Tipping Points in Online-Mediated Learning Environments
Strategies for Student Engagement in a Conceptual Framework for e-Learning

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Abstract: Teacher/Student engagement enriches learning experiences beyond the specifics of communicated information by encouraging connectivity and the fostering of learning communities. This paper is an analysis of student engagement in a postgraduate online-mediated learning environment, and considers how engagement may be an important factor in building communities of learning in conjunction with improved learning outcomes. This paper is informed by the conceptual framework for effective e-learning outlined by Garrison and Anderson (2003) as necessary for higher order knowledge building by students as part of skills development for participation in knowledge economies. Data collected through a pilot study infers that a correlation exists between the development of small groups of significantly contributing students within wider online student cohorts and the learning outcomes of all students within the cohort. The findings indicate that a number of small events have increased student engagement and motivation, and resulted in improved learning outcomes.

Keywords: Online Mediated Learning, Student Engagement, Communities of Learning, E-Learning, Knowledge Building

Introduction

Knowledge is a learned resource and it could be argued that any greater dependence on knowledge in advanced economies is dependant on the quality of learning outcomes and the systems that provide such outcomes. Lytras and Sicilia (2005 p. 4) suggest that “(k)nowledge and learning are the new battlefields for the evolution of our society and mankind”. They define knowledge societies as:

(a) a new strategic position of our society where the social and the economic perspective is concentrated on the exploitation of emerging technologies, and well-defined knowledge and learning infrastructures are the main vehicles for the implementation of knowledge and learning strategies (Lytras and Sicilia 2005 p. 4).

Knowledge-based economies are dependant on learning outcomes that are derived from a continuum of learning experiences. The OECD Glossary of Statistical Terms defines the knowledge-based economy as:

(a) an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skills levels, and increasing need for ready access to all of these by the business and public sectors.

Lytras and Sicilia, (2005 p. 4) also claim that “(w)ell defined knowledge and learning infrastructures” should produce quality learning outcomes. Davenport (2000) suggests that formal education and life-long learning are central to economic progress in new economies, that learning organizations involve people who act in teams. The ability to learn, interact and learn from others is basic for individual success in knowledge economies. He suggests that learning skills such as critical and creative thinking, the ability to communicate clearly and exercise leadership all require the debate and discussion typical of small classes. Burton (2004) discusses a number of viewpoints concerning education and the knowledge society. She describes how learning is equated with prosperity (Merricks); that boundaries between work and learning are dissolving with a focus on knowledge as a commodity (Tosey and McNair); that “(t)he goals of new knowledge industries are to learn faster than competitors” (Jarvis and Tosey); that education drivers are themselves employment driven (Jarvis and Preece); and that the UK’s Prime Minister once declared that “Education was the best economic policy we have” (Merricks).

Garrison and Anderson (2003, p. 20) suggest that “the value-add in a ‘knowledge based future’ will be a learning environment that develops and encourages the ability to think and learn both independently and collaboratively ... with the motivation to continue learning throughout their lives”. They see the role of e-learning as a vehicle to promote higher order thinking and knowledge building. As the net generation embrace technologies for interaction, the chal-
lenge for academia is to acknowledge that e-learning involves a conceptually different approach where tools to foster engagement and connectivity within student cohorts are an important element of the learning process. While e-learning is unrestrained by time and space it expands and transforms the social interaction space of shared learning (Cecez-Kecmanovic and Webb, 2000, p.73).

**Higher Education and Knowledge Based Economies**

The arrival of technologies to supplement, enable, enrich and mediate learning experiences challenges traditional education pedagogies. While e-learning is a powerful communications tool, serious questions have been raised concerning the extent and degree to which text based communication alters the ‘flow and structure’ of higher order teaching and learning, as compared with the more familiar environment of speech based communications (Garrison and Anderson 2003, p. 26). They also suggest that an e-learning environment provides conceptual difficulties in developing a social presence, a cognitive presence and a teaching presence all which are required for a quality educational experience. While it is possible to attain an education experience without all three of these elements working together it is suggested that the higher order knowledge building is better facilitated by interaction of all elements within a community of inquiry which provides a conceptual framework or context for learning and e-learning. This was also confirmed by Swan (2002) in her study which highlighted the importance of clarity and consistency in course design, contact and feedback from facilitators and active and valued discussion.

