

Students taking notes and creating summaries together (or not)

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Abstract Two collaborative elearning projects using cloud-based productivity tools were undertaken in a large first-year common-core business information systems and technology unit at an Australian university. The first project involved collaborative synchronous and asynchronous note taking and the second project involved collaborative synchronous and asynchronous summarising of unit materials. Enrolment was optional and very low (less than 3 per cent of approximately 600 students) and active participation even lower (even with considerable support provided). Results seem to indicate students need strong motivation to actively participate (especially when lurking can provide seemingly similar results). Students who did actively participate suggest active participation is probably more useful than the collaboration and somewhat resented students lurking. Collaborative elearning offers many rewards for students, teachers, and organisations, and the technology is available to facilitate this, even in very large classes, but it seems significantly harder to achieve than anticipated.

Background

Business Information Systems 100 (BIS100) is a very large first-year common-core unit (aka course) in the School of Information Systems at Curtin University, which introduces (mostly) business students to Information Systems, Information Technology, and Logistics and Supply Chain Management. We are keen to foster collaborative elearning amongst the students to increase student engagement, improve learning (particularly self-regulated learning), and reduce dependency on formal learning experiences and academic staff. In BIS100, we already use a range of technologies to facilitate, engage, and enhance student learning. The unit has been very well received by both on-campus students, who mostly attend lectures and workshops, and online students who do not (but can watch the video recordings of the lectures and workshops). BIS100 adopts a blended approach to learning, encouraging and requiring on campus students to use the online facilities (including online learning activities) as well as face-to-face sessions.

With the rise of web 2.0 productivity technologies, e.g. cloud-based services like Google Docs and Microsoft Live 365 that enable collaboration in productivity tools, two projects were envisioned where students could work collaboratively to 1) annotate lecture notes (in real-time during the lectures or afterwards) and, 2) create summaries of the unit content for test and exam preparation. It was thought that students could form an online learning community using such a collaborative tool. It was hypothesised that this could encourage students to be active learners who could interact with, but also create, learning resources. This would facilitate their learning and would also create artefacts useful as review aids for the semester test and final examination. The projects would also expose students to contemporary developments in technology, i.e. the use of cloud collaboration and annotation technologies, which would be relevant to their future employment. It was also considered that the project could investigate students' interest and aptitude for collaborative elearning in a higher education setting.

Literature review

Brown (2011, p. 50) suggests that Web 2.0 refers to “a range of software applications that have been variously described as ‘dynamic’, ‘interactive’, ‘democratic’, ‘people centric’, ‘volatile’, ‘social’, and ‘adaptive’, and as having more of a focus on “content creation than content consumption.” Although the use of Web 2.0 applications and approaches are becoming pervasive amongst students in their personal lives, a report into the impact on higher education of students' widespread use of Web 2.0 applications indicates that the use of Web 2.0 for learning is not generally a focus of students (CICLE, 2009). This is because for many students there is a clear demarcation of boundaries in ‘web space,’ e.g. personal space (messages), group space (social networking sites such as Facebook) and publishing space (blogs and social media sites such as YouTube). Using any of these spaces for the purpose of university study may be considered a violation of these boundaries for some students. This observation might explain why students may show discomfort with staff-initiated discussion groups in perceived social networking spaces, with students preferring to set up their own ‘web space’ for study-related purposes, or resorting to more conventional face-to-face methods for this purpose.

It is also apparent that many younger students are still seeking traditional pedagogical approaches in higher education, based upon their recent school experience (e.g., face-to-face contact). The CICLE Report (2009) concludes that this disjuncture between how students inhabit the ‘social web’ in their day-to-day lives and what they experience when they encounter higher education is because the higher education system at present is still traditional in its demeanour:

Characterised broadly, it is hierarchical, substantially introvert, guarded, careful, precise and measured. The two worlds are co-existing with present-day students occupying a position on the cusp of change. They aren't demanding different approaches; rather they are making such adaptations as are necessary for the time it takes to gain their qualifications. Effectively, they are managing a disjuncture,

and the situation is feeding the natural inertia of any established system. (CICLE, 2009, p. 9)

This indicates that students are both expecting, and familiar, with a higher education system that is ‘top-down’ in nature, in which students are encouraged to be consumers rather than creators of educational content. A study by Chang, Kennedy and Petrovic (2008) indicates that students may be reluctant to see the value in peer-created content because they may presuppose that academic-created content holds superior academic authority when compared to student-generated content, even when students perceive educational value in the processes of content creation. Whilst not universally rejecting peer-generated content, many of the students in their study struggled with such a shift in academic authority. Lippincott (2007) advocates that there is a need for higher education to prepare students to be content creators within their disciplinary or professional specialties. This could also provide a more meaningful way of encouraging the integration of a wide variety of skills into the curriculum, to assist with students’ future professional development.

