



Working collaboratively in a group assignment using a Mediawiki for an architecture and construction management undergraduate unit

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This paper describes an architecture and construction management unit which implements Mediawiki in teaching and learning. The main objective of using the Mediawiki is to engage students to work collaboratively online in a group assignment. It also aims to further develop student information technology skills and thus enhance their learning experience. One of the learning objectives of the unit is to develop the ability to communicate the results of student research in construction technology using appropriate digital media from which Mediawiki was chosen. This paper outlines the challenges and issues faced in the implementation of Mediawiki as a collaborative tool in a group assignment of an architecture and construction management unit. It also discusses how academic staff and students were supported through the process of learning to use the Mediawiki. Finally, potential future directions of using Mediawiki in teaching and learning are explored based on students' comments and feedback.

Keywords: Mediawiki, wiki, group work, collaboration, web 2.0, digital media

Introduction

In the 21st Century teaching and learning is no longer based on traditional means of imparting knowledge. Web technologies have evolved and play an integral role in everyday life including education. University students use the Internet to engage with study. Unlike Web 1.0 which is static, Web 2.0 is the new generation of the Internet that takes it far beyond isolated web pages (Teehan, 2010). Social software emanates from Web 2.0 and relates to social networking, including blogs and wikis, as well as other applications such as sites dedicated to social networking (Jurian, 2010). It is based on user participation that encourages open communication, allows for data to be controlled by many people and inspires teamwork (Teehan, 2010) and permits "all to participate in the

conversation of learning and knowledge making” (Rosen & Nelson, 2008, p.213). Aspects of Web 2.0 software that enhance interactivity amongst participants include the ability of individuals to collaboratively create material and make it publicly available; to allow the distribution of the created materials to selected individuals, and community based websites where a range of social interactions and communication occur among a group (Rosen & Nelson, 2008).

Mediawiki also referred to as a ‘wiki’, is one of the Web 2.0 technologies. It is a web-based application where the concept is very similar to Wikipedia. It allows multiple users to work collaboratively on the same documents. Users are able to view the history of documents with the ability to instigate further changes. Wikis have been defined by Augar, Raitman and Zhou (2004) as “fully editable websites” (p.95). Augar, Raitman and Zhou (2006) suggest in wikis participants can access, interpret, and reorder material, including images and wording as they think appropriate in a medium encouraging participant proprietorship where individuals have autonomy to develop material and the form in which it is presented. Slotter (2010) suggests wikis are characteristically constructed according to their substance, not a sequential form, while Lamb and Johnson (2007) distinguish wikis as a unique form of social media exemplifying “cooperation, interdependence and synergy” (p.57). Neumann and Hood (2009) note the purpose of a wiki is to involve those contributing to it to collectively and routinely generate original material which has the ability to also be hyperlinked.

This paper describes the use of Mediawiki as a tool for assignment submission and outlines the challenges and issues faced in its implementation. It also discusses how academic staff and students were supported through the process of learning to use the Mediawiki. Finally, potential future directions of using Mediawiki in teaching and learning are explored based on students’ comments and feedback.

Use of Mediawiki in an educational environment

The potential use of Web 2.0 technologies such as blogs and wikis are established in an educational context by Bonk, Lee, Kim and Lin (2009) where concepts associated with “situated cognition, cognitive apprenticeships, and cultures of learning” (p.1) have now been realised. Bonk et al. (2009) reflect knowledge acquisition may be radically changed from a situation where learning is passive through the utilisation of wikis.

The suitability of wikis as learning tools with their basis in a co-operative educational model is suggested by Slotter (2010) where an environment can be created in which teachers can aspire to eliminate the “digital divide” (p.40) separating them from their students. Parker and Chao (2007) conclude that wikis enable students to operate in groups to assist one another’s acquisition of knowledge through their incomparable ability to allow individuals to work together on commonly developed intelligence.

Bradley, Lindstrom and Rystedt (2010) suggest that wikis facilitate peer feedback in contemporary educational settings unlike previously established practice where teachers were responsible for providing comments on student work. They chose a wiki as a vehicle to augment the collaboration of students in a group undertaking where students were writing and providing feedback to one another. Bradley, Lindstrom and Rystedt (2010) note the wiki’s appropriateness for the activity as it has the capability of allowing users to change the text readily and accurately, as well as clearly representing which individual has edited the page, thereby indicating clear responsibility of the contributor.