Garrison and Anderson (2003, p.27) define a community of inquiry by referring to Lippman (1991) who suggested that such a community was a space where students listen to one another with respect, build on one another’s ideas, challenge one another to supply reasons for otherwise unsupported opinions, assist each other in drawing inferences from what has been said, and seek to identify one another’s assumptions. A community of inquiry attempts to follow inquiry where it leads rather than being penned in by the boundary lines of existing disciplines (Lippman 1991, p.15 as quoted by Garrison and Anderson 2003, p.27).

As in person, the ability for some to project themselves as a personality in an on-line environment is not a skill which is shared by all. To have a social presence in an online area of learning requires an environment where the teacher/facilitator encourages risk free, open discourse with perhaps emotion, humour and responsiveness interacting to build confidence (social presence). Once this has been established the student is able to explore, connect ideas and most importantly exchange information (cognitive presence) with others, including those who have less of a social presence. By being empowered to act as confident knowledge-leaders (in effect a sharing of teacher-presence) the students can infuse the learning environment with a degree of humanity which allows all to benefit, even the silent majority that may be reading communication without actively engaging.

This paper seeks to connect two aspects of this conceptual framework by considering how the fostering of students with an active social presence can lead to cognitive benefits which extend beyond the individual to a whole cohort. The specific fostering of engagement skills by all, and in particular amongst those who demonstrate an active social presence in a postgraduate study environment is challenged by both the time constraints of economic rationalism for the academic, and increasing ethnicity amongst the student population. And yet, engagement is vital to effective learning processes in knowledge-based economies. This paper will first substantiate that engagement has generated positive benefits to the student cohort being reviewed and then analyse messages to determine whether, in the period of improvement, there have been a larger number of significantly contributing students who have enriched discussions and therefore the learning experience.

**Interaction and Engagement**

Lytras and Sicilia (2005, p.7) suggest that action and feedback promote understanding and adapting to the learning environment with individuals transforming their behaviour “according to feedback they gain from participation in bigger social constructions”. Wilson and Stacey (2004, p. 33) emphasise research which suggests the importance of interaction in online and distance education, including learner-to-teacher and learner-to-learner distance interaction requiring mediation of technology. They consider that “(a)active communication providing feedback was an essential component of interactivity”. Wilson and Stacey refer to conclusions in other studies that suggest for distance learners, interactivity raises quality perceptions with students judging unit-worth according to their perception of the interactivity of the teacher. They also conclude that teachers need to be active and timely participants to sustain communication and engagement. Such views are supported by the work of Denis et al (2004) who highlight the need for online skills to create atmospheres of openness where participants are aware that their contributions are valued.
Trigwell et al (1999, p. 58) refer to earlier research by Trigwell, Prosser and Taylor (1994) identifying five qualitatively different approaches to teaching with the two extremes being teacher-focused transmission of information to students versus student-focused strategies of learning. In the latter environment the authors suggest the teacher is one who encourages self-directed learning, providing time for student interaction, encouraging debate, and who develops ‘conversation’ with students. Also, Motschnig-Pitrik (2004, p. 1) concludes that value is added to blended learning when the facilitator’s attitudes include realness, respect and understanding, but that these and similar traits ‘(c)an hardly be achieved if an instructor is primarily occupied with lecturing’.

Gladwell (2002, p. 19) refers to three agents of change as “(t)he Law of the Few, the Stickiness Factor, and the Power of Context”. The author’s contention in relation to the ‘law of the few’ is that, whilst he acknowledges Pareto’s so-called 80/20 law where, in most cases, “(f)our-fifths of our efforts are largely irrelevant” (Barabasi 2003, p. 66), he suggests that very few people (much less than 20%) can make change, and have impact on events out of all proportion to their numbers in a population. Gladwell also suggests that those who are able to make differences disproportional to their numbers act in ways that are critical to their own success. He identifies them with the rather grandiose titles of ‘connectors’, ‘mavens’ and ‘salesmen’ (Gladwell 2002, p. 34). Of particular interest to us is Gladwell’s concept of mavens who accumulate knowledge (p. 60), are socially motivated enthusiastic communicators (p. 62), and information brokers (p. 69). Over a number of semesters we have found that there are numbers of students who act in this way in the unit online communication forum. We have often wished that these significantly contributing students were more vocal and more in number. At the time, without knowing, the significantly contributing students were giving a type of humanity or presence to an e-learning platform which had previously been little more than an administrative and resource provision tool.

