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The Wiki Way: Supporting Collaborative Learning for First Year Students

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Abstract:

Skills in working in teamwork are demanded from graduates, and these are ever more likely to be over the internet. Horizon (2011) calls for this need to be reflected in students' project work. The use of Wikis has been posited as a tool for collaborative online knowledge creation, increasing engagement, and social constructivism (Wheeler and Wheeler, 2008). The use of wikis in student groups is still relatively new, however, and the need for deeper investigation of its role in supporting group collaboration has been identified in literature (Bruen et al, in Donnelly, Harvey and O' Rourke, 2010).

This study aims to contribute to this debate, and should be of interest to instructors who use group work in their teaching, as well as those who wish to explore the application of web 2.0, tools or wikis specifically, in enhancing learning. The study indicates that many positive benefits (for both students and instructors) can be gained from embedding a wiki into a group activity, and points to some of the issues and challenges that may arise. Wikis were adopted to support a collaborative group project in the first year Business Computing degree for a Marketing module in the Dublin Institute of Technology. The wiki was used by the students for a short project on the integration of technology and marketing.

This study utilised an action research methodology, with the aim of improving professional practice (Mc Niff and Whitehead, 2010). The wiki was selected in response to some concerns about the assessment. Issues such as poor progress, last minute action, lack of meaningful collaboration, and inability of the instructor to track progress or identify problems, all arose in the past. For these reasons, along with the desire to integrate Web 2.0 tools into assessment, the wiki was adopted.

The research was evaluated using a questionnaire, which was administered anonymously using an online survey tool (www.surveymonkey.com), using mostly open-ended questions. This was triangulated through wiki contribution measurement and instructor observation using field notes.

From a theoretical point of view, the students' responses demonstrate the enhancement of the groups' collaboration, improved communication and social construction of knowledge. This supports the findings of earlier studies (Wheeler and Wheeler, 2008, 2009, Lai and Ng, 2011). From the students' point of view, feedback was generally positive about the experience. Practical issues such as 'one version of the project', being able to view each others' progress, and avoid repetition were perceived as adding value to the process. Managing the introduction of third level assessment expectations, working in groups, and the wiki technology posed challenges for the instructor.

In conclusion, positive outcomes in supporting student collaboration, engagement and deepening learning emerged from the research, along with implications for further enhancement of the students learning experiences in future assessments. Further examination of the individual members' contribution levels warrants further study, while the role of the instructor as moderator of the wiki also deserves examination.

Introduction:

Web 2.0 technology encompasses a range of open source, interactive, easy to use tools that have been heralded as providing educational opportunities for increasing engagement and supporting learning and teaching in the higher education sector (Hughes, 2009). Tools such as blogs, wikis, and podcasts are being used both within learning management systems, and independently, to enhance learning and improve engagement and collaboration.

The potential of wikis to support collaborative learning has received particular attention in recent years (Wheeler, Yeomans and Wheeler, 2008). However, their use with student groups is still relatively new, and the need for further investigation of their role in supporting group collaboration has been identified in literature (Bruen et al., in Donnelly, Harvey and O' Rourke, 2010, Lai and Ng, 2011), as there are only a few empirical studies into the assessment of learning in the Web 2.0 environment.

A single cycle action research project was conducted with the aim of investigating the use of wikis as a support tool for collaboration. Wikis were adopted to support the collaborative group project in the first year of a Higher Education Business Computing course for a Marketing module. Prior experience of this project identified problems such as superficial analysis, delayed activity and efforts, and a lack of meaningful collaboration. In addition, students complained about difficult group work and social loafing. As the instructor was unable to monitor their progress, these issues only became evident on submission of the projects. For all of these reasons, along with the desire to integrate Web 2.0 tools into assessment, the wiki tool was implemented.

Contextual Situation:

This project was conducted in an Irish higher education institution on a group project for first year students of a Business Computing degree in the Marketing module. It was run in the second semester from February to March (5 weeks). In total 39 students are registered for this module, they self-selected their groups, resulting in 14 groups of between 2 and 3 members (a group of international Erasmus students were given permission to create a group of four). Age range was from 19 to 21, with 4 mature students. The wiki was embedded in the Blackboard Virtual Learning Environment (VLE) that the students were familiar with using from their first semester.