There also appears to be a paucity of literature on student collaboration in elearning environments. Similarly, there appears to be little research undertaken into student use of student-generated resources within higher education. The latter, specifically, is a fertile area for investigation considering the increasing use amongst students (in other areas of their lives) of Web 2.0 social networking tools and platforms. These tools and platforms encourage collaboration and information sharing, if not artefact creation. It is an interesting question to consider whether students will eventually take up learning resource creation and perhaps, even, out do the academic staff in this regard.

The use of emerging technologies and tools to assist collaborative learning amongst students, such as social annotation (SA) tools, have not yet been extensively used and examined within the context of higher education. SA tools include online social bookmarking applications that allow annotating (adding comments, highlights, sticky notes, etc. to) electronic resources and support easy online information sharing. SA technologies also enable knowledge sharing solutions and are a platform for social interactions and discussions. Novak, Razzouk and Johnson (2012) conclude from their review of the literature that annotation technologies used in educational settings can increase participation and engagement; improve instruction; promote attention, communication and organisation; as well as improve reading comprehension and peer-critique skills.

Greater student engagement is one of the reasons for encouraging students to work collaboratively. Beer, Clark and Jones (2010) state that whilst there does not appear to be a single definition for student engagement, the definition offered by Coates that is an amalgamation of a number of distinct elements is useful; “Engagement is seen to comprise active and collaborative learning, participation in challenging academic

activities, formative communication with academic staff, involvement in enriching educational experiences, and feeling legitimated and supported by university learning communities” (Coates, 2007, p. 122). We propose that it is useful to regard ‘student engagement’ to include both activities that involve greater collaboration with other students undertaking the unit, and/or greater engagement with the learning content for the unit.

Steimle, Brdiczka and Muhlhauser (2009) indicate that university lectures are often considered as suboptimal learning settings for student engagement because communication is centred on the lecturer, causing learners to easily become rather passive listeners. Collaborative note taking and annotation activities are regarded as important elements to overcome this problem and encourage active learning and engagement (Prince, 2004 as cited in Steimle et al. 2009). Steimle et al. (2009) claim that the sharing of notes with other learners may encourage students to complete their notes, to critically examine their own understanding of the material, and to co-construct a shared understanding with other learners. In their field study of note taking amongst students in university courses, they found that most students do not use electronic tools for note taking and annotation, instead preferring pen and paper, again adopting traditional approaches. They describe a concept and system that enables students to collaboratively annotate lecture slides during a lecture, using a digital pen to make handwritten annotations on printed slides and empty pages, just like a traditional pen. They also found that although many students possess a laptop (78.6 per cent N=180), only a small number of students take notes on the device (19.6 per cent N=35). This is because many students find annotating lecture slides with a laptop distracting.

Neumann and Hood (2009) state that although there are many reports of the successful application of wikis in higher education, most of the claimed successes of wikis are not based on improvements in learning outcomes, but were related to the frequency of use of the system. Their study evaluated the use of a wiki to promote student engagement and learning of research report writing skills in a statistics unit. Students were divided into two groups - one group used the wiki to collaboratively write the practice report, whilst the second group wrote the practice report individually. Students who used the wiki to write the report gave higher ratings on cognitive engagement and engagement with other students. They conclude that wikis support collaboration among students and encourage more cognitive engagement with the subject matter. It was hypothesised that students working in a more collaborative way might be expected to show a better demonstration of learning outcomes on assessed work. However, it was observed that the marks obtained by students in both groups for a summative assessment did not differ significantly. They point out that the effects of using a wiki on student learning and engagement may be limited in the study due to the low participation rate, with further research needed to determine whether the learning benefits of working collaboratively are enhanced when there are higher levels of participation.

It is often assumed that most people are still consumers rather than creators of Web 2.0 content, generally speaking and with regards to learning in a higher education setting. It is currently also assumed that one per cent of people contribute content online, nine per cent edit it, and 90 per cent do not contribute at all (Nielsen 2006, Marwick 2006). Nov (2007) suggests that in order to understand what underlies user-generated content contribution (particularly in the context of Wikipedia), it is important to understand what motivates content contributors, and identify which motivations are associated with high or low levels of contribution.