Widespread use of wikis is noted by An (2010) in varied activities including, “brainstorming, knowledge construction, project planning, problem solving, resource sharing, case libraries, assignment submission, presentations, and community building” (p.3). Jones (2010) notes specific instances of the extent and capability of wikis to enhance online participation of students as well as provide the ability for them to engage collaboratively in ways that are limited by other modes of online communication such as email and asynchronous discussion boards.

About the unit and Mediawiki

Mediawiki was introduced as a group assignment in one of the core units for students of Construction Management, Architecture and associated combined degrees at Deakin University. This unit provides further understanding of construction technology through a systematic examination of the design and construction of low-rise commercial and industrial buildings, assembly principles and the behaviour and adequacy of structural components. Emphasis is placed on the selection of the appropriate systems, theoretical and on-site aspects and the detailing of components. The unit was taught through a series of lectures, group assignments and an end of trimester examination. There were two assignments in this unit which were to be submitted in one Mediawiki which contributed fifty per cent of the final grade. Each assessment element was designed for students to develop understanding of construction technology through complementary learning methods.

One of the learning objectives of this unit is the development of the ability to communicate the results of the students' research in construction technology using appropriate digital and physical media, hence Mediawiki was chosen. The architecture and construction wiki assignment included experience of peer learning where students were expected to work collaboratively to develop communication and team skills in a process reflective of that described previously by Boud (2001) as "learning from and with each other in both formal and informal ways" (p.4) where focus is placed on the act of knowledge formation and assistance students provide to individuals is seen to be equally important to the specific activity undertaken. In referring to assessment contexts Boud (2010) suggests "access to learning peers" (p.162) can provide a supportive environment and be valuable for individuals to test meaning, generate varied options in approaching activities, locate further resources and provide a range of thoughts, opinions and feedback. Furthermore, the group assignment was also aimed to develop the Deakin Graduate Attribute of working effectively as part of a team as outlined in the *Deakin University Higher Education Courses Operational Policy* (Deakin University, 2011). Employers and professional organisations perceive team work as highly desirable and this assignment was designed to promote it. The principal purpose for choosing Mediawiki as the digital media tool for a group assignment submission is that Mediawiki is not only an excellent vehicle to collaborate and communicate ideas but also it engages students in cooperative learning activities (Teehan, 2010). Using Mediawiki also represented a move from the traditional paper-based submission of assignments towards a sustainable environment. Moreover, as there is no standard format in Mediawiki, this allowed students to explore possibilities of being creative in presenting their work for example by embedding other tools such as media files.

180 students were enrolled in the unit and to complete the group assignment students were divided into 18 groups with 10 team members in each group. The purpose of this particular group size relates to the "real world" of a construction company where the teams may be vast, requiring varied skills. Each group was assigned a team member as the "project manager" for the project. The "project manager" was responsible for monitoring the progress, facilitating contribution of the other team members and overseeing the content of the project. Each group was assigned to one Mediawiki which only teaching staff and the members in the assigned group could access. Students accessed the Mediawiki through the learning management system. Students were allocated 10 weeks to complete the assignments. The tutorials for this unit were designed to reflect an authentic professional consultation with the "client" (the teaching staff). The groups were given 20 minutes each week to consult with the clients on progress of the project. From the "History" page of the Mediawiki, teaching staff were able to observe the students' progress as well as an individual's contribution to the assignment. It provided teaching staff with an opportunity to provide feedback to students as they worked on their assignment and the means to encourage the group members to demonstrate their participation and to ensure they were conforming to the requirements of the assignment. A self and peer review marking rubrics also formed part of the marking criteria for group members' participation. Individual marks were given according to the individual's contribution to the assignment to credit each group member appropriately and fairly. Each group member's contribution was assessed by their team members using a self and peer evaluation (SPE) marking form where the members evaluated themselves and their peers. The final marks for each member of the team were based on their SPE where the group marks graded by the teaching staff were factored with their SPE marks. The self and peer assessment marks were then compared against the contribution in the discussion page.

