

# Case Studies: Using Moodle for Collaborative Learning with University and Senior Secondary Students

Mr Mark Paynter

PhD Student, Centre for Integrated Human Studies and Centre for Excellence in Natural Resource Management, The University of Western Australia. Paynter80@gmail.com

Professor Neville Bruce

Director, Centre for Integrated Human Studies, The University of Western Australia, Neville.Bruce@uwa.edu.au

## Abstract

The recently developed Australian Curriculum recognises the global changes that impact on the learning programs for all education institutions. We are now a globalised society, where the challenge of an economic crisis in one part of the world has widespread implications. Civil wars and famines lead to humanitarian crises and refugee migration that have an international impact. The Centre for Integrated Human Studies at the University of Western Australia recognises that the 21st Century provides humankind with significant global challenges on a number of fronts – social, economic and ecological. Providing students with the knowledge and skills to connect with members of the global community will ensure our future citizens are well equipped to contribute to meeting these tests. Learning management systems such as Moodle are seen as key strategies to enable education which prepares students for a challenging future.

Since 2009, The Centre for Integrated Human Studies has developed post-graduate programs using Moodle as their learning management system. During this period a unique senior secondary program in regional Western Australia that incorporates the use of high definition IP video conferencing also has been developed with Moodle. This combination of Moodle and regular video conferencing enables a high degree of class engagement and collaboration from students across up to five schools. The post-graduate program currently has 40 off-campus national and international enrolments and the secondary program about 80 students over seven courses. In reporting on these two case studies, this paper will describe how these programs have developed and the school-based research undertaken. The next phase of the development will be using Moodle to support collaboration between the university and secondary schools.

## Keywords

University and school collaboration, Blended learning, Moodle, Integrated Human Studies, Interdisciplinary studies Off-campus delivery, Learning management system, Australian Curriculum, ICT

## Introduction

Collaboration, engagement with a globalized society and independent learning skills are high priorities for both Integrated Humans Studies and the new K-10 Australian Curriculum. Indeed the Australian Curriculum and Assessment and Reporting Authority (ACARA, 2011) describes the goals of the Australian Curriculum are to develop in individuals:

- their capacity to learn and play an active role in their own learning;
- the essential skills in literacy and numeracy - recognizing that creative and productive use of technology, especially ICT, is a foundation for success in all learning areas;
- creativity, innovation and resourcefulness - solving problems in ways that draw upon a range of learning areas and disciplines;
- a capacity to plan activities independently, to collaborate, to work in teams and to communicate ideas;
- the confidence and capability to pursue university or post-secondary vocational qualifications leading to rewarding and productive employment;
- the ability to relate to and communicate across cultures;

- a capacity to work for the common good, in particular sustaining and improving natural and social environments;
- a capacity for responsible global and local citizenship.

In order to achieve these goals schools must enable students to manage their own learning and collaborate globally. Learning management systems such as Moodle provide an ideal platform to facilitate these learning strategies.

Developing collaborative capacity in students is also a focus of an Organisation for Economic Cooperation and Development (OECD) initiated project Assessment and Teaching of 21st Century Skills (University of Melbourne, 2011). This project aims to develop support for school systems participating in the international PISA tasks from 2014 that will include the use of ICT for collaborative problem solving.

The advocacy for the incorporation of futures education in the curriculum is a development of interest to users of Moodle. The 21st century is presenting challenges for society of unprecedented importance (Martin, 2007). The inclusion of futures thinking in the curriculum provides students with a capacity to appreciate these challenges and contribute to society's response (Hicks, 2012), (Slaughter, 2004), (Gidley & Hampson, 2005). Hicks (Hicks, 2012) includes engaging in active and responsible citizenship - locally, nationally and globally as a key theme of futures education. A recent description of school-based research by Bateman (Bateman, 2012) as well as reflections by Hicks (Hicks, 2012) and Gidley (Gidley, 2012) indicates that futures thinking has been the focus of research and curriculum interest for some time. Clearly a learning management system, such as Moodle provides a very useful platform to enable the engagement of students globally and support them in developing a futures perspective. These are important goals for both secondary and tertiary education systems.

The case studies that follow outline how these goals are addressed in two Western Australian settings - a metropolitan university and cluster regional secondary schools. The final section of the paper describes research related to university/school collaboration and plans to use Moodle in a project between a university and secondary school schools.

## **Case Study One: Moodle in Integrated Human Studies at the University of Western Australia**

Integrated Human Studies (IHS) is a new field of tertiary education that brings together the sciences, social sciences, humanities and applied disciplines to explore the nature and future of humankind. It asks what it means to be human in the 21st century: its objective is to promote human wellbeing in a sustainable world through education and action. At the University of Western Australia we have designed first year undergraduate units in IHS to provide students with a broad understanding of humans and human futures and to provide context for their chosen careers. At a postgraduate level we have developed Certificate, Diploma and Masters level programs to provide graduates with the knowledge and skills needed to address complex problems in a rapidly changing world.