Wangpipatwong (2009) states that although knowledge sharing has been gaining attention among researchers and business managers, with many studies examining the factors influencing knowledge sharing in an organisational context, little attention has been paid to addressing knowledge sharing among university students in a classroom environment. Within the context of educational institutions, Cho, Li and Su (2007) hypothesise that students may not share knowledge because they are afraid to lose their exclusiveness, and also see the knowledge they possess as their intellectual property, giving them a personal advantage. This assumption may be particularly relevant within the context of knowledge sharing in higher education (although higher education is not generally a zero sum game).

Olaru, Purchase and Letch (2010a) identified some of the factors that may cause students to be reluctant to participate in university online learning forums where there is a focus on sharing knowledge. They identified three behavioural clusters in online learning communities, based on a survey of students' values and online behaviours at the University of Western Australia.

The first behavioural cluster that they identified is known as the "reticent participants," (roughly 30 per cent of students surveyed), who tend to be younger and concerned primarily about the freedom to express conflicting views or being censored (Olaru et al., 2010b). They spend the least amount of time engaging in online discussions, and place less value on knowledge sharing and reciprocity. It is hypothesised that making this group of students' participation anonymous may encourage them as they will perceive less barriers (such as moderation) and will come to the realisation that participation will enhance their own learning and self-efficacy.

The second behavioural cluster identified by Olaru et al. (2010b) is the "individualistic contemplators" (roughly 39 per cent of students surveyed), of which 65 per cent were Asian students. These students value the relational aspects of online interaction (respect, prestige, and obligations), and are highly competitive. It is thought that if online learning forums provide more individual benefits or have built in activities to trigger participative behaviours this cluster may switch their current attitudes and intentions about online knowledge sharing. Anonymous online discussion boards may be one such example.

The third behavioural cluster Olaru et al. (2010b) identified is the "e-collaborators" (roughly 31 per cent of students surveyed) who tend to come from a significantly higher

age group and tend to be post-graduate students. These students are much more likely to share their knowledge within an online setting because they value the interactions within the network, are altruistic, and do not need recognition for their contribution. They are motivated to exchange ideas and expect reciprocity. Although “lurkers” (those that watch interactions but do not contribute content) come from the first two behavioural clusters, it is thought that in time, they will become e-collaborators too, but they need time to first settle into such online learning communities. Olaru et al. (2010a) also indicate that other issues affecting online participation include the degree to which students identify with their cohort, their shared language and interests, their collectivist and individualistic values, and their levels of nurturing behaviour. They conclude that all three clusters gain the most from university classes offering the opportunity to participate in both face-to-face and online methods of learning (i.e., blended learning).

Wei (2009) also testifies to the significance of national culture as being a major barrier to knowledge sharing. Language was seen to be the greatest barrier to knowledge sharing, followed by technical knowledge, concern for face, and technology infrastructure. Thongprasert’s (2008) investigation considered how cultural values affect the way Thai students (in both Thailand and Australia) access and share knowledge in a virtual classroom. They conclude that methods of knowledge sharing, communication and learning are profoundly influenced by the cultural values of students. As Thai students perceive a power distance between themselves and their lecturers, they are less comfortable to ask questions and present their ideas. Uncertainty avoidance is another factor, with Thai students in Australia tending to worry about losing face, and lack of language proficiency in online community discussions, instead preferring informal communication channels. This concurs with Ardichvili’s (2008) view that in Asian cultures, the desire to save face constitutes a significant barrier to participating in open knowledge sharing forums, where there is always a threat of ridicule. This observation may be a significant factor amongst the large number of international students enrolled in the BIS100.

Research objectives

The aims of this research were to:

1. *Get students to collaboratively annotate the lecture slides for BIS100.* A version of each week’s lecture and workshop slides were made available each week online in Google Docs native presentation format, for the students to collaboratively annotate the slides by putting their annotations in the “Speaker Notes”. Some students have been observed annotating their personal electronic (Microsoft PowerPoint) copy of the lecture and workshop slides in a similar way in class. Students would be somewhat familiar with this technology since they use Google Docs cloud service to do their assignment (writing and drawing) and share that with their Workshop Leader (and the Unit Coordinator) as a means of ‘submitting the work’ without having to print, email, or upload it. The Google

Docs presentation application works in a similar way to most other presentation applications.

2. *Get students to collaboratively produce learning unit summaries for BIS100.* Following on from (1) above, we also recommended that students construct their own summaries of each learning unit (i.e., primarily the lecture and workshop slides, and other learning resources), to facilitate their learning and as a review aid for the semester test and final examination. We decided not to provide summaries for the students, beyond a sample summary, but rather sought to motivate students to make the summaries themselves given the clear learning benefits that could result. No doubt a number of students already do this but the percentage is most likely very small. A template summary document for each learning unit was made available online within Google Docs. One of the templates was completed with the sample learning unit summary normally distributed to students.