Gladwell’s second agent of change, the ‘stickiness factor’, suggests that there are “(s)pecific ways of making a contagious message memorable; there are relatively simple changes in the presentation and structuring of information that can make a big difference to how much of an impact it makes” (Gladwell 2002, p. 25). The author discusses at great length the stickiness factors of the children’s program Sesame Street, where the content (reading and arithmetic) was delivered in an engaging and contagious way (pp. 89-110). The learning message, words and numerals, stuck with the audience because of the way it was delivered. For the unit of study reviewed in this paper, the content is highly structured and technical in content. Student communications could be met by mere factual responses creating an inadvertently closed-ended communication. There is little in the way of stickiness in such styles of communication.

Gladwell’s third agent of change, the power of context, suggests that that a situation can be tipped “(b)y tinkering with the smallest details of the immediate environment” (p. 146). He highlights that small events can have very large impacts and suggests that lack of sensitivity to nuances (for example by being culturally insensitive) can have lasting impacts. In text based environment where body language is not discernable, context can be misconstrued and meaning can be contorted by poor expression. Thus the dangers and, in other circumstances, the advantages of tipping points assume greater empowerment. In the case study reviewed in this paper, as part of the process of fostering student engagement, the facilitator consciously attempted to pay attention to small details in terms of the style, timing and tone of response provided to all posted communications.

In an environment of asynchronous learning, with a large and culturally diverse international population, we believe, that by fostering the on-line presence of those students who have shown a willingness to engage, we can generate the multiplier effect of a learning community. Thus, attention to the small details were considered to be important for encouraging all students to communicate and once this process was commenced the identification and encouragement of Gladwell’s concept of mavens or significantly contributing students, could further facilitate the learning process of both the individual and the collective group.

Background and Motivation

In a postgraduate unit of study where the subject was taught twice a year from 2003 – 2005 (six periods) the unit experienced a general increase in failure rates culminating in a failure rate of 43.5% at end of semester four. This initiated a unit review that concluded changes needed to be made to some or all of content, delivery, assessments and student engagement, in order to return to tolerable failure rates without compromising academic quality and accreditation objectives. The outcomes of such changes were evident in subsequent semesters with the failure rate reduced from 43.5% in semester four to 22.1%

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1 Person-centred e-learning.
2 We refer the concept of ‘mavens’ as significantly contributing students to signify that they provide valuable assistance to the teacher/facilitator in developing a learning environment or ‘community of inquiry’.
in semester five. In semester six a subsequent reversion to pre-change strategies in one of the variables resulted in the failure rate for that semester returning to 40.3%.

As lecturers providing traditional on-campus face-to-face delivery together with an online-mediated communication forum which is shared by both off-campus and on-campus student cohorts, staff have been keen to seek ways to improve student engagement, and in doing so improve overall unit results. The unit being investigated is a core unit which is usually the first course of study for a number of postgraduate degree programs at a university business school in Australia. Teaching facilities are excellent with a commitment to make all course material available online, and to focus student/lecturer communications via an intranet forum, WebCT. The unit itself is not particularly popular with students as, whilst a core program component, it is often not a subject that many students have studied in their previous education. Materials used are well developed and defined with the teaching team for this unit remaining reasonably consistent over the first five of the six periods of review. Only one of the sessional staff changed.

In approximate terms, the student cohort numbers per semester over several semesters average 160 on-campus and 40 off-campus or distance learning students. The latter are spread throughout the world and rely entirely on intranet WebCT for contact and unit dialogue. Off-campus students are generally composed of 50% Caucasian business people or professionals living overseas, with the balance being non-Caucasian of diverse backgrounds. On-campus students are increasingly non-Caucasian from overseas locations (with a growth in sourcing from the sub-continent) and represent approximately 90% of the on-campus student cohort. Staff discussion over several semesters suggests that most of the overseas-sourced students (particularly those on-campus) are unfamiliar with the concept of regular assessment, have experience and expectation of low exam hurdle requirements, and seldom seek unit study materials beyond those officially provided. Hamilton et al (2003) note that Asian international students accept information uncritically from authoritative figures. This is certainly representative of the experiences of the lecturers in this unit, and we suggest that the unit has traditionally presented as a teacher-focused surface-learning paradigm rather than having any student-focused deep level of understanding.