Literature Review:

The Impact of Web 2.0 in Education:

As students of the Net Generation spend increasing amounts of time online, the use of Web 2.0 to enhance learning in higher education is desirable, with increasing demands and expectations from industry for graduates with experience of online collaboration (Elgort et al., 2008, Johnson, Smith, Willis, Levine and Haywood, 2011). Web 2.0 tools are now being adopted by instructors on (and off) campus with the aim of supporting and enhancing learning and student engagement in various ways. Resulting from these developments, Wheeler and Wheeler (2009) found that teachers regularly seek ways to support student collaboration in interactive learning environments.

Elgort et al. (2008, p.195) argue that while the use of 'online teaching and learning systems and tools' such as Virtual Learning Environments (VLE's) are common in universities, using online tools to support student centred learning is less common. Yet they claim that the tools can offer a potential solution to the problem of engagement. Social Web 2.0 tools are free, and allow both students and instructors to publish online with speed and ease – the 'read-write-web' (Boulos, Maramba and Wheeler, 2006). The social web appears, therefore, to offer some potential as an educational tool. Lai and Ng (2011) propose that Web 2.0 can allow users to create their own content, build on others contributions, modify, critique and amend others' work.

Collaborative Learning:

Social networks such as wikis, appear to offer potential in supporting collaborative group activities. The benefits of using wikis that have been proposed by researchers include principally, the ability to create knowledge through user-generated content in collaboration with others. Specifically, wikis are web pages that enable rapid and simple authoring direct to the web. Text, images, video and hyperlinks can all be added without the need for html coding. User groups can generate a document and use the comment facility on each page to suggest improvements, or just edit each others' work (Richardson, 2009). A revised version of the wiki is created each time, so it is possible to revert to a prior edition if changes need to be undone, for example if amendments are made incorrectly, or later refuted.

The creation of a knowledge element of wikis has suggested exciting opportunities such as Wikipedia sites throughout campuses (Lamb, 2004), and the development of communities of practice. The individual learner could generate and synthesise knowledge, then contribute to a shared repository, assimilating comments from others to reach a common goal of knowledge creation (Boulos et al., 2006). The use of wikis in this way, however, is not pervasive, with only a few examples evident in practice.

Much more common is the use of wikis in group activities to foster collaborative learning (Wheeler, 2008), and improve group communication. Early experience of this proved positive and wikis were lauded as a solution to social loafing, low quality contribution to projects and poor engagement. Wikis, blogs and podcasts in education are now being used to improve contribution, collaboration and deepen learning (Lai and Ng, 2011). Their use is still relatively new, however, and potential benefits and how those can be realised still warrants exploration and documentation (Bruen et al., in Donnelly et al., 2010).

The Challenges of Implementing Wikis:

Some research began to identify difficulties with the use of wikis. Judd, Kennedy and Cropper's (2010) experience of wikis contradicts earlier claims of successful collaboration. They analysed students individual contributions and reported much lower levels of collaboration (and much later activity) than was previously believed. Cole (2009) suggests that wikis are not inherently collaborative and that in fact the wiki needs to be embedded within the module, and linked to critical assessment for collaboration to occur. Both papers argue that unless the wiki assessment is constructively aligned within the module, it is unlikely to engage the students properly. It appears that wikis may not be the panacea proposed by earlier academics. It is imperative, therefore, that appropriate guidelines for their use in each context can be clarified.

Exploration of pedagogical issues for the use of wikis is important for any practitioner. In order to foster high level thinking skills and social engagement, instructors should ensure that all students contribute to the wiki. In practice, equal levels of contribution would be difficult to achieve. Judd et al. (2010, p.350) found that 'the least productive 50% of students provided less than 15% of the total wiki content' compared to the most productive 10%, who provided just over 40%.