We hypothesised that these activities would encourage greater student engagement both in terms of engaging with the unit content, and online engagement with each other when discussing their lecture slide annotations or learning unit summaries. We also hoped that it would encourage students to familiarise themselves with (and work towards achieving) the learning outcomes in a more incremental manner throughout the duration of the unit, rather than a last minute swot for the test and exam. We also anticipated, unfortunately, that getting students to participate in the projects, and be active contributors would be a significant challenge in itself, so planned to provide a considerable amount of support material for each initiative.

The research aimed to address the following questions to varying degrees:

1. Would the increasing use of Web 2.0 applications in students' day-to-day lives (e.g., Facebook, Wikipedia etc.), encourage students to collaborate in this manner in an instructor-designed collaborative elearning environment?
2. Would students be willing to actively participate in the project?
3. Which collaborative project would they prefer? Collaborative lecture note annotations or collaborative learning unit summaries?
4. Would Google Docs be an effective tool for them to use for these tasks?
5. Would the project encourage students to work more incrementally through the unit to achieve the learning outcomes?
6. Would they find other students contributions useful (and vice-versa)?
7. Would they find participation in the project beneficial to their overall learning?

Approach

This was action research. Trials were implemented in Semester 1 and again in Semester 2 of 2011. Introductory and support materials were developed, including a video to explain the purpose of each project, namely: 1) the Collaborative Lecture and workshop Notes

Annotation Project (CLNAP) and 2) the Collaborative Learning Unit Summaries Project (CLUSP). The collaborative services were configured and made available to students. Students were encouraged to participate in the project a number of times and through a number of channels (e.g., announcements made during lectures and workshops and via the Blackboard learning management system) at the start of the semester and a number of times during the semester. They were also informed that participation was voluntary, that they were able to withdraw at any time, and we were careful to point out that students' would not be assessed on their contributions, nor would they receive any points for participating.

To accommodate different learning styles a few different formats for the summaries were encouraged, e.g. a purely textual summary, a textual summary including a few simple diagrams, as well as a more visual summary like a mind map. These were not emphasised, however, because being mostly young first-year students their knowledge of, and ability to work with, other knowledge representations was generally assumed not to be strong. The annotation of lecture notes was primarily textual (i.e., the addition of 'speaker notes') but students could also annotate the slide content if they wished to and knew how to do this.

Attention was also given to how effective the projects would be if hundreds of students were trying to edit the same documents in Google Docs simultaneously. Google Docs does allow concurrent real-time editing by multiple authors (around 30 or so, depending upon which productivity application is being used), and the assumption was that not every student would embrace this task or undertake it at the same time within class or outside of class. Getting a substantial number of students to participate in the project, for this to be a problem would be an achievement in itself. Although Curtin University uses Microsoft Live 365 for student email and other services in the future (e.g., SkyDrive and Office Live 365), we concluded that as there were currently more severe limitations of concurrent authorship within Office Live 365, with no more than 10 students at a time being able to edit documents simultaneously, we would stick with Google Docs. Google Docs was also preferred because it provides embedded instant messaging tools that would enable students to discuss and reflect on the learning resources being created, whilst they undertook the collaborative learning activity.

Students enrolled in BIS100 (both on campus and online) during Semester 1 and Semester 2 of 2011, were invited to participate in the projects, which were introduced in the second week of the unit. In Semester 1, 2011 there were approximately 750 students enrolled on campus or via online learning, with additional students taking the unit through partner institutions. In Semester 2, 2011 there were approximately 600 students enrolled on campus or via online learning, in addition to students taking the unit through partner institutions. The student population is a diverse group; mostly students coming from high school, although there are some mature age students, and a large proportion of international students from various countries in Asia.

A survey was offered at the end of each semester to those students who chose to participate in either of the projects. The survey was implemented via Blackboard, and consisted of 12 items, with a combination of open-ended questions, Likert-scale questions, and multiple-choice questions. Basic data analysis was performed in Microsoft Excel. Ethics approval to conduct the surveys was granted by the Curtin University Ethics Committee.

Findings

Unfortunately, as mentioned above, there was a poor uptake of the projects amongst students across both semesters and both modes of study. Therefore the results detailed in this section are not statistically significant due to the small size of the sample. The CLUSP had a much greater uptake than the CLNAP across both semesters but participation was still very small (less than 3 per cent of approximately 600 students), which was disappointing considering the large numbers of students taking the unit. It is also important to note that BIS100 is a first year unit, and that perhaps a greater participation rate might have been achieved amongst students who had been in a university environment for a longer period of time (such as postgraduate students), who may be more confident and keen to participate in collaborative behaviours. As previously discussed, Olaru et al.'s (2010) description of 'e-collaborators' who are much more likely to share their knowledge in an online setting are students who come from a significantly higher age group and tend to be postgraduate students.