Our challenge in developing IHS units and programs was two-fold: first we had to create new content and concepts or curricula material that would transcend normal discipline-based studies and focus on complex real life problems at a local, regional and global level. Secondly we needed a pedagogy that would promote creativity, critical thinking, problem solving and above all collaboration and the ability for students to express and share alternate points of view. We wanted to attract students from a broad range of disciplines and careers and as far as possible from a broad range of cultures and nationalities to enhance interaction and global understanding. Above all, we wanted students to have a learning experience that would not just inform but would engage them in a shared concern for human and world futures. Thus we opted for a social constructivist pedagogy (Moodle, 2012) where students are active and collaborative learners and selected Moodle as the learning management system that best exemplified this approach.

We are now in the third year of delivering the postgraduate programs: they can be studied on-campus at UWA or fully online through partnership with Open Universities Australia. Importantly, the on-campus and fully online students study and collaborate together; the main distinction is that on-campus students can meet face to face, although even this distinction is lessened with the use of live on-line tutorials that all students are invited to join and the use of Skype and other communication systems for small group interaction. Unit enrolments have been growing steadily, currently there are around 40 students enrolled from disciplines and professions

such as teaching, law, medicine, engineering, town-planning, public service, music, dance, agriculture and anthropology.

In both the development and delivery of the programs, we have used some of the principles of action research. Interdisciplinary studies with the breadth of IHS require continued updating and indeed change at the level of evolution. The world is changing more and more rapidly; our ability as unit coordinators to keep abreast of new ideas, technological advances and world affairs, let alone incorporate these into the courses, is a real challenge. Thus we have adapted action research to include students in course maintenance and curriculum development. Through forum activity, messages to coordinators and specific assignments, students are encouraged to suggest new material, skills and delivery methods to enhance teaching in current units and contribute to future curriculum and course design. We use Moodle assignment and grading systems to reward students who choose to be active in this area.

Another major feature of our units is allocation of 20% of the final grade to collaborative activities. This is largely through interaction on forums but an important element is how much they have helped each other with advice on projects, essays and assignments. Again Moodle grading systems provide a good base for assessing collaborative activity.

Research was undertaken by the Centre into the views of post-graduate students about the effectiveness of Moodle as a learning management system (LMS) in achieving aims of the IHS courses. The IHS programs aims to develop a range of attributes and capacities, many of which are consistent with the Australian Curriculum outlined above. The survey was conducted after the completion of semester one courses in 2012. Twenty students participated in the online questionnaire out of the 29 students enrolled. Of the 10 students (out of 20 responding) who have used other LMS, all regarded Moodle as a superior or effective as other LMS experienced. At least 75% of respondents agreed (or strongly agreed) that Moodle enabled the IHS course objectives of communication and collaboration with other students to be developed. For the course aims of delivering effective online learning, the development of independent learning skills and the communication with the course coordinator, 90% of respondents found Moodle effective. Moodle was not considered effective by 25% of respondents in enabling leadership skills to be demonstrated.

Respondents in the study also were asked to identify the elements of Moodle that were most effective in supporting their learning in IHS. Those identified were the forum for weekly posts (by 95%), email messaging for contact with course coordinator (by 80%), uploading work to be submitted (by 80%) and the use of the grade book for feedback on marks (by 80%). The side blocks were considered the least effective element of Moodle, with only 40% agreeing they were effective. Whilst the messaging was seen effective in contacting with the course coordinator, there was a view that the messaging capacity to provide notifications and communication with other students was less effective.

## **Case Study Two - Moodle in a Regional Cluster of Secondary Schools in Western Australia**

### **An overview of the secondary school cluster and their collaboration**

A number of secondary schools in Western Australia encounter challenges in providing a senior curriculum that is sufficiently broad and meets the expectations of local communities. This challenge is particularly evident in regional areas and especially in regard to specialised senior courses in English literature and in mathematics where enrolments at individual schools may be less than six students. Provision for academically able students is also a challenge for these schools, as gifted and talented students from regional areas may not take up places in designated metropolitan schools or in centrally provided on-line programs. See figure 1.

An example of a regional group of schools working collaboratively with Moodle to meet the challenge of curriculum provision is a cluster of public secondary schools in the south of Western Australia. This collaborative is now in its third year of delivery of courses with Moodle as the learning management system together with two hours of high definition video conferencing per group each week (see Figure 1 below). Professional support for staff in regional schools has also developed using multi-modal provision with Moodle and video conferencing. The use of Moodle has also extended to some mathematics and English teachers of wholly on-site classes who are able to see the benefits of access to course work for students who are participating in Vocational Education and Training (VET) programs and miss some in-school classes.



