Mainstreaming tablet classrooms: Engaging first year learners

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Abstract

Young students entering university in the first decade of the twenty first century bring with them a very different set of expectations, skills and attitudes to new technologies than those of previous generations. Born after the computer became a desktop tool, brought up on TV channel surfing and rapid fire video clips, and using mobile phone technology to connect to all who are important in their lives, these students are used to a wired, connected world.

How do universities cater for this new generation of learners, building on the sophisticated technological skills these students have already developed while still teaching some of the more traditional academic skills expected when studying at tertiary level? This paper describes the mainstreaming of an innovation that began as a small project two years ago involving three academics from different discipline areas of the University and which is now being mainstreamed to all first year students. The theoretical underpinnings of the innovation and a description of how the learning environment is being used to engage first year learners will be the focus of the discussion.

Introduction and the context for change

A new breed of students is entering universities in the latter half of this first decade of the 21st century and we, as teachers and lecturers, need to be preparing ourselves for a significant cultural shift in the way that these new students interact with and learn from each other. These are 'wired' students; people who have never known a world without the Internet, mobile phones, digital music and electronic connection between friends and relatives. Whilst they are not the only people who come to university, this Net Generation (Oblinger & Oblinger, 2005; Frand, 2000) will become an increasingly significant proportion of the tertiary student population in the next ten to fifteen years and their involvement in tertiary studies will precipitate sweeping changes in the tertiary learning landscape. Their success in tertiary education will depend upon the ability for them to engage with the literacies and culture of the university, but it will also require those of us who teach in tertiary institutions to recognise and respond to these new cohorts of students and embrace the literacies of these new cultures and seek ways of making links from the spatial, visual and technological literacies they bring to the established literacies of the academy.

In an attempt to engage Net Generation learners and enhance their first year university experience, we need to explore ways of increasingly incorporating the new literacies of online chatrooms, digital social networks, mobile technologies and the Internet to our learning environments while providing strategies of engagement for these students with the broader social, cultural and intellectual expectations of a tertiary education. In so doing, it is likely that a critical analysis of the pedagogies used at a tertiary level will furnish us with ways of

doing things better, both for the Net Generation students arriving in our classrooms and the others whose experiences are different from ours and traditional academia.

All this comes at a time when the University machine is expected to be leaner and more business-like, when the costs of delivery have to be weighed more stringently against the benefits of the introduction of new learning strategies and university administrators demand profit to be derived from all university enterprises. This becomes an issue when, increasingly, the modes of preferred learning and certainly the modes of learning that engage the Net Generation, often require substantial investment in infrastructure, high maintenance costs and ongoing investment in the face of obsolescence. Learning that embraces electronic means of communicating and sharing information must be able to demonstrate an increased effectiveness in engaging and maintaining the engagement of learners, before widespread investment in infrastructure will be supported by administrators and the costs incurred outweighed by the benefits gained in other areas.

At Charles Darwin University, as part of strategy to enhance students' early experiences at university, we are seeking to engage Net Generation students and looking for methods of developing and improving pedagogical practices within the learning environment. Using Tablet PCs as a way of introducing technological literacies into the classroom, we have found that the pedagogical changes their appropriate introduction necessitates, has the potential for increasing the engagement of a wider range of learners. Tablet PCs in a wireless enabled learning space, bring the resources of the networked world to an ordinary desktop, providing an opportunity to use these resources in ways which create richer learning environments and add more dimensions to the construction of meaning by the learner.

Additionally, from our initial observations, Net Generation students used to this 'wired' world seem to engage more readily in these learning environments, and the cultural literacies of their world and those of the academy are able to come together in the one learning space. We have also found that the effective use of Tablet PC technology necessitates a clear change in the pedagogy of the classroom. (Tutty, White & Pascoe, 2005; Tutty & White, 2006) New ways of teaching and learning have to be employed in an attempt to ensure these technologies are used to their fullest extent to engage all learners and to enable the construction of culturally significant meaning for Net Generation students. We are finding that new pedagogies are facilitating the engagement of other students for whom the strategies and learning environment is conducive to engaged and deep learning (Biggs, 1999; Oblinger & Oblinger, 2005).

Theoretical underpinnings

Net Generation learners

The terms Net Generation learners (Oblinger, 2004), milennials (Howe & Strauss, 2000) and digital natives (Prensky, 2001) have been coined to describe students born during the last 15 years of the twentieth century, who are now beginning to embark on their tertiary studies. Brought up within a world of technological devices, these students use information and communications technologies (ICT) ubiquitously: to meet, play, date and learn. It's an integral part of their social life and for many, it has been supporting their learning activities over the past ten years. Prensky (2001) argues that because these students have spent their entire lives surrounded by and using computers, video games, digital music players, video cams, cell phones and all the other toys and tools of the digital age that "our students have

changed radically. This current change in not incremental as in previous generations but discontinuous – a change that is so fundamental that there is absolutely no going back."