It was apparent that most students were not keen to participate in the projects, and of the few that did participate many did not wish to assist in annotating the lecture notes or creating the learning summaries, but just wanted to benefit from the work of an even smaller number of students. The low active involvement amongst those students who did participate in the projects matches the participation rates more generally found in online collaborative learning. As previously discussed, (Judd, Kennedy and Cropper 2010) document a very small minority creating content, a small number editing content, and the majority making no contribution at all.

Collaborative Lecture Unit Summaries Project

During Semester 1, 2011, despite a small number of students participating in the project (N=7) there was generally a high satisfaction rate amongst respondents, and all respondents wanting the trial extended to other units within the university. Students were clear about the objectives of the project (100%). Sixty per cent of students contributed towards the learning unit summaries, with 20 per cent of them contributing after the learning unit had been completed, and 40 per cent of them contributing in preparation for the semester test. Participants in the trial generally found other students contributions helpful (80%). Google Docs was seen to be useful for collaborative learning unit summaries by 80 per cent of respondents, and very easy-to-use (80%). Most students

used the summaries in preparation for the semester test (80%). Some positive comments from students participating in the project during Semester 1, 2011 included:

“Allowed for a greater expansion of ideas and a broader view of a topic otherwise seen from one angle. The collaboration also meant that we had a reason to review our work (and [study] notes) more effectively in order to portray our ideas in a more comprehensive style.”

“Being able to compile better quality and more rounded summaries, because of multiple contributing authors.”

During Semester 2, 2011, although there was a slightly higher number of students who signed up to the CLUSP trial (N=11), less students were clear about the aims of the project (45% of respondents), and 54 per cent of students made no contribution in terms of adding or editing content. Similarly, 45 per cent of students never looked at other students' contributions. There were lower satisfaction rates with the effectiveness of Google Docs for creating learning unit summaries, though this is perhaps explained by the observation that 36 per cent of students did not use Google Docs (because they had made no contribution throughout the semester). Fifty-four per cent of students did not use the CLUSP in preparation for the semester test. Fifty-four per cent of students were satisfied with the CLUSP, with the remainder either dissatisfied (9%), or not able to evaluate their satisfaction because they did not participate enough to comment (36%). Whilst 63 per cent of respondents would participate in CLUSP in the future, a higher percentage of students (72%) would like to see CLUSP extended to other units.

Some positive survey feedback from students included:

“It is great study tool, and it is also great to see what information other students find noteworthy. Occasionally I may miss something that another student picked up on.”

“I think it could be a great forum for discussion and lateral thinking in the unit.”

“Very good resource for revision and study for the final exam.”

“Would love to see this available for other units.”

“Great innovative idea! Don't stop this one!”

Collaborative Lecture Note Annotation Project

Only one student signed up to the CLNAP during Semester 1, 2011, and seven students participated during Semester 2, 2011. During Semester 2, 2011, amongst the small number of students that did participate in the CLNAP (N=7), many appeared to be unclear about the objectives of the project. This may be explained however, by the observation that 28 per cent of those surveyed did not read the documentation about the project at all, and 85 per cent did not watch the video that was provided. Some students commented that it was difficult for them to see when annotations had been added to the

slides in Google Docs. This is a valid point and technical limitation of most (if not all) presentation tools (i.e., it is not possible to simply and quickly tell which slides have new annotations in the speaker notes).

During Semester 2, 14 per cent of students completed the lecture slide annotations as they worked their way through the learning unit, and 14 per cent did the annotations in preparation for the semester test. Twenty-eight per cent of students were both satisfied with the CLNAP and likely to participate in a CLNAP in the future. Fifty-seven per cent of students wanted to see CLNAP extended to other units at Curtin University. Some positive responses from students included:

“Gives you the opportunity to work with other people.”

“A good thing about the Collaborative note taking would be that each student who contributes can learn off one another.”

“Anything involving collaboration is a good idea.”

“Viewing and learning from other students’ contributions (the few that actually DID contribute).”

Steimle et al.’s (2009) study of collaborative paper-based annotations of lecture slides, found that some students do not take notes because the course slides offered by the instructor contain sufficient information. This is most likely the case in BIS100 as well, where a great deal of effort has been put into developing very detailed and comprehensive lecture and workshop slides. In this regard, some students commented:

“The lecture slide and workshop explain very briefly, so I don’t have anything to add.”

“Most of my notes were repeating what is on the slide.”