Supporting staff and students

Like any new project or technology it was expected that there might be issues relating to initiating work in the wiki. Ebersbach, Glaser, Heigl and Warta (2008) suggest wiki technology, with its low technical access hurdles, is ideal for web-based group processes where it does not require extensive training. However the self organisational processes that make wikis so appealing can be challenging though the fundamental principle of the wiki technology is simple (Ebersbach et al., 2008). Lecturers in research conducted by Rifkin, Righetti, Longnecker, Leach and Davis (2010) articulated a range of possible difficulties in using the “new media” (p.11) which included wikis. Their reservations noted the time-consuming process of acquiring competence with new tools and developing and assessing student tasks; lack of certainty of how to evaluate the tasks and that all students have equal opportunity to utilise the online environment; whether this type of medium provides an effective learning platform; and issues relating to relative benefits of team assignments (Rifkin et al., 2010).

In the wiki assignment, support was provided by staff from a central group at Deakin University providing teaching and learning assistance. They were readily available to help both teaching staff and students. Initially, the staff member teaching the wiki assignment was provided a one-to-one hands-on professional development training session in using Mediawiki. The session included an overview of Mediawiki; step-by-step demonstrations and authentic practice activities; discussion of the benefits of using Mediawiki to enhance teaching and learning; and discussion of management, administration issues and tips for effective use of the Mediawiki. The session was based on a workshop developed to enable teaching staff to be equipped with some experience in using Mediawiki in their teaching practice, as well as to increase confidence in its use. Progressive support and assistance was available to the teaching staff member in the initial and the final stage of the design and structure of the assignment. Student support was provided in the form of a presentation overview of using the Mediawiki during one of the unit lectures, and a drop-in session was also conducted for students with queries relating to its use. Through feedback from students it was suggested the help guide linked to Mediawiki was a useful reference site for students needing assistance to begin the assignment.

What did students think about using Mediawiki?

As this was the first time Mediawiki was used in this unit, students were invited to complete a survey to provide feedback on their experiences, including issues encountered with using Mediawiki. Sixty-two students completed the survey. This represents 34.4% of students who enrolled in this unit where 32% of the students had previous experience using Mediawiki in another unit while the remaining 68% were first time users of Mediawiki.

Students were asked if they identified any advantages in using Mediawiki compared to paper based submissions. There were four common factors or advantages that were commented on by students in this survey when using Mediawiki; identifying individual contributions, ease of communication, flexibility of accessing Mediawiki, and learning from peers. Student responses are shown in Figure 1.

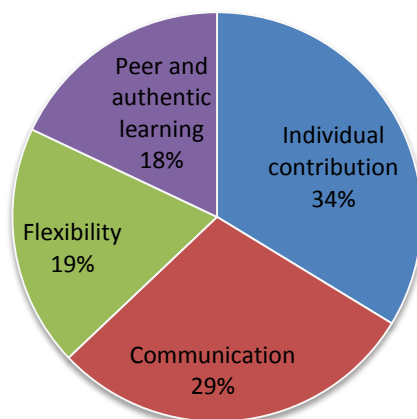


Figure 3: Advantages of using Mediawiki as viewed by students

Communication

Communication among group members was anticipated to be a potential issue in this assignment. This was due to group composition consisting of students enrolled in the unit from varied courses including construction management, architecture, associated combined degrees and civil engineering. Thus, students were encouraged to use the discussion page feature within the Mediawiki to discuss, exchange ideas or make suggestions in the “Discussion” page before choosing as a group the most relevant materials to be included in the “Submission” page. The benefit of using this page instead of exchanging emails to group members was that the group members could check updates without logging in to their emails. This eliminated the excuse of group members who did not receive an email message, or a student who does not check their emails regularly.

Feedback indicated a significant number of positive student comments on the use of Mediawiki to enhance group communication: “Mediawiki is a very handy way to work collaboratively in large groups, as the information can be edited by everyone simultaneously”; “[Mediawiki] built important team skills and organisational skills”; “members of the group can work independently and still be able to communicate with the rest of the group”; “Mediawiki did enable a large group of students to communicate and get to know one another better. This was the largest group I have worked with since starting university”. In general, these comments from students confirm that Mediawiki is an effective collaborative tool for a large group of individual members and it makes communication among team members easier.