'Social loafers' is a term given to students who wish only to meet minimum task requirements with minimal cooperation or collaboration (Beaudoin, 2002). It had been expected that the measurement of contribution through the analysis of wiki logs would prevent this social loafing, however this proved not to be the case, and non-participation remained an issue. Clearly, there are a range of issues and challenges related to the practice of using wikis in education.

Biggs (1996) maintains that for assessment to be effective it must be constructively aligned to the module outcomes, with clear expectations and with formative feedback. This has since been emphasized by both successful and unsuccessful experiences of the wiki technology. In addition to constructive alignment, recommendations for the implementation of wikis include: training on the technology, training on communications and working in groups, and clarification on the expectations in terms of outputs (Jones, 2007).

Supporting First Year Students:

While lecturers have long been aware that first year students present particular challenges in the classroom, increasingly academics have called for a much more strategic and holistic approach to educating first year students (Star and McDonald, 2007, Chickering and Gamson, 1987, Krause, 2006). A variety of challenges are presented with first year groups and while many of these vary with the institution and course, a number of themes emerge from the literature, including - increased diversity of student groups, transition from second level, and the need to foster engagement and involvement.

Theoretical understanding of student development recognises the importance of behavioural mechanisms, such as the students' level of involvement or engagement with their learning. Astin presented his Theory of Student Involvement in 1984, which refers to the amount of physical and psychological energy that the student devotes to the academic experience (Astin, 1984). The theory of involvement emphasizes the active participation of the student in the learning process, rather than the

student playing a passive role as a receiver of information (as proposed by content theory for example). If the student becomes more involved academically, and also socially, they are more likely to succeed in the course (Perry and Allard, 2003). Krause (2006) then built on this with her model of student engagement. Engagement refers to the time, energy and resources that students spend on activities to enhance their learning. A strategic approach to policy-making with regard to first year students is advocated. She argues that the key to enhancing their experience is to focus on engaging the student with the institute, and also with the broader community.

Research Methodology:

The main research objective is to support the students' collaborative learning. Arising from this the overall research question is: Can wikis support collaborative learning in students' group work? As previously stated this constitutes a single cycle action research project. Action research is a cyclical process of reflection, and is particularly suited to educational settings (McNiff and Whitehead, 2010). Its aim is primarily to improve practice. In applying the action research cycle to this activity, the sequence of steps used is as follows:

Reflect → Plan → Act → Observe

The cycle can then be repeated a second time (cycle 2). Methodology is presented under those headings.

Stage 1: Reflect:

This stage comprised a critical reflection on how the students learning could be improved. Fundamental to this reflection was an investigation of the literature on group collaboration and the potential of wikis to support group learning, and on the first year experience, as discussed in the previous section. Reflection on the context of the students' assessment aimed to improve understanding of the challenges they faced.

In previous years, students working on this project were slow to progress their project, analysis of critical sections was superficial, and there was evidence that tasks were divided up, with little communication and collaboration between members. Some groups complained about group work being very difficult and members not contributing equally. The instructor had no mechanism of monitoring group progress or members contributions, and thus was unable to intervene or provide intermediate support. It was felt that these first year students needed higher levels of support than had been available.

Stage 2: Plan:

The learning activity comprised a group project, which required the group to review and analyse marketing literature, and provide a contextual example of the marketing activity in practice. This time it was to be prepared online, using wikis. The assessment is weighted at 40%, and so represents a significant proportion of the module grade. The wikis were private to each of the groups. All students had worked in teams in the previous semester, and at that time were trained in team skills and supported through team dynamics exercises and workshop activities.

Stage 3: Act:

As this is a Business Computing Degree, even though it was expected that using the wiki would not cause major technical difficulties, training and demonstration of the wiki was provided. Students were briefed verbally and in writing (with detailed written assessment guidelines) on the project and expected outcomes. Guidance was given on the subject (Marketing) concepts to be addressed and workshops were organised for database searching and academic referencing. A range of resources was made available, with links to these in the Blackboard VLE. Blank wikis were provided to each group and their use was demonstrated in class. The 'Wikis in Plain English' video (www.commoncraft.com) was shown and discussed.