Brown (2001), Prensky (2001) and Oblinger (2004) describe this new generation of learners as action oriented; preferring experiential, self-directed learning experiences. Step by step progressions can be frustrating given their ability to multi-task and parallel process (Prensky, 2001). These students have sophisticated digital literacy skills with the ability to compose and comprehend complex multimedia texts, using well honed information navigation skills (Brown, 2001), however their ability to evaluate the source quality of Internet resources and their text literacy may be less well developed than previous student cohorts (Jones, in Oblinger & Oblinger, 2005). A bias to action and collaboration with social networks plays a significant part in most of their learning experiences, with these students preferring to learn from one another rather than reading or working individually in an online context devoid of social context. Such a bias has implications for pedagogy, particularly in a first year tertiary environment which often values very different literacy styles.

Student engagement

The importance of student engagement has long been recognised. The engagement of learners in their education, creating environments that encourage their participation and active involvement in deep learning (Biggs, 1999), is referred to a great deal in writing concerning good teaching and learning environments. Recent work in Australia by McInnis (2005), Krause (2005) and others summarises student engagement, characterising it as:

- adopting learning approaches of the university;
- spending time both in and out of class on meaningful activities;
- valuing of other perspectives in their learning;
- a creation of a sense of place. (McInnis, 2005)

Krause (2005) identifies and highlights the connotation of emotional involvement in the term. Engagement requires the involvement of both our intellectual and emotional faculties. As such the process of engagement requires us to be cognizant of the learning environment, to provide nurturing learning spaces which provide maximal opportunities to provide academic and social support (Krause McInnis & Welle, 2002); ways to do academically meaningful work in a supportive environment and engage learners, including the Net Generation learners who are now arriving on our classroom doorsteps.

The literature over the last thirty years has developed a strong case for the recognition of the cultural constructedness of the classroom and the processes of learning. Bourdieu (1977), Vygotsky (1978) and others have introduced into the common language of educators the concepts of social and cultural capital and the cultural contextualisation of learning. Students are no longer treated as passive receivers of knowledge; they are active participants in the construction of their own knowledge: their culture, environment and history creates opportunities for and places constraints upon the way they learn and engage with others within the learning environment.

As a new generation of learners entering universities, the Net Generation learners bring with them into the tertiary classrooms, a new cultural discontinuity (Prensky, 2001). If we are to engage with them, tertiary education will need to accommodate and value new literacies both as it attempts to reflect these changes in our broader culture and as it seeks to perform the transformative role of socialising students into the literacies of the academy.

The practical implications for lecturers and tutors is that we need to create learning spaces which facilitate learning as a student-centred, collaborative process with access to the tools of the Net Generation (Kift et al, ND). At Charles Darwin University we are exploring ways of adapting our current infrastructure, with wireless networks to establish learning spaces conducive to styles of blended learning that create opportunities for engaging educational experiences that promote deep learning. If we can involve students from the very start of their tertiary career in an environment that fosters student-centred learning and the creation of a sense of place, then it's likely that we will be able to keep them and make their experience more meaningful.

Learning spaces and Net Generation learners

While traditional teaching spaces have become more technologically enhanced in recent years with the inclusion of data projectors and Internet connections, the fundamental learning model these spaces support is one of knowledge transmission: with knowledge passing from expert to novice, constructed often as a 'one to many' interaction. Even though we recognise that learning is an active process with students constructing their own understandings of the world, our classrooms are still organised to support a pedagogy where the dominant learning tasks enabled are passive, individualistic and centred on knowledge production activities.

This contrasts sharply with the learning needs of Net Generation learners outlined above, where multi-tasking, social networking and experiential trial and error learning with peers are the dominant interaction modes. Learning spaces that are likely to be more appropriate for this generation and, it could be argued, future generations, will need to cater for small group activity, provide table space for a variety of tools, ensure seamless connectivity with a ready availability of hardware and software, provide accessible resources, workgroup facilitation and access to experts (Brown, 2005; Dyson & Cairns, 2002).

Studio classrooms

One approach that has embraced the transition from a traditional space to a more collaborative group space has been studio classroom models of teaching and learning first reported in the last decade of the twentieth century. Introduced initially at Rensselar Polytechnic Institute in the USA (Wilson, 1993), the approach has been adopted at a number of universities around the world (e.g. Carbonne, Lynch, Barnden & Gonsalvez, 2002; Bruhn & Burton, 2003; Bradbeer, 1999) and results from these numerous implementations have generally been positive. Typically, studio workshops are delivered to groups of between 25 to 70 students in purpose built facilities fitted with computer workstations that are designed for both whole group and small group work. In this environment, educational considerations rather than the physical infrastructure drive the teaching and learning process (Bleed, 2001).