Individual contributions

Some students found the wiki advantageous for monitoring individual contributions of group members while others were more ambivalent in regard to this feature. One student commented that “all group members can [then] see each others’ contributions and measure their work in relation to that”; while another appreciated the immediate availability of others’ contributions “I think the wiki is a good tool for [a] group assignment as it allows people to put their stuff up and the others can see it instantly”. As stated by one of the students, the wiki made individual members somewhat accountable for the work they carried out as it was obvious whether contributions were being made. A student concurred that the wiki could track individual work and monitor contributions, while another stated that the wiki was a good repository and provided easy access to others’ work. Although some students commented that the Mediawiki was an excellent tool to “check” on the contributions of each group member, others expressed reservations about the wiki’s capacity to do this, “an issue was that quite a few people struggled with operating wiki so the one group member who was experienced at it generally put work up for them, therefore it may have seemed like people did less than they actually did”.

Student comments in regard to the intended ability of the wiki to enable participants to monitor individual contributions suggested in some cases it was useful, while others found it might not have been an accurate representation of an individual’s participation in the group project.

Flexibility

Students’ comments included “Mediawiki could be used from home and made doing the assignment as a group a lot easier”; “the wiki is easily accessible so it is useful for seeing the progress other group members have made. It is also useful for staying in contact with group members outside of emails and phones, as long as the wiki is regularly checked by everyone”; “all parties/group members can work on the wiki and collate work easily rather than relying on face to face meetings and deadlines to see each others’ work”.

As well as being able to contribute in the “Discussion” page, group members could also meet face-to-face to discuss their assignment at a convenient time as this is an on-campus unit. The face-to face discussion could then be uploaded into the “Discussion” page within Mediawiki so that the students who were unable to meet were able to see updates and contribute to the discussion as well. Students noted the “discussion page allows for quick and easy communication”; The Mediawiki allowed us to easily share this information via the discussion

page”; and “one can easily talk about issues via the “Discussion” function”.

Overall, these comments and observations from students indicate that Mediawiki is accessible by anyone, anywhere with Internet connections and hence making sharing resources easier among team members.

Peer and authentic learning

A student commented that “learning how to use the wiki means that we will be able to use it in the future, not only for assignments but as an actual life skill”; while another student reported it enabled group members to encounter a “range of different students from other courses, got to associate with them like the real world”. Some students commented that Mediawiki is a good tool for sharing ideas with other group members and giving feedback on their contributions; “I found that working as a group we were able to share resources which was very useful”. Thus, the wiki assignment was perceived by some students as a tool which assisted authentic learning among peers.

Challenges in using wikis in teaching and learning

In a study of student wiki use, Jones (2010) identified a high degree of dissatisfaction with the wiki tools which negatively impacted on the project as a whole for the students. Feedback from this study group indicated that for a significant number of students, using Mediawiki was not an easy task.

There were three main issues were cited by the students in the Deakin University architecture and construction wiki assignment. These included: skills required in using Mediawiki; the need for workshops on more advanced skills in using Mediawiki; and group dynamic and size. Students’ responses are shown in Figure 2.

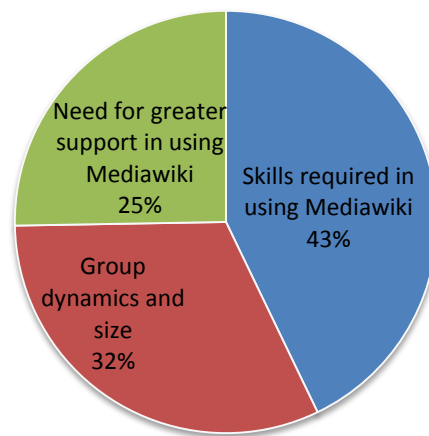


Figure 4: Main issues encountered by students using Mediawiki

Skills required in using Mediawiki

Lazda-Cazers (2010) noted in using a wiki with students in an undergraduate course that acquiring skills to work with the wiki posed a challenge for some students, while Ebner and Kickmeir-Rust (2008) suggest although a wiki is designed to use with easily accessible coding, a degree of computer literacy is necessary to contribute to it.