A summary of the briefing activities is as follows:

- Presentation on the learning activity and links to outcomes and assessment criteria (with supporting written document)
- Team work discussion and review of challenges and good practice
- Wiki video shown, wiki in the Blackboard VLE demonstrated, with technical information, such as how to join, editing capabilities, etc.
- Class discussion of the assessment
- Training in Journal database search techniques and academic referencing

This represented a significant investment in time with the aim of introducing key skills that the students can build on in future years and other modules.

Stage 4: Observe:

This stage comprises monitoring the project and gathering data. A range of data-gathering techniques were utilised (McNiff, and Whitehead, 2010), including:

- *Instructor field notes:* Students actions and reactions, comments and queries were observed and noted. McNiff (with Whitehead, 2002) regard field notes as 'important instances of critical incidents' (p. 94), with the aim of documenting important features of the action.
- *Wiki content and data:* This included the subject information in the wiki, students comments to each other, in addition to the total groups' and individual members' contribution levels. This data can be used to evaluate the students' levels of activity and engagement online (Trentin, 2008, Judd, 2010).
- *Questionnaire:* A short, anonymous email survey was conducted after the wikis were completed. This was important to capture the students perceptions of the value (or not) of the wiki, and their experience of group work (Elgort, Smith and Toland, 2008). Of 39 students, 19 questionnaires were completed.

The data collected above was then analysed through a process of sorting, searching, and categorising (Creswell, 2007). This was then interpreted to reveal key themes and triangulated.

Getting Started:

Despite the time spent on training and familiarisation, additional class time needed to be allocated to the assessment. When little activity was detected in the first two weeks, class discussion uncovered a lack of clarity of expectations, and a lack of confidence with the activity. This mirrored previous studies, such as Wheeler et al. (2008), when a slow start was due to uncertainty regarding lecturers' expectations, and the potential and functionality of the wiki (for example, whether it could be edited, what style should be used: essay or bullet points).

It became evident that project needed to be treated as a process, not an event, with instructor intervention and workshop-style classroom activities. Examples of other students' wikis were demonstrated, with encouragement to integrate links, images and video in addition to traditional academic material such as theory and references.

Class time was set aside for mini workshops on problems and challenges, which ranged from technical issues such as access and formatting, to presentation queries. These were designed according to the students evolving challenges and needs, and required a level of agility on the part of the lecturer, as the issues raised anticipated immediate resolution:

'I uploaded a video, but now it's gone, how do I fix it?'
'Which library databases are best for digital marketing?'

The queries raised in class were a mix of technical issues, such as access to the wiki, features, Blackboard passwords, and content-based issues, such as referencing style, expectations of standard.

As this was first year group, it was important to set clear, high expectations and encourage discussion of these (Chickering and Gamson, 1987).

Level and Timing of Contribution:

37 out of the 39 enrolled students participated in the assessment, however one group (of 2 members) found that they were unable to access their wiki and emailed it to the instructor. The participating 35 students created a total of 669 page versions, during 3,652 views, resulting in the creation of 81 pages of content across the 13 groups. Timing of contributions was relatively late, though evidence from field notes indicates that the students were working on the literature search and review, before approaching the wiki element of the assessment. These findings reflect similar experiences by previous researchers such as Judd, Kennedy and Cropper (2010), and Trentin (2008), albeit in different contexts.

Cooperation in Learning:

The remaining 13 groups worked successfully with the wikis, that is, they fulfilled the requirements of creating individual pages for each element of the learning activity, and each member contributed. Eight of the groups used the comments section to comment on each others' work, communicate and suggest changes or next steps, with a total of 37 comments¹:

*'Ok then change of topic.....we can do the same as Davids'
'@ Emma and David the Journal Im going to use is [article name]'
'Great work Alan well done'*

Student A: *'hey, how recent do the journals need to be??'*

Student B, in response: *'in the brief it just said they need to be recent! how far back is recent??'*

As found in previous research (Judd, Kennedy and Cropper, 2010), students were much more likely to edit a page than to make a comment. In fact, as these students are in a small class, and spend time together daily, the comment facility was less useful to them than it would be to students in larger groups who may be separated by distance or module selection. 79% of survey respondents reported that they worked mostly face to face on the project, with the remaining 21% working mostly online.