The initial experience at Rensselar reported markedly increased student satisfaction levels, similar or better student outcomes at a consistently lower cost per student when compared to the traditional approach (Pipes & Wilson, 1996). Subsequent studies both at Rensselar (Lister, Siegmann, Byrne, Cupples & Laplante, 2000) and elsewhere (Bradbeer, 1999; 2000; Carbonne, Lynch, Barnden & Gonsalvez, 2002) have supported these results and also reported higher student attendance (Bradbeer, 2000) and claims that "students are obtaining a more 'rounded' and more comprehensive understanding" (Carbonne, Lynch, Barnden & Gonsalvez, 2002, p.90). On the down side, staff used to more traditional teaching methods may have trouble adapting to studio teaching models (Bradbeer, 1999; Pipes & Wilson, 1996) and so undermine the claims of cost efficiency reported.

A model for mainstreaming tablet classrooms

At the beginning of this year, a wireless workshop utilising tablet PCs and adopting a studio teaching model was established at Charles Darwin University. The demolition of one wall and the joining of two small, relatively under-utilized classrooms has afforded a bright, well lit space with groups of desks that will support up to 50 learners at any one time.

Teaching and learning structures

Three hour workshops replace traditional lectures, tutorials and practicals. In the workshops, time is used flexibly to include some direct teaching (lecture style), hands on practice, and collaborative activities such as group projects, peer teaching and problem solving discussions. This integrated approach facilitates:

- increasing emphasis on social aspects of classroom learning where ideas and concepts are actively explored, constructed, applied and critiqued;
- students actively engaging with learning materials and problem solving, both individually or collaboratively;
- the teacher's role shifting to mentor/facilitator: someone to model processes, challenge students to think more broadly and support students in this new environment.

Resources

To cater for the Net Generation learners identified above, but also to ensure all students received the support needed, a range of resources are available and used in the new learning space:

- Human resources (arguably the most important): a support ratio of 1: 15-18 students is used to staff the classes. In the current semester, larger classes that have 30 – 45 students, there is one lecturer and two facilitators. Classes under 30 have 1 lecturer and 1 facilitator. Facilitators are required to provide support to students as needed during the workshop. Outside the workshop times, support is provided by the lecturer;
- Furniture is grouped in small tables that facilitate up to 7 students working together- there is enough space for a variety of equipment including digital cameras, the Tablet PCs, and any other devices students may want to use. Currently this space is the only classroom within the university where the use of group seating arrangements as the norm is approved;
- Hardware in the tablet classroom consists of 3 trolleys of tablet PCs with wireless Internet connections (15 computers per trolley with 10 extras);
- Software available in the Tablet PC classroom consists of a range of generic web-based resources and specific tools for particular classes:

    - A blended learning approach is used in the workshops. Digital resources, interactive multimedia content web sites organised into a series of learning activities created by the authors are used extensively to support the learning process.
    - Electronic communication is available via the university course management system, although some more interesting Web2.0 social networking tools are currently being trialed for small group collaborative work;

♦ Rich software suites are prepared each semester for the hardware to ensure students have a range of tools required for a range of learning needs.

Implementation and Considerations

Logistics

The establishment of the wireless workshop followed on the earlier successful use of a smaller space by the three authors in a range of subjects over the last five semesters (Tutty, White & Pascoe, 2005; Tutty & White, 2006). This initial deployment had demonstrated to those of us involved, that an institutional endorsed and more formal solution was required if a broader range of students and academics were going to use the facility and adopt this approach.

The implementation of a project like this takes time, energy, innovation and a certain amount of risk taking. In the early stages, the project was patched together with temporary and robust equipment set up in a classroom close enough to the IT storerooms so as not to make transportation of the equipment and setting up a prohibitively time-consuming activity. Those involved, plunged into the task of using the equipment in their classes and exploring strategies for implementing blended learning using the resources to hand. Despite the technological hitches, the frustrations and the sometimes spectacular failures, informal indications and feedback from students was positive enough to persevere.

Early in 2005, with the second implementation of the 'quick and dirty' wireless networks and Tablet PC computers, far fewer hitches and continued positive feedback from students encouraged us to seeks ways of formalising the project and seeking support for a more permanent arrangement for the learning space. Support, initially from the faculty Dean, was gained through the presentation of a proposal that highlighted both the pedagogical and economic gains that could be realised from the instigation of mainstream wireless classes. The Dean then championed the initiative with University senior executive. With the Director of IT services supporting the creation of the learning space and indicating his willingness to provide technical aid and expertise, two major hurdles were overcome.