**Figure 1: Year 9 mathematics enrichment students from two schools collaborating on a problem solving task using Moodle and video conferencing in southern Western Australia. Teacher: Mrs Jane Forte, Albany Senior High School. 28 June 2012.**

### **The role of Moodle in enabling a secondary school collaborative**

Moodle provides the key mechanism by which the secondary cluster of schools collaborates. It provides the learning management system (LMS) that is pivotal to the programs across the schools. Whilst the medium for synchronous interaction between the teacher and students has moved from web-conferencing to HD video conferencing since 2010, Moodle has continued to be favoured by teachers as the preferred asynchronous means of delivery. Moodle will be hosted and supported by Education Services Australia (ESA) for the cluster until the end of 2012.

Front-end Moodle training has been provided each year to staff and the cluster coordinator together and ESA provided on-going advice to individuals. It is quite apparent to the authors, that Moodle has features that enable early adoption by novice ICT users. In addition, as confidence grows Moodle provides opportunities for staff to innovate over time. This has been demonstrated by observing that Moodle is used initially as a repository of course information for students and then progresses through to a more collaborative platform where students share their learning through the forums. Novice users also have shown a capacity to adapt with confidence, a course template developed by a colleague with core course information and then used with their own class.



**Figure 2: Senior students from three schools collaborating using Moodle and video conferencing in southern Western Australia. Teacher: Mrs Barbara McNeill, North Albany Senior High School. 28 June 2012.**

### **Research in Western Australian Secondary Schools on Moodle and other ICT use**

During 2011 a study (Paynter & Bruce, 2011) was undertaken with 115 teachers from twelve secondary schools in metropolitan and regional areas of Western Australia responding. Questions in the survey related to the general capabilities of ICT capacity, critical and creative thinking and problem solving. In addition a general appraisal of teachers' interest in broader global issues, their sense of self-efficacy and their suggestions for curriculum support was included in the study.

Respondents were asked to describe their personal use of various ICT applications for teaching, preparation or private purposes. Moodle (or other learning management systems) were used by over a third (37%) of respondents, with about 14% of the respondents indicating use of more than 5 hours per week.

Respondents also described the extent of their students' use of ICT in their classes. Almost half of the respondents (46%) indicated that their students were using Moodle or another LMS, with almost a quarter (22%) indicating more than 2 hours use per week. Not surprisingly a positive correlation between staff personal use and student use in class was found.

The introduction to this paper described the importance of a learning management system such as Moodle to support schools in meeting the goals of the new Australian Curriculum. This curriculum identifies ICT capacity as a priority and has five integrated elements. We believe students collaborating with local and international colleagues using Moodle will develop the communicating with ICT and applying social and ethical protocols and practices attributes in this curriculum. Given the priority identified in the new Australian Curriculum and other international initiatives for ICT capabilities and collaboration we consider that priority needs to be given to on-going professional support for teaching staff in their use of Moodle.

The role of Moodle as a LMS in developing the key themes of collaboration and global engagement in futures education was referred to in the introduction. Given the pre-eminent influence of teachers on educational outcomes for students (Hattie, 2009) recent research was conducted by the authors (Paynter & Bruce, 2011) to explore the views of teachers in Western Australia about futures education and their degree of self-efficacy. Self-efficacy of teachers for this element was assessed by asking respondents to express their view about ten commonly cited reasons as to why people don't like to think about the future. The results of this study indicates a presence of teacher efficacy where possible futures are seen to be within the capacity of the individual to influence (Paynter & Bruce, 2011).

Consequently this study provides assurance that many teachers have a sense of confidence in their own capacity to influence possible futures. Teachers' belief in their personal efficacy to motivate and promote learning affect the types of learning environments they create and the level of academic achievement of their students (Bandura, 1993). Consequently it is our view that when this proactive view is present, teachers will engage students effectively in key futures education themes – including the use of information and communication technology (ICT) and Moodle. This study also provided insights about the nature of the on-going professional support for Moodle and other ICT to ensure the aims of secondary education are achieved.

