



## Supporting ways of learning for Indigenous Australian pre-undergraduate students using Moodle

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This paper discusses the way in which the ways of learning and learning strengths of Indigenous Australian university students can be supported by the Moodle learning management system (LMS). Moodle is currently undergoing a pilot phase at CQUniversity before it fully replaces Blackboard and Webfuse as the sole university LMS. Several courses from Nulloo Yumbah, CQUniversity's Indigenous Learning, Research and Spirituality Centre, are participating in this pilot phase. The literature highlights the way that information communication technologies (ICTs) align with Indigenous ways of learning when learning materials are designed and presented in a way that is culturally relevant. The paper outlines Indigenous learning styles and presents a discussion based around what Moodle does and does not offer to benefit Indigenous learners. From this, a number of the potential benefits and constraints of Moodle are presented and future research directions identified.

Keywords: Indigenous learning, Moodle, elearning, learning management systems

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### Introduction

In 2009 CQUniversity began the transition from two learning management systems, Blackboard and Webfuse, to one system, Moodle. Moodle is an open source learning management system, and is currently undergoing its first pilot run in a live setting at CQUniversity. Only a selection of courses are currently running Moodle as their LMS, all other courses continue to run in Blackboard or Webfuse. Alongside the implementation of the new LMS has come a push from the University to make sure that all courses running in Moodle adhere to a set of minimum standards in order to provide consistent presentation of courses for students. However, what needs to be considered for courses run by Nulloo Yumbah (and indeed all University courses) is how the unique ways of learning of Indigenous Australian students can be supported by the learning environment provided by Moodle.

This paper sets out to present an overview of the use of Moodle at Nulloo Yumbah (CQUniversity's Indigenous Learning, Research and Spirituality Centre) and to determine how Indigenous ways of learning align with what Moodle offers. Using the Indigenous ways of learning and learning strengths identified by Harris (1980), Hughes & More (1997) and Hughes, More & Williams (2004), as well as the work on designing for cultural difference by McLoughlin & Oliver (1999) the aim of the paper is to identify ways in which Moodle can accommodate, support and nurture the unique ways of learning of Indigenous Australian students enrolled in Nulloo Yumbah's Tertiary Entry Program (TEP). The paper will begin with a review of the literature regarding Indigenous ways of learning and learning styles, and will then attempt to examine how these mesh the different features that are available in the CQUniversity Moodle pilot installation. To conclude, the paper identifies some issues and constraints that arise between what Moodle allows, and what is available in the version of Moodle currently being piloted by CQUniversity.

### Background and context

Courses offered within Nulloo Yumbah's Tertiary Entry Program (TEP) range from a computer literacy course, to academic and university skills courses, to introductory sciences and mathematics courses. Typically, TEP has around 60-70 students enrolled (though in 2009 that number reached 148). TEP

students are primarily Indigenous and are geographically spread throughout Queensland and Australia, including remote communities and correctional centres. Nulloo Yumbah also offers several undergraduate courses with an Indigenous focus. Courses offered within TEP are run in a multi-modal environment. Students are provided with hard copy course materials which can include a course profile, a study guide, a book of resource reading material, and in some cases a CD containing other resources such as PowerPoint files or instructional videos. Each course also contains a supplementary online component - traditionally this has run in the Blackboard learning management system (LMS) – one of the two systems currently in place at CQUniversity. These courses fit into a Mode A grouping as categorised by Bell, Bush, Nicholson, O'Brien and Tran (2002), in that the course website is supplementary, and participation for students is optional. Due to the location of some of the students who Nulloo Yumbah supports, it would be unfair for these students for the websites to deliver additional course materials. All courses are delivered via flexible learning mode only, with two non-compulsory on-campus residential schools run each term.

The extent to which this website supplements the course is often left to the discretion of the course coordinator, however there are set of minimum standards as to what must be included. This, coupled with the fact that the online component has been supplementary, has led to several of the TEP online Blackboard courses being underdeveloped, and thus under-utilised by students of Nulloo Yumbah. Since the introduction of the minimum standards there is a uniform online presence of all TEP courses which has led to more students participating and accessing the material online.