The Deakin University architecture and construction management students commented on the requirement of having necessary skills and knowledge of Mediawiki to be able to format, code and arrange information within the Mediawiki. Some students noted the difficulties of formatting Mediawiki compared to word processing software, as well as difficulty of arranging the layouts and knowing the codes used in Mediawiki. "It was hard to format our submission ... not being able to put in tables ... the format of Mediawiki will take some time to get used to"; "we found the formatting of the Wiki extremely difficult and time consuming"; "coding was problematic to begin with as everyone was new to the program"; "the biggest issues are having group members of varying skill, and also general teething issues yourself, it's very hard to suddenly pick up an internet coding format when you're not used to it. Some students wouldn't feel motivated to learn it either, when they consider that they will never need it in their careers"; and "the use of Mediawiki is suited better to those who are well versed in coding and computer use. As we are studying architecture, I heard of, and know many people who struggled using this as a medium. Adding tables, changed text size/bolding/italics, adding pictures etc proved to be quite a struggle for some". One student commented "when two people are working on Mediawiki at the same time, the first person's saved work is lost when the second person goes to save their work. When two or more people are contributing at the same time, a lot of work can be lost".

Students' comments indicated that overall, a specific level of information technology skills and technical competency was required to be able to contribute successfully to the wiki.

Need for greater support in using Mediawiki

Some students suggested in their feedback the need for assistance with developing skills beyond basic wiki formatting in order to effectively complete the assignment: "[there] should be more instruction initially in how to use the site"; "having the tutorials focus more on the actual wiki that was being produced rather than on the group (maybe, get the wiki projected on a screen so that the group can go through parts of it with the tutors)"; "there should be more education and practice on Mediawiki before commencing the actual project"; "tutorial sessions should incorporate lessons of how to display information on wiki (drafting skills, detailed sections, good websites, common building knowledge)". Other students suggested the need for more advanced workshops on Mediawiki "I think the wiki is a good idea and should be used in the future although all students need to be taught how to use the wiki to a fairly advanced level for it to be fully practical"; and "more on line video tutorials should be made available to ensure more things can be easily implemented e.g. formatting, how to insert a gallery for photos etc.... There is a lot the wiki can do but learning tools such as more video tutorials need to be provided so that we can learn to use the wiki facility to its fullest".

Students' requests for support and assistance suggest a minimum expertise requirement to be able to operate and contribute confidently to a group assignment using a wiki as the medium for interaction and collaboration. Further training in using wiki would have helped the students to work more effectively in that medium.

Group dynamics and size

The challenge with this assignment was not intended to be about Mediawiki as a technological tool but rather the level of responsibility of the students taken towards their contribution to the assignment and their attitudes towards fellow group members. Jones (2010) and Neumann and Hood (2009) observed in research on student use of wikis a degree of unevenness of participation of group members, although Jones (2010) suggested this situation occurs commonly in group collaborative contexts whether or not technology is utilised as the group

medium.

Although the assignments consisted of a group mark and individual mark a similar situation was noted by some student participants in the Mediawiki assignment who provided feedback on group dynamics: “less group members. I feel that 5 members per group would be more beneficial with this assignment as it would be easier to determine a direction for the group and easier to determine individual tasks for group members. It was very difficult to organise the group with 10 members, 1 leader and no specific tasks set for individual members in the assessment brief. If you had members in your group who hardly contributed, like the group I was in, then the group mark will be low and an individual who put in lots of work for their nominated section of the assignment will be punished due to the poor contributions of other members in their respective sections”; and “good experience, worked with a lot of different students. It is really dependent on the group you get, I heard some other groups were really struggling with group participation”.

A significant number of comments were also noted that group size was too large to work effectively particularly in terms of group administration and should be re-evaluated in future teaching periods.

Future directions

Compared to the traditional paper-based group assignment, Mediawiki makes it possible for teaching staff to observe students' progress as well as identify an individual's contribution to an assignment. Furthermore, Mediawiki also allows students to explore possibilities of being creative in presenting their work, for example by embedding multimedia files. In ways outlined above, Mediawiki is a good collaborative tool especially for group assignments. However implementation of the Mediawiki assignment completed by groups of architecture and construction management students at Deakin University highlighted the need for some refinements to the assignment to be adopted for future similar group projects, as suggested by student comments and observations of the lecturer and educational support team.