“Lecture slides already sufficient.”

The issue of student anonymity was raised, with one student commenting: “I think it would have been more effective if it was anonymous.” Anonymity would be quite easy to achieve with Google Docs but, perhaps, a case can be made for encouraging students to share openly and worry less about perceptions of their contributions. Anonymity would, however, also make it easier to benefit from others without contributing themselves.

One student when asked why they did not add or edit any lecture or workshop slide notes commented that, *“nobody else had added notes.”* This statement is perhaps indicative of a more general state of apathy towards collaborative knowledge constructing behaviours, as well as the need for there to be a substantial number of individuals actively participating in order to make such a collaborative project viable.

Commonalities across both collaborative learning initiatives

There were similarities in the responses across both semesters within both the CLUSP and CLNAP initiatives, particularly in terms of the perceived barriers to participation. The small number of students who did contribute found the exercise of creating the learning summaries was perhaps more useful when done on their own rather than collaboratively. The possibility of potentially sharing annotations and summaries with hundreds of students was a disincentive, as was the lack of anonymity amongst students. This finding concurs with Olaru et al.'s (2010b) description of “reticent participants” in online learning, who tend to be younger students that prefer anonymity, like to express conflicting views, and do not like the possibility of their thoughts being censored.

As one student commented about the CLUSP:

“I joined the collaborative summaries later, after the semester test, but I found that it was easier for me to work from my own notes as I was able to arrange things in a way that would help me to remember and also to omit information that I already knew. I however think that they are a good idea and would have been very helpful to the majority of students.”

Other students commented that they felt they learnt best “*from their own way of doing things*” which inspired them to create their own summaries for each learning unit, whilst others felt that they had nothing else to contribute to other students’ summaries. Perhaps those who create their own notes could be encouraged to share and compare them with others doing similar (to find omissions and see different understandings and perspectives). One student commented that the CLUSP could be improved through “*greater student uptake and participation.*”

The problem of students ‘bludging off’ of other students’ contributions, whilst making no contribution to the project, was also raised:

“Although it sounds a bit jaded, I feel that a lot of students would simply ‘use’ the contributions of others instead of contributing also. As a high-achieving student, from my perspective it just feels like I’m doing work for others who can’t be bothered. That said, if it was secured so that only those who contribute could view them as well, perhaps that would be a bit more encouraging to use it? Probably feels more equitable that way.”

Again, the issue of ‘bludging’ was raised:

“Just felt that others could use it without contributing. It if it could be secured so that only those who contribute could view, I’d probably feel more comfortable as a high-achieving student who is often frustrated by the lack of effort shown by the bulk of students.”

“I didn’t participate because my notes are for me. It would irritate me if I took all the time to create those notes in a special way so that I myself could understand and if a bludger read straight off my hard work and didn’t create any of their own preparation. I would feel used and annoyed.”

One student gave a suggested solution to this problem:

“If a student has not contributed to the summaries at all a week prior to a test or exam, they should be removed from participating. If joined, it must be compulsory to make a contribution to the work.”

There was also feedback on how to increase participation in the project in the future:

“Small prizes for participating?! Though the benefits of the trial is a prize itself, until the collaborative trial becomes a mainstream uni practice, maybe an added incentive to get the idea off the ground would be good. If I did it again I’d do a summary as each week passes.”

Another student suggested:

“Keep the Unit Summaries project and remove the PowerPoint Note taking project. Using both might be effective, but is more efficient to stick to the one that provides the best results :-)”

Analysis

The success of these projects was stymied by a low participation rate amongst the whole student cohort who were invited to participate, and a low active involvement amongst those that did join the trials. Considering that this was research that aimed to increase collaborative behaviour amongst students, this was obviously quite problematic. This low rate of collaborative behaviour is consistent, however, with the observation that only a small number of individuals are motivated to engage in collaborative user-generated content production on the web at a more general level (i.e., outside of academia).

The literature review indicated that unless students are given specific incentives or rewards to participate, such a low response rate is not unusual. It is likely that the low participation rate amongst students is reflective of the behavioural cluster Olaru et al. (2010b) described as “individualistic contemplators”; they suggest these students are least likely to participate in online forums and need to see more evidence of individual benefits or require built in activities to trigger their participation behaviour. Sixty-five per cent of the individualistic contemplators cluster identified as Asian students in the study at UWA described as valuing the relational aspects of online interaction whilst remaining highly competitive may have similarities to this study group, given the large proportion of students from Asian countries enrolled in BIS100. This offers a possible reason why some students may not have felt motivated to participate in the projects. Further explanation is drawn from Ebner et al.’s research which revealed that of 287 university students engaging in a collaborative online learning activity, none created new articles or edited existing ones across an entire semester, when no rewards or incentives were offered for participation (as cited in Neumann & Hood, 2009).