The trend of increasing student failure rates over semesters one to four has anecdotally been considered by some to have been caused by a decline in student quality through demographic changes in country of origin. This perception arose as the source of students changed from local students of Caucasian origin to international students of very diverse backgrounds. A further demographic trend is the increasing numbers of students from the Indian sub-continent. Volery and Lord (2000, p. 218) consider that demographic variables in relation to the students country of origin need to be considered when examining success factors for online education. In the context of this case study, whilst the impact of student quality and demographic inferences are unproven, the possibility that this demographic shift may be changing the dynamics of engagement is of interest to this paper.

The growth in overseas-sourced students reflects the reality of the Australia-wide university environment and is critical to its success. Government Senate estimates show that nationally revenue from international students grew by 142% between 1999 and 2004 to A$1.9 billion, with overseas students now a fifth of the total student population (The Age 5/01/2006). This is the reality of today’s academic environment. It contributes to the economy of Australia from a knowledge-based perspective and the education it provides to overseas-sourced students is likely to have some unquantifiable future impact on their countries of origin.

Entwistle (2000), refers to work done by Perry in the 1970’s which suggested that students initially see learning as memorizing and reproducing information given by teachers, with students only gradually recognizing that is was more rewarding to transform information and ideas to give meaning from their own personal perspective’s. Perry’s observations appear to describe how many of the students in this unit cope with their first postgraduate semester. As this unit is usually the first point of contact for international students, there is a certain amount of acclimatization and cultural assimilation which takes place, adding a further degree of complexity.

The process of review for the unit commenced during semester four as evidence suggested there was a strong likelihood of further deteriorating student outcomes. The content, structure of unit study materials and assessment standards were considered to be justified and reasonable. The review panel concluded that student outcomes could be enhanced by changing the form and style of assessment tasks together with strategies to encourage student engagement. Changes to both methods of assessment and engagement were implemented in semester five with semester four and semester six data allowing a pre-change and post-change analysis from which to make observations and draw tentative inferences. The new assessment tasks were designed to promote progressive learning and enhance student competencies by enforcing a regime of regular assessment, something that the majority of primarily international students were perceived to lack. The changes made to assess-
ment regimes were found to be successful and were continued in semester six. However, the focus of this paper is not on the assessment regime. While it is difficult to isolate the specific contribution of engagement initiatives versus assessment initiatives in relation to the improved outcomes, the opportunity to differentiate outcomes presented itself in semester six. Data to substantiate this proposition will be presented and, as a consequence of the clearly discernable importance of engagement to outcomes, the balance of the paper will focus on engagement as a mechanism to foster student learning.

Focus and Approach

Part of the strategy for outcome enhancement was to place more emphasis in semester five on encouraging students to participate in online-mediated communications via WebCT with both the facilitator and other students. It was expected that this would result in an improved level of knowledge-sharing to the advantage of those students who participated in the on-line environment. However, it was also anticipated that advantages would flow to the student majority who do not take part in WebCT discussions but are known from available statistics to read and follow discussion content. The review team appreciated that this strategy would require resources beyond the standard time allowed for average levels of online activity as represented by the online facilitation of the previous four semesters. Shannon and Doube (2004) confirm that academics in many studies site lack of time for not engaging in more on-line communications. As those responsible for both the budget and online facilitation for semesters one through to semester five the authors have been in a position to understand what reflects average levels of online activity, and to determine just how much effort and time would be required to change focus to support a new paradigm.

As a consequence of the implementation of new initiatives, it was anticipated that facilitator hours to encourage student engagement would be higher in the early part of semester five than in previous semesters. In practice, the initial extra effort to encourage student engagement continued throughout the semester. This significant additional time and resource commitment needs to be factored into consideration for any further implementation strategies where improved student engagement is a desired outcome. Such an issue has been highlighted by Holtham and Courtney (2005). They report that advocates of computer-mediated distance education should recognize that extra effort is required by both students and faculties to engage in on-line learning and that not all have the communicative and technical capabilities to effectively engage.

We were interested in the concepts of tipping points as described by Gladwell (2002) but not necessarily focused on them. Gladwell’s contention that little things can make a big difference intrigued us and we speculated how, in a highly-structured postgraduate unit, we could make a difference beyond current practice. Experience by one of the authors at another tertiary institution suggested it was possible. However, the comparative environment was for an unstructured undergraduate unit demanding strong commitment and engagement from the students. In this alternative scenario, the bulk of resource material was developed by the students within a vibrant, provocative and highly engaged WebCT-equivalent intranet forum. The students of that unit were a homogenous group with similar ethnic and cultural backgrounds whereas, the student cohort for the unit analysed in this paper were culturally diverse with different learning styles and experiences. The approach taken was thus one of making a number of small changes, continuous review and concerted effort.