Elgort, Smith and Toland (2008) suggest if the purpose of using a wiki in a learning context is to promote successful group cooperation then some degree of 'scaffolding' (p.207) may need to be established in the use of a wiki for a team assignment, as appropriate team behaviour cannot be assumed. There were a significant number of positive responses from the student survey conducted in terms of working collaboratively in a group assignment using a wiki. However the need to expand the skills of students in using this tool is suggested as essential for students' learning in using the Mediawiki. In corresponding future units Mediawiki will be used in a co-requisite of this unit. To expand the use of this tool, Mediawiki will not only be used as a collaborative tool within the unit, it will be used as an interactive tool in a co-requisite unit of construction and structures and another unit in the same course which is a project based unit from a higher level. The purpose of this is to establish a peer learning exercise among the students in a different year level. For example, the students from the higher level will be able to collaborate and learn from the students in the co-requisite unit of construction and structures who have experience using Mediawiki. On the other hand, the students from the higher level could assist their peers on the content of the unit which they have undertaken in previous years. This will enable students to engage in cooperative learning activities within the same course but in a different year level.

In another future initiative after the due date of the wiki assignment, it is suggested the wiki could be made viewable to all students with none of the students able to make any further editing changes. The aim of this is to enable students to view what other students have completed for the assignment and learn from one another. It

will also serve as revision for the final trimester exam.

Ebner and Kickmeir-Rust (2008) emphasise ease of use by participants of a program is a key element to its effective application, and this aspect is frequently neglected with wikis. To ensure that Mediawiki is successfully implemented in the future in this unit at Deakin University, it is suggested students are effectively prepared to use the wiki technology itself. The first tutorial of the unit may present a suitable opportunity to introduce Mediawiki to students where they could explore the idea of Mediawiki by browsing Wikipedia or a similar site. This will enable students to become familiar with navigating wiki sites as well as learning the basic syntax of a wiki. Providing students with a small wiki related task may increase their confidence with using Mediawiki. Karasavvidis (2011) in reporting on a study investigating problems encountered by undergraduate university students using a wiki suggested editing the activity with a wiki as a whole into progressive activities, and the adoption of innovative means of developing knowledge acquisition in teaching students using Web 2.0 technologies in order to reduce difficulties and enhance their positive use. Deakin student feedback in the wiki assignment noted: "I believe that using Mediawiki can be useful for group assignments, as not everyone can be at uni all at the same time, it can create problems if people do not know how to use a basic wiki. I know that there were some lectures and info sessions on how to use wiki, but maybe by adding a small practical assessment on how to use it, maybe something around 5-10 percent, it would give an incentive for people to learn".

These suggestions could be addressed in future wiki assignments by providing more comprehensive training in using the wiki by students. Similar comments are noted in feedback from Higher Education students in a study on wiki use in a group assignment reported by Witney and Smallbone (2011), whose ideas for augmenting the use of a wiki related to learning frameworks provided for wiki use to be available during classes as well as assistance in the development of effective group interaction. Cole (2009) observed that the learning activity or project itself should be developed in the first instance with the wiki in mind, and to incorporate introductory activities relating to learning how to use a wiki. The former observation is reflected in a comment by one of the Deakin students who suggested the wiki "needs to be more deeply entrenched in the curriculum before students can stop viewing it as a hindrance".

Conclusions

There is significant potential in using Mediawiki in teaching and learning to engage students in a group assignment. Mediawiki allows students to present their assignments or projects using different ways of submitting assignments other than a paper-based form which enable students to explore creative possibilities in presenting their work as well as working collaboratively in a group in an online environment with access to peer learning opportunities. Duffy and Bruns (2006) suggest "new technologies, such as a blog or wiki, make new demands on learning and provide new supports to learning, even as they dismantle some of the learning supports upon which education has depended in the past" (p.38). According to the wiki assignment outlined in this paper staff as well as students require appropriate support in implementing a wiki in teaching and learning in order for students to experience worthwhile learning outcomes in terms of accommodating group dynamics and working collaboratively with students from a varied course background. This may include incorporating some of the suggestions of students which included providing greater guidance in how to format and use a wiki in a group online assignment.

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