on to their wiki. Each team was able to view other teams' wikis although initially this was not widely understood. There was a deliberate decision to allocate different 'clues' to teams so that collaboration between as well as within teams was essential if the mystery were to be solved. The learning tasks, focused on further development of critical literacy and numeracy skills, were mostly, but not always, conducted in class time and modelled a variety of pedagogical strategies used within the primary school classroom. Discussion about these pedagogical strategies and how they might be transferred to a primary school classroom formed a key part of each face-to-face class. Student reactions to the use of the wiki were gathered from reflective writings students were required to do as part of their assessment tasks, as well as from three focus groups of randomly selected students who took the course.

Facilitating communication within teams

Group work is a feature of many of the courses in the Bachelor of Education program. Many of the students taking this course found it difficult to juggle different class times, work and social commitments with arranging face-to-face meetings with the various groups to which they belonged. The students were widely dispersed across the metropolitan area so meeting off-campus also posed problems. The ability to communicate via the wiki appealed to many of the students as scheduling conflicts and time constraints were eliminated as problematic factors.

Students were allocated into teams, rather than self-selected into teams. This resulted in some students working within friendship groups, but in many instances students found themselves working with people with whom they were unfamiliar. For some of these students the wiki helped them overcome issues of working with unfamiliar people; in the wiki everyone had an equal voice and equal access to each other. It provided a neutral ground where prior relationships were not a strong influence. However, for others the wiki did not overcome issues of exclusion from the group, with members of some pre-existing friendship groups using already well established means of communication beyond the wiki, such as text messages, MSN or email instead of the wikis.

Facilitating contribution to team work

The open nature of the wiki acted to motivate students to ensure they were making adequate contributions, at least commensurate with other members of their teams. The ability to see who was contributing, how much and how often seemed to have encouraged a sense of responsibility to the team in some students. When contributions weren't seen as equal, some teams saw this as an opportunity to self-regulate and develop strategies to ensure a more equitable contribution. Most teams developed an agreed approach to allocating responsibilities and checking that the team had met the requirements of each activity.

However, in this course, the wiki content wasn't directly assessed, but indirectly used as an input to the final assessment task. Therefore contributing to the wiki was a choice that students made. The majority of students chose to contribute to the work within the wiki environment, reflecting their high level of engagement in solving the mystery and sense of duty to their group. However, it would seem there exists among a minority of our students a pragmatic ethos of doing only that which is assessed. Such students made minimal contributions to the collaborative work within the wiki, preferring only to make a contribution to those tasks that were directly assessed. For a minority who preferred individual to group work, their contributions to the work of their team, either within the wiki or in class was minimal, reinforcing Grant's views that the discourse of the individual is still strong in education (Grant, 2006) and that a culture of collaboration needs to accompany the introduction of wikis. This outcome also implies that, in addition to designing an engaging task that provides an authentic reason to use a wiki, attention also needs to be paid on how the use of a wiki is assessed.

Facilitating learning

One of the key features of how the wikis in this course were used was that all students could access their own as well as other teams' wikis. Students felt that this was highly beneficial since they could see how other individuals and other teams were approaching the use of the wiki, how they were organising their information and, importantly, what answers they were coming up with and what approaches they were taking to solving the overall investigation as well as solving individual activities. The asynchronous nature of the wiki was also important to some of the students, providing them with time to reflect on their responses or contributions that is often not available in a face-to-face class. The fact that content was stored on the wiki and accessible at any time during the semester enabled students to return to previously expressed ideas, reflect on earlier ideas and consolidate understandings. Students made substantial use of the comments function within the wiki to test new or alternative ideas with their team members about the investigation or individual activities. However, few instances of using the wiki to develop content collaboratively were evident. As in the studies cited above, students were reluctant to make substantial changes content posted by their peers, to "mess it up" but were happy to make minor editorial changes.

Conclusion

In this example of using wikis, collaborative knowledge building took place largely through vicarious learning from lurking in other teams' wikis to see how others had tackled a particular problem or conclusions they had drawn. Collaborative knowledge building also occurred strongly for many teams as a result of the exchange of comments within the wiki. However, most students in this course viewed the wiki primarily as a communication tool, rather than a collaborative knowledge creation tool. Reluctance to change other people's work was evident for most of the teams although a minority took advantage of this affordance as a way of overcoming the tyrannies of distance and time. The experience of this initial attempt at integrating wiki technologies into a pre-service teacher education course reinforced the importance of designing an engaging and authentic reason to use the wiki, but also highlights the need to ensure that a culture of collaboration and collective knowledge creation is instilled in students who are being asked to use this technology. Further consideration of how to assess the contribution to wikis also needs to be made.

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