It is also apparent from this study that students tend not to study and learn incrementally but mostly only in preparation for exams and assignment submission deadlines. Most students do not review and complete their notes or lecture slide annotations after the

class, but instead become more active when preparing for the semester test or the final examination. Amongst the students taking part in the trial in Semester 1, 2011, 20 per cent did the learning unit summaries after they had moved on to later learning units, and 40 per cent did them in preparation for the semester test (i.e., just in time). Again, this makes increasing collaborative behaviour amongst the student community throughout the semester more difficult. Perhaps students need to be taught collaborative behaviours (and made aware of the benefits) as much as anything else.

Low collaborative behaviour by students is also identified in Judd, Kennedy and Cropper's (2010) research that assessed students collaborative behaviour based on their contributions to a wiki-based shared writing task. Despite efforts to provide a learning design to support collaboration, a relatively small proportion of students did the majority of the work, and many students' contributions were considered superficial. Because the majority of contributions were made on the last day students could contribute to the wiki, there was very little ongoing collaboration. They conclude that wikis are not inherently collaborative and that additional components may be required to promote participation and collaboration amongst students. Thus, even when students are required to engage in collaborative behaviours because an assignment requires this, they still tend to leave contributing until the last minute.

Perhaps this apparent lack of enthusiasm to participate in collaborative behaviours with peers is because students do not value such collaboration. This may relate back to the observation that despite being immersed in a Web 2.0 environment, when it comes to the delivery of education most students still want a more 'traditional' experience and may be reluctant to use current technologies also. There is still a tendency for students to prefer face-to-face instructor led learning (but not lectures), which may have more perceived value to students than peer-generated content. There is still also a preference not to use technology when annotating lecture notes, with one student commenting, "*I prefer writing notes from lectures by hand.*" This finding concurs with Steimle et al.'s (2009) observation that despite many students possessing laptops, most prefer not to use electronic tools for note taking in lectures because they see it as a distraction (to themselves and possibly other students). This may, however, change going forward with the popularity of more convenient tablets.

Another explanation may relate back to the notion of boundaries in 'web space.' Perhaps some students are more keen to engage in online collaborative behaviours in their private lives (through Facebook etc.), but are not ready or willing to make the jump to collaborating online in that way in an online learning context. This relates back to Olaru et al.'s (2010a) discussion of behavioural clusters in online learning. If anonymity were offered, this might appeal to some students. That said, one might also even question whether social media is really a form of collaboration (i.e., something like directed group work).

With regards to the research questions we can say:

1. The vast majority of the BIS100 student cohort, across both semesters, was not keen to participate in the two projects. This corresponds with the findings of other research studies, and the low levels of people who engage in user-generated content in other collaborative environments outside of academia (e.g., Wikipedia).
2. Amongst the very small number of students who did participate in the projects, an even smaller number were actively involved and contributing content. Most did not annotate slides or contribute learning unit summaries in an incremental fashion as they progressed through the unit, instead tending to do this in preparation for the semester test. Obviously this type of activity does not enable collaborative behaviour amongst the group.

As mentioned, for some of the students who signed up to the projects, the lack of anonymity was a problem. For others who were keen to contribute content there were concerns that the ‘bludgers,’ who were not actively contributing or editing content, would unfairly benefit from their hard work. As one student commented: *“If a student has not contributed to the summaries at all a week prior to a test or exam they should be removed from participating. If joined, it must be compulsory to make a contribution to the work.”*

3. The CLNAP was not popular, particularly during the initial implementation of the project in Semester 1, 2011, when only one student signed up. A few more students signed up in Semester 2, 2011 but were not very active. The CLUSP was more popular, with some students suggesting removing the lecture slide annotation component of the project altogether, and extending the CLUSP to other units within the University.
4. There was an overwhelmingly positive response from students to using Google Docs for such collaborative behaviour. Students reported that it was easy to use and useful for the task.
5. Unfortunately, the projects did not encourage students to work more incrementally through the unit. There was still a tendency for students to contribute after the learning unit had been completed, or in preparation for the final examination. To be clear though, there was no real incentive in either project to encourage incremental learning (beyond the fact that they could immediately see other students’ contributions).
6. Some students found their peers contributions useful, whilst others were unable to comment because they had never looked at the contributions made, nor made a contribution. One would imagine that if peer-generated content was more highly valued by students that this would lead to more students finding one another’s contributions useful to their learning.
7. With regards to the CLNAP, students reported that they could learn from one another’s contributions. They also liked the pre-designed templates, enabling them to go through each objective and summarise their notes into a document. One student also commented:

“I found the collaborative note summaries a good motivator for me to summarise my notes, re-read everything and make a good set of study materials for the examinations. I feel it would have been a lot more beneficial and enjoyable if more students joined in with the note making, and to discuss the material with fellow students. It would have made learning a lot easier and more insightful to gain the opinions and views from fellow peers. It was a shame not many helped to contribute. I was slightly disappointed with my fellow BIS100 peers. I am however extremely grateful to the two other students who did make contributions, and I hope they went well in their studies and exams.”