## **Indigenous ways of learning and learning strengths**

Often cited as the most influential research into Indigenous education theory is Harris's (1980) Aboriginal learning styles theory. Harris (1980) observed the Yolngu people in Mililingimbi, Northern Territory, Australia between 1975 and 1976. Based on this research, Harris (1980, p77) identified "what were observed to be the five major traditional Yolngu informal learning strategies or styles". These learning styles and the ways in which they differ from mainstream non-Indigenous learning styles are:

- Observation and imitation versus verbal instruction
- Personal trial-and-error versus verbal instruction and demonstration
- Real life performance by the learner versus practice in contrived settings
- Context specific learning versus the learning of generalisable, context-free principles
- Person orientated versus information-orientation

Hughes and More (1997) present an expanded list of what they define as learning strengths. For Hughes and More (1997) the concept of learning style is used inconsistently. Instead, they define ways of learning and learning strengths. They define ways of learning as, "the mental processes and instructional settings which an individual uses while learning" (Hughes & More, 1997, cited in Hughes, More & Williams, 2004, p. 262) and learning strengths as, "a way of learning in which the student is more competent" (Hughes & More, 1997, cited in Hughes, More & Williams, 2004, p. 262). Hughes and More (1997, cited in Hughes, More & Williams, 2004) outline the following as recurring learning strengths for Indigenous learners:

- Learning through observation and imitation rather than verbal instruction
- Learning through trial and feedback
- The group is more important than the individual
- Holistic (global) learning
- Visual spatial skills
- Imagery
- Contextual Learning
- Spontaneous Learning

The writers also note that the identification of these learning strengths is not implying that Aboriginal students be solely using their learning strengths, and that Aboriginal students (as all students) should be aided to develop their weaker ways of learning in order to use the appropriate approach when required for a task. However, these ways of learning are often looked over entirely and "learning styles imposed by educational institutions are quite different to the learning styles of Aboriginal students" (Dolman, 1884, p. 54).

## **Moodle: Benefits and constraints for Indigenous ways learning**

Moodle is an online learning management system, and provides students with a virtual learning environment (VLE) for which they can complete their studies. The philosophy behind the design of Moodle is one of social constructionist pedagogy (Moodle, 2009). Learning is undertaken in an environment that encourages groups to construct and build knowledge together, to collaborate in tasks and to share new knowledge within the group. On face value alone it would seem the philosophy of learning in Moodle aligns with the Indigenous learning styles that have been identified, in particular the importance of groups and community.

### **Computers in Indigenous learning**

Computers and ITCs can produce positive learning experiences for Indigenous students. Tools such as Moodle help in the development of digital literacies. In terms of the use of computers and ICTs in Indigenous education, the two trends that develop from the literature are:

- Computers and software learning tools are well suited to the learning styles of Indigenous students (Dyson, 2002; Fryer, 1987)
- In order for them to do so, software and learning tools must be designed and delivered in a way that is culturally relevant to Indigenous students (Kutay & Mooney, 2008; Eady, 2008)

Previous published work has examined the use of Information Communication Technologies (ICTs) and their link with positive Indigenous learning outcomes. For Dyson (2002, p.189) Indigenous learning styles theory, “sits well in computer education. It allows teachers, particularly non-Indigenous teachers, a way of creating a learning environment which affirms Indigenous interests, values and identity.” The use of computers also helps Indigenous students develop independence, allowing students to feel more in control of their learning situations, develop a relationship structure that is conducive to learning, and increasing the one-to-one interaction with the teacher (Fryer, 1987). According to O’Donoghue (1992), computers appeal to Indigenous visual-spatial strengths through the use of colourful graphics, are a patient medium that forgive mistakes, can provide instead feedback and require little writing so suit an oral cultural background.

While the use of computers have the potential to play a positive and welcome role in Indigenous education, not all of the software and system implementation provides enough cultural relevance to be effective. Cultural inclusivity is one of the essential foundations of student-centred learning environments (Chen, Mashadi, Ang & Harkrider, 1998), as it “allows learners to access learning resources in a manner that is congruent with their values, beliefs and styles of learning” (McLoughlin & Oliver, 1999, p.3).