## University and Secondary Collaboration Using Moodle

Close collaboration between secondary schools and universities has always been seen as an ideal but one difficult to establish in practical terms. Often collaboration has been limited to curriculum design to ensure good preparation of students for tertiary studies or collaboration of teachers and academics to develop disciplinary texts or other specific materials. Slater (2010) reviewed a number of case studies of broader and more innovative collaborative projects at both an institutional level involving university faculties and schools and a more individual level involving interested staff from each institution. Slater considered that an understanding of the cultural elements of each organisation is crucial to introducing and sustaining collaborative activity and that the nature and effectiveness of interaction within the collaborative group is pivotal to success. Given that schools and universities have similar educational objectives and pedagogies and share much subject matter it is somewhat surprising that there are not more examples of effective collaboration between the two. One reason may be that until recently the technical support needed for effective collaboration was lacking. We cite here an initiative one of us was involved in, namely setting up 27 years ago a school-university collaborative group in Human Biology. This was hosted by the Australasian Society for Human Biology (Australasian Society for Human Biology, 2012) which had and still has the following aims:

- 1 to promote and support human biology research in the region of Australasia.
- 2 to promote and support the teaching of human biology in Australasia.
- 3 to promote the professional needs of human biologists including established research workers, research students, educators at tertiary institutes and secondary schools, technicians and support staff.
- 4 To cooperate and form affiliations with other organizations having similar objectives.
- 5 To promote the study of human biology in schools and tertiary institutes and to publicize the role of human biologists to the general public.

The model we generated did indeed promote strong collaborative activity not just between staff from both educational sectors but between students. However, difficulty of communication, effective forum discussions, dissemination of teaching materials and workshops gradually reduced the effectiveness of this initiative. All this of course has now changed with advances in ICT in general and in our experience Moodle in particular. From this background and experience we at the Centre for Integrated Human Studies are seeking collaboration with secondary schools in Western Australia. Economics students have already engaged with university staff to explore futures scenarios. During the next stage of this collaboration it is expected that Moodle will play a crucial role in providing a learning management system for shared projects and communication between both staff and students at universities and secondary schools. Through this collaboration the aims of the Integrated Human Studies course as well as the futures orientation of the secondary curriculum will be addressed. In addition it is hoped that the benefits recognised from collaborative problem solving can be realised. Given that the university students will be located both within Australia and internationally, our experience shows that Moodle, with a capacity to securely manage access, will be an ideal learning management system for this collaboration. The framework by which the project will occur is being developed in collaboration with participating school staff; progress will be reported on our website: Education for World Futures (Education for World Futures, 2012).

## Conclusion

We have seen in the case studies outlined a university course and a cluster of secondary schools responding to the changing education needs of students in the 21st century. The value of a futures perspective in the curriculum has been outlined and insight provided into current education practice in Western Australia.

Common amongst all these elements is the importance of collaboration – both for students and for their learning institutions. Moodle has been shown to be a highly suitable learning management system to enable this collaboration and provides opportunities for further development. This future development will include university and school collaboration and will be based on the work of Slater (2010) and others who have reported on school and university collaborative strategies.

## References

- ACARA. (2011). The Shape of the Australian Curriculum V3. Retrieved 15/11/2011, 2011, from [http://www.acara.edu.au/verve/\\_resources/The\\_Shape\\_of\\_the\\_Australian\\_Curriculum\\_V3.pdf](http://www.acara.edu.au/verve/_resources/The_Shape_of_the_Australian_Curriculum_V3.pdf)
- Australasian Society for Human Biology. (2012) Retrieved 9/07/2012, 2012, from <http://school.anhb.uwa.edu.au/ashb/index.html>
- Bandura, A. (1993). Perceived Self-Efficacy in Cognitive Development and Functioning. *Educational Psychologist*, 28(2), 117-148.
- Bateman, D. (2012). Transforming Teachers' Temporalities: Futures in an Australian classroom. *Futures*, 44(1), 14-23.
- Education for World Futures. (2012) Retrieved 9/07/2012, 2012, from <http://learning.ewfi.org/ewf/>
- Gidley, J. M. (2012). Evolution of education: From weak signals to rich imaginaries of educational futures. *Futures*, 44(1), 46-54.
- Gidley, J. M., & Hampson, G. P. (2005). The Evolution of Futures in School Education *Futures*, Vol.37(4), 255-271.
- Hattie, J. A. C. (2009). *Visible Learning*. New York: Routledge.
- Hicks, D. (2012). The Future Only Arrives When Things Look Dangerous: Reflections on Futures Education in the UK. *Futures*, 44(1), 4-13.
- Martin, J. (2007). *The Meaning of the 21st century : A Vital Blueprint for Ensuring our Future*. London: Eden Project Books.
- Moodle. (2012). Pedagogy Retrieved 9/7/2012, 2012, from <http://docs.moodle.org/23/en/Pedagogy>
- Paynter, M., & Bruce, N. (2011). Delivery of a Futures Orientation in Western Australian School Curriculum: current levels of teacher awareness, interest and support. Submitted Research Project. Centre for Integrated Human Studies, The University of Western Australia.
- Slaughter, R. (2004). *Futures Beyond Dystopia : Creating Social Foresight*. London ; New York :: RoutledgeFalmer.
- University of Melbourne. (2011). Assessment and Teaching of 21st Century Skills Retrieved 30 April, 2011, from <http://atc21s.org/>