The strategy was to simply try differing forms of interaction and engagement online for semester five to encourage student participation, with the expectation this may enhance student performance and outcomes. The strategy included a number of intuitive steps. These included; the introduction of humor into what might be considered a fairly sterile environment with technical course material, to always respond to a student within twenty-four hours, to respond seven days a week, to frequently initiate dialogue and not just be responsive to student queries, and to always present in a positive courteous, attentive and respectful manner. As this paper is a reflective paper adopting an ex-post review, changes made were implemented without regard to subsequent opportunity for research. We acknowledge that statistical validity and the ability to generalize are hampered by the ex-post approach. Nonetheless, we believe that the findings are interesting, and, as we have subsequently found, the intuitive changes made to interaction and engagement for semester five are well supported by the work of Wilson and Stacey (2004), Swan (2002), Swan et al (2000), Aviv et al (2000), and others.

The Case Study

As a consequence of strategies employed to encourage student engagement via WebCT, message traffic in semester five doubled (1491), compared with the

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3 The perception of what is ‘average’ or ‘normal’ in terms of academic effort is difficult to assess however, allocation of time via workloads models allows time to act as an indicator of effort.

4 The online-mediated delivery process of this unit earned a Praxis mention for excellence on the faculty web-site.
previous semester (792). As one of the authors has consistently been the facilitator for on-line discussions in semesters one through to semester five, it is reasonable to suggest that the increase in traffic is most likely the outcome of different strategies introduced to foster student engagement. Another and more pertinent outcome of both the assessment and engagement changes introduced in semester five was a reduction in student failure rates from 43.5% in semester four to 22.1%. While we were not able to isolate the contribution of changes in engagement versus changes to assessment in semester five, the opportunity to make some more substantive inferences, concerning the contribution of engagement to outcomes, presented itself in semester six.

In semester six a different staff member was responsible for on-line facilitation with a return to a more conventional use of that media. This resulted in much lower levels of student traffic with 596 messages compared with 1492 in semester five. The failure rate for semester six also returned to the above 40%. Whilst we infer a connection between levels of student engagement and outcomes, there may be other causal issues for the outcome deterioration in semester six associated with demographic changes or perhaps that intakes in the second half of the year have different competencies to those in the first half of a year. However, as assessment changes made in semester five were continued into semester six, and the only major process variable between the two semesters was the extent of student engagement on WebCT, it is suggested that student engagement levels are a significant contributor to semester outcomes.

The viewpoints of Wilson and Stacey (2004) concerning the need for teacher online activity to be continuous and at least daily would appear to be a factor in the increased student engagement indicated by the data for semester five over semester four, and its subsequent reduction in semester six. We acknowledge that in semester four the online facilitator followed a conventional style of usage for WebCT as an announcement tool and as a tool for answering student queries. To a significant degree such engagement is limited by the university perspective of how much time is budgeted for such activities, and the understandable perspective that staff might only choose to work x hours per week and be available during y periods of the working day and week-ends. However, students study habits are not limited to office hours and their study progress can be impeded where responses are not timely (Eastmond 1995).

O’Donoghue et al (2003, p. 23) refer to student contact being flexible around their other commitments and research by Volery and Lord (2000, p. 220) also identified the importance of facilitators attitudes towards timely access as critical success factors in online education. In order to more appropriately balance staff availability online with student study habits the facilitator committed to presence as at least daily, including week-ends, and frequently on a late evening basis at levels beyond normal budgeted hours. The results would appear to validate the strategy, and are supported by student evaluation comments for semester five that were quantitatively and qualitatively better than noted for semester four.

Semester six saw the introduction of a change in online facilitator and a return to conventional levels of engagement similar to that employed in semester four. The level of activity on WebCT provided for semester five is unsustainable without changes to how hours are formally budgeted and allocated to various teaching tasks. However, the significant reduction in discussion traffic and student outcomes in semester six and the return to high student failure rates indicates the consequences of reverting to previous levels of staff activity supporting an online presence.