Technical issues:

While this group was a little slow to start working on the wiki, the evidence above points to this being related more issues of expectations of a third level assessment, rather than technical concerns. This is not to state that there were no technical issues, rather that they manifested themselves later in the project, and at a higher level. 62% reported that they found the wiki easy or very easy to use. There were some access issues with different machines, Java version, and compatibility with the internet browser used. The most frequently cited technical difficulty was incompatibility with Internet Explorer:

'it doesn't work on the internet explorer browser. You need to download Mozilla, kind of inconvenient.'

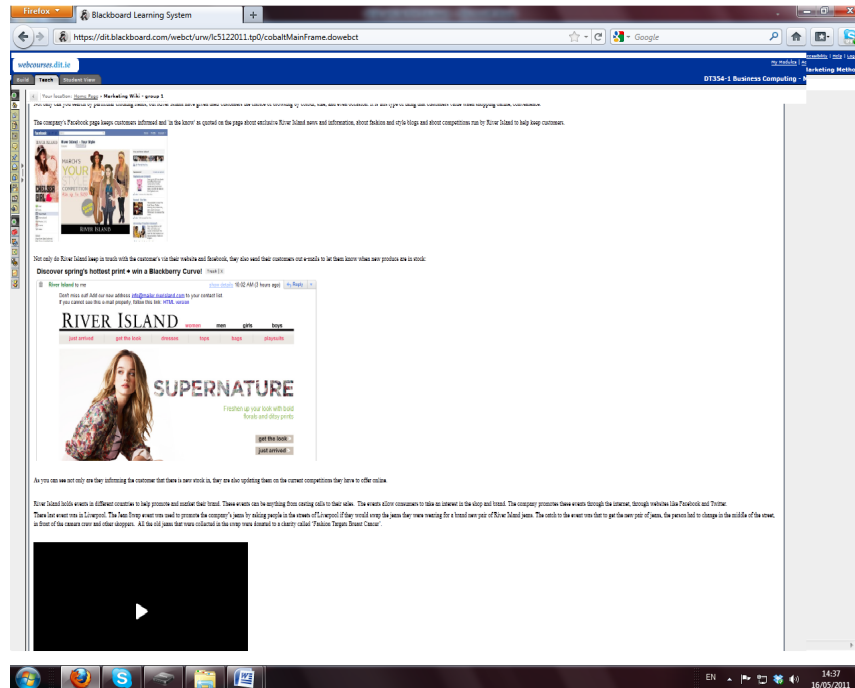
In addition, some students reported problems with features:

'I tried to add in background color and boarders but for some reason it wouldn't let me. Hoping she'd see how familiar and adventures we got wit wiki that she might give us a few extra marks, but i guess not'

By the end of the project, all groups bar one (see previous) had become proficient with the technology, and uploaded text, images, and links to their wikis. Some also including attachments and video (see figure 1 below).

¹ Students' names have been changed throughout to preserve anonymity. Their spelling errors have not been corrected.

Figure 1: Example of one of the wikis created by the students (names hidden), personalised, with logos, images and video:



Students complained about the absence of a word count facility as creating extra work, having to copy to Word to check their progress. Some decide to limit the use of the wiki to the final stage:

'we didn't really use it as we thought it wasn't great... instead we used microsoft word and at the last min put everything up'

Two of the groups put up their work on the last day, having decided that it didn't add value for them. In hindsight some written instructions on wikis for later review would be a useful resource for the class.