Earlier studies have suggested that in terms of learning software and programs, most were generally inappropriate for Indigenous students (Fleer & Klich, 1988). Such programs were often text orientated and lacking in visuals, stories or characters relevant to Indigenous people. Steen (1997, p.22) argued that there is a need to improve computer software and computer instruction so as to make it more culturally appropriate for Indigenous people, stating that software design “must take into account the learning styles of Aboriginal people, have more graphics and be less text based, be self paced, with instant rewards and have an absence of negative remarks.” Steen (1997, p.22) also argued that, “there is a need for the design of software that takes into account group activities, since Aboriginal students work and perform better in small groups, reflecting their social and cultural background.” Fleer (1989, p19) aligns with this stance, adding, “since Aboriginal people commonly share learning experiences in small groups rather than individuals, software should be designed that it is appropriate for the sharing of information between individuals in groups.”

Kutay & Mooney (2008) also outline a need for IT resources to be sensitive to the specific needs of Indigenous knowledge and knowledge sharing, and that current curriculum design is often not ideal and is not satisfying for the participants. They argue for a PBL (Problem Based Learning) design. Eady (2008, p.57) affirms this also,

Reports suggest that online learning programs, when designed and delivered in culturally appropriate and community relevant manners, can be potential solutions to effectively address the unique learning and skills development needs of Indigenous Learners.

Modern learning management systems, such as Moodle, allow for much more connectedness between teacher and student, and between students as groups. Communication can be synchronous in the form of a chat room, where questions can be asked or admissions made to not understanding without students feeling embarrassed or stupid (Gibb, 2006). From the outside Moodle would appear to be an LMS that could potentially enhance Indigenous learning.

### **Group and collaborative learning support**

Moodle allows for the creation of groups, which can then communicate through discussion forums viewable only by the group. Small or large groups can be created for specific activities, assessments or discussions. Discussion forums are a great tool for communication and Indigenous students often use these to introduce themselves to other students, providing information about their background and family history, where they are originally from, and what their hopes and aspirations are post-TEP.

Wiki's are easily created and students can work collaboratively on group tasks or assessment items. There is also the availability of synchronous learning technologies, such as chat rooms and instant messaging chat. Studies have suggested that these real time interactions were preferred over asynchronous tools such as forums and email lists, as real time interactions recall the traditional tutorial group (Gibb, 2006). Students can also contact one another using the real time instant messaging function. Courses have the option of providing a block listing all of the current online users. Students can open instant messaging windows with other online students. A constraint that arises from this is that this type of communication is text based and can limit the interactions of students from predominately oral cultural backgrounds.

### **Moodle is online only: Computer literacy and the digital divide**

The digital divide refers to the inequality in access to computer based ICTs such as the Internet (Samaras, 2005; Lester & Koehler, 2003). Computer literacy and the digital divide remains an issue for indigenous students, where often access to ICTs such as the internet is limited, or without suitable capabilities available to use such resources effectively (Samaras, 2005; Lester & Koehler, 2003). It is also one of the major reasons as to why Indigenous students do not or cannot engage or participate in the online learning management systems.

In terms of Indigenous people, research focusing on the digital divide has identified that people of Aboriginal or Torres Strait Islander heritage (among other groups) are missing out on the current technological boom (The Smith Family, 2008). Data from the 2006 Australian Census also showed that 43% of indigenous households had access to the internet, compared to 64% of those from other households. For Indigenous people in very remote areas, Internet access drops to 13% for Indigenous households, however for other households in very remote areas the access rate is 62%.

Even when internet access is available in remote areas, the strength of the connection may also constrain students. Holderness (1998, p.43) states, "not all internet connections are created equal", and many remote Indigenous communities battle with narrow bandwidth (Hutta, 2003). Mostly it comes down to access, as Samaras (2005, p.86) states, "one factor affecting Indigenous access to ICTs is the geographical distribution of the Indigenous population, 70% of whom live outside major cities." However, internet access does not automatically equate to strong computer literacy skills. Gibbs (2008) acknowledges that while today's youth are very comfortable in a digital world, they seem no more prepared than previous generations when it comes to having the knowledge and skills required to use computer applications at a level suitable for tertiary education or in the workforce.