Data Analysis

The following table provides some basic details for each of semesters four, five and six which, at a macro level, shows that message traffic clearly increased in semester five. It was during semester five that all the strategies for engagement were adopted by the same staff member who had previously been responsible for on-line activities for the unit in semester four. To this analysis we now add a second level of analysis which tries to identify whether Gladwell’s agents of change relating to the ‘law of the few’ (significantly contributing students) and the ‘power of context’ (referring to a situation being tipped by small things) contributed to the positive outcomes in semester five. Data analysis sought to identify the extent to which the significantly contributing students were active during semester five (using 53% of data) and six (using 100% of data). The analysis of only 53% of the available data for semester five (the first part of the semester) was a consequence of both limited time availability and, the realization that any further data would only strengthened conclusions being made. The volume of data reviewed exceeded that available for the whole of semester six to which it was to be compared.
The retrospective nature of this study contributes to the lack of data availability for semester four. However, as the online facilitator for the unit is one of the authors, we are in a position to have inherent knowledge about the style and intent of on-line communications for semester four and, the thrust of this paper is the action taken in semesters subsequent to semester four.

In semester five the first 789 messages were analyzed for data from a total message population of 1492. The sample of approximately 50% of the total messages for the semester five, represents more than the whole population sample size for both semesters four and six, and was deemed to be sufficiently representative to enable effective analysis. Data collection methods involved the following:

- A unique code for each student in ascending order of when they first became active on-line. This has been useful in assessing when any student became active, and analysis of how many messages any student posted whilst retaining anonymity.
- A unique code for each message thread in ascending order and a unique code for each message within each thread. The former allowed assessment of how many threads were created and how wide-spread was the contributory activity of each student. The latter allowed a distinction between the first message in any thread and subsequent messages. This distinction was important because any student’s first message in any thread is most likely to be a traditional inquiry message which is useful to initiate debate, but not necessarily an indicator of a significantly contributing student.
- An identification of student participants on-line that met certain selection criteria to be classified as significantly contributing students. While the selection criteria is subjective it is designed to recognize only those students that contribute to a wide range of message-thread activity over a large part of the semester, and where the majority of their messaging activity are not the first messages in any thread (inquiry) but are subsequent messages within the thread (contributory). For example a student in each semester met the message-thread activity criteria but their messages were disproportionally first inquiry messages and therefore neither of these students were included in the list of significantly contributing students.

Those considered to be significantly contributing students or the mavens referred to by Gladwell.

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A number of observations were made in relation to the data. They support the contention of this paper that a beyond normal focus on student interaction and engagement would appear to produce superior outcomes. The observations are:-

• The extra focus and resources on engagement contributed to a doubling of message activity in semester five compared with earlier semesters.
• The return to a normal level of focus and resources on engagement for semester six reduced message activity back to pre-semester five levels.
• The average number of messages per student and average number of threads that each student contributed to are both higher in semester five than semester six.
• There were eight significantly contributing students identified for semester five and only three in semester six. This disparity is an indicator of student engagement. The eight significantly contributing students in semester five contributed 41% of all student messages on-line, and were a critical part of improved levels of knowledge-sharing to the advantage of both the significantly contributing students and other students. For semester six the three significantly contributing students identified only contributed 22% of all student messages, about half the percentage in semester five.

Conclusions

The importance of student engagement to student outcomes is supported by data collected from this study. What is also evident is that a larger number of students within a semester responded positively to small changes to engagement endeavors. What is not so evident is how these significantly contributing students have personally benefited from their active involvement in their own learning process and, how much their presence on-line activated a ‘community of inquiry’ to foster knowledge building. Were the analysis of data for this unit limited to considerations of student traffic, the potential to identify this stratum of knowledge building behaviour would have been missed. We consider that the significantly contributing students identified (in addition to facilitator strategies) injected the on-line environment with humanity and personality by providing a presence with which the silent majority could identify. As a consequence, we also believe that the ‘helpers’ contributed to the improved student outcomes. What impact such a community of inquiry may have on lifelong learning paradigms is unquantifiable. However the more tools students have in their learning toolbox and the more comfort they have in their ongoing use, the better equipped they may be to participate in knowledge-based economies.

We admit to being surprised by the extent of improvement in student outcomes experienced in semester five and have tried ex-post to examine factors impacting the outcome. There is no doubt that resources expended by academics contributed to the improved results, however, we believe that the co-facilitation by the significantly contributing students has also enriched the learning process.

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