Support and collaboration from areas across the broader university allowed the project to be viable. Charles Darwin University requires each undergraduate student to complete two common units in their degree and the involvement of these classes brought both the volume of students required to make the project economically viable and the cohort of first year students who were likely to be the Net Generation for whom blended learning in a wired environment would be the most beneficial. Sound pedagogy, deep learning and effective engagement in this first year would seem to be a recipe for the building of a firm foundation for students early in the university career, and helping to keep the students at university and engaged in later years.

The confidence of the Faculty Dean and the university administration meant that the outlay for the infrastructure necessary to get the project going would be funded centrally rather than borne completely by the School involved. The refurbishment of the classrooms and provision of nearby storage, data projectors, power outlets and general classroom infrastructure was provided by the university and the faculty funded the purchase of new tablet PCs, wireless access points and other equipment. With the involvement of other groups and schools such as the common units group, the potential to distribute the costs more evenly is increased.

An encouragingly 'whole of university' approach enabled the classroom to be refurbished over the summer break so that the majority of the infrastructure was in place and ready for the start of semester one. Walls were knocked down, wireless access points and more power outlets than you have ever seen in one room before, were all installed prior to the first class. Tablet PCs were imaged, desks were arranged in groups and the whole system was tested and retested right up until the day before the first class; and with the presences of IT staff in the first week to iron out any small hitches, the roll out of classes for a semester one pilot was possible and becoming a reality. Now that we have had a chance to use the new facility and receive some initial feedback from the students using the equipment we are beginning to appreciate the benefits of working with an enterprise solution rather than a small 'early adopter' innovation and small oversights are already being identified and addressed, ready to be implemented for the second and larger cohort of students using the lab in the second half of the year.

Accountability and Evaluation

The importance of evaluation and accountability for funds invested in infrastructure is not lost on those of us involved in the implementation of the trials. The need exists for us to monitor our more formal approach and to ensure that that the information we gather on the success or failure of the implementation has important pedagogical implications for the broader university and some not too insignificant implications financially for schools and central funds if the trials prove to have some valid and repeatable successes in improving engagement, particularly by first year students and those of the Net Generation.

Evaluation of the first cohort of students in 2006 has been mapped and is currently in the detailed planning stage. In July, there ought to be some initial indications of the views of students and staff involved. Satisfaction surveys, interviews and reflective representations/drawings and concept maps have been identified as ways of capturing a diverse range of views and responses to the use of tablet PCs and the blended learning environments in which they are used. The ongoing review and reflection of those involved in facilitating and coordinating classes will provide a useful backdrop for the qualitative information drawn from students as we implement the use of the classrooms across groups over the next year.

Conclusion

Tablet PC workshops are an opportunity for the implementation of different and more appropriate pedagogies in an environment that make available to the Net Generation, the tools of communication with which they are familiar. It is an opportunity to develop a teaching methodology and context which is conducive to the engagement of students in their early experiences in tertiary study in a way that seeks to demonstrate an in-depth understanding of individual learning needs of a broader range of the student cohort. The benefits of the tablet PC Workshop environment are emerging with increased experience, as students begin to feedback their first impressions and as the staff involved begin to reflect upon the events of the last twelve months. Most obvious at this stage seems to be the changed dynamic of the classroom interactions, peer to peer. Students seem to be engaging with each other on a more personal level both socially and around the tasks set within the workshops. Establishing and creating environments where these social networks can be maintained and enhanced around academic tasks provides a stronger and more stable environment for learners in their early stages in tertiary studies. A more engaging social and academic environment, we contend, is

likely to prove to be a stronger predictor of early, first year success at study and have ramifications for retention and engagement further along the line. The workshop environment, access to familiar tools of technology, increased social networks and the potential for greater pastoral care will encourage student participation and retention beyond their first experience in the tertiary education environment.

Engagement of learners at universities in deep learning is an important enterprise and the engagement of the Net Generation in their first year of the university experience is paramount. If the Net Generation students enrolling in our universities are not engaged at this early stage in their university experience, there is the potential that they will find that engagement in other arenas. As Prenger (2001) states, the Net Generation doesn't need universities to provide effective and engaging learning, it is all around them in the social networks, games and web-based documents with which they surround themselves. They don't need university for real learning, but universities need the Net Generation, because it is within their ranks now that, with the disciplines and literacies of academic pursuits incorporated and interacting with the 'wired' world of these young people, that the new, the inspiring, innovative and world changing discoveries of the next generation already exist.

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