The most obvious problem that presents itself is that access to Moodle at CQUniversity is available online only. Based on what the literature presents about Indigenous people and internet access there is already an evident problem. Off campus access to computers continues to be one of the prominent problems for implementing online learning tools for Indigenous students (Foster & Meehan, 2007). This is not a problem for on campus students, however the courses run through Nulloo Yumbah are offered in FLEX (distance) mode, and some students, such as those in remote areas or correctional centres, have little or no internet access. Potential offline solutions are on the horizon, such as a project to integrate Moodle with Google Gears for students who can only access internet for irregular, short periods (Moodle GSoC 2009, 2009). Other possibilities exist, specifically the ability to run Moodle in an offline portable mode (named Poodle, short for Portable Moodle) on a USB drive. However this solution presents security risks as students are able to navigate and access all files on the device. Such a solution would allow for materials

to be delivered to students in an LMS environment. An offline solution to Moodle that CQUniversity would implement and support would be welcome.

### **The learning environment and cultural context**

A report by The Smith Family (2008) states that the flexibility of technology is a powerful asset in helping to personalise education resources that are sensitive to cultural differences and Indigenous students' learning styles. The report also posits that because technology is flexible, it is possible to offer Indigenous students many different ways they can express their creativity and culture at their own pace.

Several past studies have presented ideas as to how online course materials have been developed to fit in with the learning styles of Indigenous people. McLoughlin & Oliver (1999) present very much an instructional design perspective for Indigenous online learning, citing that the needs of Indigenous Australians are unique, and that often times mainstream cultural material designed for Anglo Australians is not pedagogically appropriate. Dyson (2002) presents a design for a culturally affirming computer literacy course and suggest ways of presenting course materials that are appropriate to Indigenous learners. Auld (2002) outlines how a computer programs were used among the Kunibidji community to produce talking books for the Ndjebbana language – a language of only 200 speakers. Specifically this study looks at the implementation of CAN (Computer-assisted Ndjebbana) and at the development of a multimedia approach to support the teaching and learning of the Ndjebbana language within a remote community.

Customisation of the visual appearance of Moodle is possible. The overall template theme can be customised, as can the different 'blocks' that help form how course content is delivered and accessed. CQUniversity have adopted a uniform look for all course templates that displays the university logo and course name and uses the university colour scheme. However, while the template is fully customisable by the web administrators, the CQUniversity look cannot be modified or customised by course designers. This is no doubt due to university branding policy, but because of this each course shares the same template. This extends down into page backgrounds, HTML blocks, forums and any mediums within Moodle. Course content that is culturally relevant to Indigenous students has already been developed for TEP courses, however delivering it within a totally customised visual environment is not possible. So while individual images, graphics and icons can be used, there is no scope to redesign the entire look of one individual course to accommodate cultural diversity.

To an extent, designing courses to meet Indigenous visual-spatial strengths and strong relationship with imagery can be delivered using Moodle, but only by using third-party tools or somewhat advanced HTML and CSS editing. Embedding rich media content is also catered and allowed for. The amount of text an image used is in course content is completely flexible. More complex imagery can be used in terms of video screen casts, recorded video, or even interactive Slideshare or VoiceThread presentations.

This issue has been raised by Dron (2006), arguing that learning management systems require adaptability, not adaptivity. Moodle has the capability to adapt to different conditions however currently at CQUniversity this is not possible. At the moment, there is no limit as to what can be embedded and incorporated using intermediate HTML techniques. Although due to the way Moodle renders certain HTML and CSS there can be some display errors. It could be said Moodle is protean in this regard, it can be massaged and enhanced in ways to suit what is required (Jones, 2009).

### **Oral cultural backgrounds**

Research has suggested that computers can appeal to Indigenous learning by catering to those with an oral cultural background (O'Donoghue, 1992). This is only true in terms of delivery. Content can be delivered to students using audio, video or imagery. However any interaction within Moodle, such as discussion forums, chat rooms and instant messaging, is all text based. There is no capability for audio or video chats between students or between student and lecturer. These text-based-mediums do work, and students are using them, but Moodle cannot enhance interaction beyond a text based form. Over 10 years ago Steen (1997) highlighted the need for less text based learning tools. Indigenous students have also stated that they would rather speak to a person than attempt to converse through a computer interface (Foster & Meehan, 2007; Centre for Indigenous Health, 2003). In addition to this, Foster & Meehan (2007, p.134) identify that text based tools can cause further problems,

students for whom English is not their first language or for whom the use of aboriginal English dialect is the cultural norm have experienced difficulties translating the spoken

word to grammatically correct written word. Such difficulties have been exposed by the change to text-based PBeL and are reflected in student grades.