Collaboration:

Examination of the history and wiki contributions reflects evidence of the students learning and collaboration on the project. These findings were triangulated by the feedback from the student email survey and from the instructor observation notes. Some student groups used the comment facility of the wiki to coordinate their efforts and respond to the problem (Judd, Kennedy and Cropper, 2010):

'I have got a good bit of stuff about Bulmers Pear and their online marketing campaign when they launched it. Most of it is pretty good and relevant so I will try to get the thousand words done by this evening and we won't have to be rushing it on Monday then'

The students found the fact that they could improve and add to each others' work beneficial. There is evidence from the wiki of the students supporting each other, co-creating knowledge and collaborating. The wikis were built from joint efforts, all students participated in the wikis, uploaded information etc. There is evidence of an effort to improve standard and organization of their work, using headings and sub-headings.

*'We read each others work and suggested ways to improve it'
 'Its an easy way for a group to work together and it saves time printing or emailing assignments as its all done online'
 'you were able to personall[ise] the project using pictures and embedding videos to help create an understanding of the topic'*

Evidence of learning from and with each other is demonstrated by the improvement in the content of the wikis and the overall grades achieved, and the fact that the learning outcomes were achieved. Collaboration did occur within the groups, with encouragement and support from the instructor throughout the process.

Disadvantages of the Wikis:

As stated in the previous sections, some groups preferred to discuss issues face-to-face, and some worked together around a laptop, making changes as a group. This rendered the 'assessment' or individual contribution measurement tool meaningless for those groups, and made the wiki just extra work:

'did not like them at all'
'Found it hard to make the pages look well, wasn't very impressed overall with the wiki, especially the lack of spell check'²

For these groups, the wiki did not appear to add much value.

Convenience and Efficiency:

These are themes that don't appear to receive much attention in wiki research, but the challenges of meeting up are often reported as one of the biggest challenges of group work (Jaques, 2000), so this is an important, perhaps underestimated benefit:

'It mean the group did not need to work at the same time or face to face.'
'easy to see how the other people in your group are getting on.'
'I liked using them'
'It saved us having many different copies of word documents'

A number of the groups stated their intention to use wikis in future group projects, perhaps one of the best indicators of preference!

Tutor as moderator:

Once the students began using the wikis the tutor was able to monitor the progress of the students, and view and track their activity on the wikis in a way not possible through other platforms. This development was new to both the students and the instructor, and presented some interesting challenges (Salmon, 2003). It made sense to then allow time in class to address whatever issue was current for the students – for example researching journal articles – and a set of 'frequently asked questions' evolved as a resource.

These interventions evolved as required in this instance, but required time and a certain agility. It would be beneficial for future projects to attempt to predict and pre-plan these, around 'common problems' and techniques. Similarly, additional resources available through the students' Blackboard VLE could be further developed to include both technical trouble shooting, and academic and content support information.

Conclusion: Can Wikis Support Collaborative Learning?

There can be no doubt that web 2.0 technologies will play an ever increasing role in higher education. The findings from this research suggest that wikis can support and add value to collaborative group learning, in the form of improved communication, a sounding board for ideas and repository for information. It is clear that the learning and collaboration can and does occur in an online environment. In addition the advantages of improved communication, and a single version were much appreciated by many groups, who saw this as an efficient and effective medium that they would like to see adopted much more widely.

² In fact spell check is available – clearly this student did not engage sufficiently to find it.

Some challenges to implementing wikis were identified and should be highlighted. The issue of constructive alignment has been widely discussed, so this assignment was firmly embedded in the module, and aligned to learning outcomes and grades. However, the new technology was in hindsight not given enough attention at the briefing stage. It is recommended that the use and features of wikis requires more than a single briefing and demonstration. In fact creating a resource for the features (such as editing, page history, chat etc.) and how they work for later review would be beneficial. For some student groups it may be appropriate to hold the briefing in a laboratory, where students can engage with the technology immediately.

The advantages of using wikis have been identified in the literature, along with the instructors' role (Salmon, 2003). It allowed monitoring and tracking of the groups' activity and progress, which then set the agenda for workshops on the evolving project.

This study has demonstrated the unique capabilities of wikis in supporting students' collaborative learning in this context, and has contributed to improved practice. Future development of the research described in this paper (cycle 2) will involve deeper examination of the changing role of the instructor and implications of e-moderating on class activities, and of the students levels of engagement and collaboration.

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