Conclusion

The Collaborative Learning Unit Summaries Project got a better response from students, than the Collaborative Lecture Note Annotation Project, both in terms of the number of students signing up and the level of participation during the trials. The students who participated were also positive about the use of Google Docs for collaboratively sharing knowledge. It would have been beneficial to conduct either follow-up interviews and/or a focus group with students who agreed to participate in the trials, whether they were active or inactive content contributors. However, the small sample size and time limitations prohibited this. It would have also been interesting to survey students who did not participate to see why they did not participate.

For students not familiar with working in a collaborative user-generated content environment such as Wikipedia, it would have been useful to explain the principles and benefits behind this. As Wheeler, Yeomans and Wheeler (2008) indicate in their trial of a student wiki project, and as done in this project, students need to be informed about the probability of their work being edited or extended by others, or even deleted if other users consider their contributions inaccurate or inappropriate. Wheeler et al. also point out that it is important to raise the issue of authorship in such an environment, whereupon the ideas contained with the Wiki become part of the whole learning community. This point could have been better communicated in this research.

The most crucial issue affecting the success of future implementations of these projects would be to increase the participation rate of students; both in terms of signing up to join the projects, and then subsequently actively participating. Perhaps running only one of the collaborative projects at a time might be beneficial (as suggested by some survey respondents), such as the CLUSP that appeared to be more popular with students. One possibility would be to make participating in the collaborative project part of the unit coursework. However, as others have pointed out (e. g., Judd et al., 2010), although this does increase the number of students who are part of the trial, it does not necessarily increase the rate and quality of collaborative behaviour, with the majority of students adding or editing content the day before the coursework is due. The issue of giving students an incentive to participate was raised by a couple of survey respondents. Attention would need to be given to what form this would take, and considering that the motivations for participating in the projects would be quite diverse amongst the student population, perhaps a number of different strategies would need to be considered.

Generally though, students need to see that the main benefit would be that it could really assist them in the achievement of the learning outcomes for the unit.

The above issues are relevant to the subject of motivation. So perhaps it would be insightful to survey students on what encourages individuals to engage in content contribution. Nov's (2007) research in this area would be one example, where a volunteering motivation scale was used in accordance with a survey on contribution levels amongst a sample of individuals who contribute to Wikipedia. Likewise, it would be helpful to survey students about their volunteering behaviours more generally, and use of collaborative social media outside of the learning space. Several students who were keen to contribute content expressed their dissatisfaction with students who were 'bludgers' that could benefit from others work without actively contributing. The suggestion was that these students should either be removed from the trial altogether if they had not made any contribution by the week before the final exam, or should be forced to contribute content. This raises the issue of what would be deemed by students as an appropriate contribution, who would judge that, and what effect this would have on participation rates. In terms of examining some of the factors that may cause students to be reluctant to contribute, it would be helpful to survey students about their cultural background, whether domestic or international students etc. This may throw some light onto the possible cultural factors that may be at work, as indicated in Olaru et al.'s (2010) research.

As indicated above, this is a fertile area for future research investigations. It would be beneficial to address in greater depth how enhancing collaboration amongst students could lead to increased levels of student engagement, both in terms of contact with peers and also unit content, and hopefully then student learning outcomes. It would also be interesting to look at the extent to which students perceive the higher education sector as role-modelling good practice in terms of collaborative content creating and sharing behaviours. As previously discussed, the learning environments that students encounter in modern universities has barely changed over hundreds of years, so it is not therefore surprising that students still might prefer more traditional approaches. Perhaps students might be both more motivated and see more value in collaborative content creation, when such a project is seen to be part of a wider institutional commitment to 'open' and collaborative knowledge sharing practices amongst both staff and students. As Atenas (2011) states, within academia there is frequently a reluctance amongst staff to share teaching resources amongst staff even within institutions, requiring a wider cultural change to encourage a system of open knowledge practices, both in terms of using open educational resources (teaching and learning materials made available for reuse under an open license), 'open research' approaches, and open access journals.

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