A possible solution for this will be the use of audio podcasts, narrated power point files and video screen casts for students to access. This solution is not without constraints also, due to the bandwidth and internet connection required to access audio and video media files.

### **Assessment options**

Some assessment based or facilitated in Moodle is one area that is conflicting with Indigenous learning styles, this includes the multiple choice tests and quizzes (Dyson, 2002) of which Moodle offers. However, this form of assessment can be introduced by allowing students to undergo trial runs, as Indigenous students are not always test wise (Harris, 1990). Trial and error is something that Moodle can facilitate very well, with all forms of assessment having the option of allowing multiple attempts, and in the case of file uploads they can be non-committal in the first (or more) instance.

Learning journals with reflections of learning are one mode of assessment that is appropriate to Indigenous learners that is not currently available in the build of Moodle run at CQUniversity. This is a feature that has been discontinued Moodle-wide, and is not specific to CQUniversity. Instead students must keep the journal in an offline word processing file, as Moodle does not offer a way to keep a journal that is viewable by the student and lecturer only. Currently it is recommended that the "Online Text Assignment" be used as a replacement to the journal. Moodle Blogs as an alternative also fall short, as they are Moodle implementation-wide (meaning every Moodle user at the institution can read every blog) and not tied to any specific course.

Dyson (2002) adds that peer assessment is also a means of assessment more appropriate to Indigenous learners. Outside of information discussion boards, Moodle offers a Question and Answer Forum. A Question and Answer Forum requires students to first post something, before they can view other student's posts. Setting up such a forum for an Assessment task allows students to assess and comment on their peers' work, once they have first completed the task.

### **Summary**

Through an examination of the features of Moodle, several tools that could improve tertiary education for Indigenous students are evident. These include group based and collaborative tools such as discussion forums, live chat rooms, group participation tasks, shared assessment tasks and wikis for knowledge building. Other benefits include the possibility of instant feedback to assessment, trial and error can be catered for in online assessment and quizzes, and the ease at which third party tools such as Slideshare, Voicethread and YouTube can be incorporated into courses.

Opposing these benefits are a number of constraints. Students coming from oral cultural backgrounds might not be able to fully engage with a text-based medium so the use of third party visual and audio tools would be required. There is also a lack of customisation in the visuals and themes in the CQUniversity implementation, this creates a barrier for course designers to create customised culturally engaging learning environments. This stems into a division between what Moodle allows, and what a specific institutions version of Moodle allows. Overall a major issue with Moodle is that it is no more than a static facilitator of content and requires considerable use of third party tools to enhance the learning of Indigenous students.

### **Conclusion**

As CQUniversity is currently running Moodle for the first time in the current term, there is no concrete or definite feedback from Indigenous students that can be presented here. Overall there has been positive feedback about Moodle from students during residential schools. Students cited the ease of navigation to information as a vast improvement from Blackboard.

A review of the literature has identified the need for online courses to be designed in such a way that is culturally relevant to Indigenous students, however this is not wholly possible in the current implementation of Moodle running at CQUniversity. What is clear is that Moodle is but a platform, and any complex imagery or material must be embedded or imported from third party tools. It is a positive that Moodle allows for this to happen, even though in some cases it requires intermediate web editing skills.

An unexpected finding from this paper is the two streams of constraints that have appeared based on what Moodle allows, and what the CQUniversity instance of Moodle allows. This is possibly an issue inherent in all institution installations of an LMS, but it is particularly noteworthy as a finding here, as it does impact on the way Moodle can adapt to Indigenous ways of learning at CQUniversity. It is an issue that will be a focus of future work to come from this study. An additional future study will present the way in which Moodle was used to create a course specifically intended for Indigenous students, as well as more in-depth usage results from specific aspects and resources used in the courses based on data collected from Nulloo Yumbah students.

Future work in this area will also involve surveying students to gain data for analysis, as well as working with other projects, notably the LMS Indicators Project (Beer, Clark & Jones, 2009), in order to examine how Indigenous students are using Moodle, and how courses can be developed to further support Indigenous ways of learning.

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**Please cite as:** Duggan, T. (2009). Supporting ways of learning for Indigenous Australian pre-graduate students using Moodle. In *Same places, different spaces. Proceedings ascilite Auckland 2009*. <http://www.ascilite.org.au/conferences/auckland09/procs/duggan.pdf>

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