Models of research-led learning and the theoretical and practical considerations in diverse contexts

R.W. Moni, Head of Educational Research Unit, School of Biomedical Sciences, The University of Queensland, St Lucia, QLD 4072, Australia.

How can teaching, learning and assessment of physiology be integrated to disciplinary research? In the experience of the School of Biomedical Sciences (UQ), there are distinct advantages to a systematic approach based on consensus models reflecting the priorities of physiology as a dynamic discipline, as well as the prioritised goals of course and program designers. These help (i) students to learn about physiology and learn through doing physiology that might be relevant preferably beyond the undergraduate years and (ii) teachers to assist student learning through appropriate course delivery and assessment. There is evidence available in the literature demonstrating (i) the connection between notions of scientific literacy (which frequently underpin the learning of science in school settings) and approaches to physiology which address the needs of large diverse classes (Laugksch, 2000) (ii) definitional challenges of how research and teaching can be integrated – do we really mean "research-based" learning? (Griffiths, 2004; Healey, 2005) and (iii) the link between research, teaching and inquiry based learning (Brew & Boud, 1995; Clarke, 1997). Examples of putting this theory into practice are illustrated by the Biohorizons eConference, an asynchronous assessment task in the large, foundation course - Human Biology (Moni *et al.*, 2007). Over 5-6 weeks, first-year students self-select into one of ten thematic work clusters. They work in pairs to write and upload a mini-paper on a detailed topic of Human Biology (entailing physiology) and a PowerPoint presentation. They are then individually assessed on the quality of questions and answers posted to their peers within their cluster. First, coded student opinion data support our course curriculum model which emphasises a balance of assessing knowledge, key manipulative laboratory skills, scientific reasoning to support inquiry, language use supported through effective student-student and student-teacher interactions. Details of this assessment task map to the curriculum model and to phases of inquiry based learning, thus demonstrating the usefulness of the model to explicitly frame learning, teaching and assessment (Moni & Moni, under review). Second, student opinion data from Biohorizons are used to define six ways in which this assessment task supports student diversity (Matthews *et al.*, 2007). It is argued that broad models can be made sufficiently flexible to address the needs of all students, irrespective of whether they are planning to pursue a path in physiology research.

Brew A and Boud D (1995) *Higher Education*, **29:**, 261-273.

Clarke BR (1997) *The Journal of Higher Education*, **68:** 241-255.

Griffiths R (2004) *Studies in Higher education*, **29:** 709-726.

Healey M (2005) *Journal of Geography in Higher Education,* **29:** 183-201.

Laugksch RC (2000) *Science Education*, **84:** 71-94.

Matthews KE, Moni RW & Moni KB (2007) Strategies for enhancing equity practices in the teaching, learning and assessment priorities of large first-year classes. EOPHEA 2007 Conference, Ethics and Equity: Re-evaluating social responsibility in education. 19-22 Nov, 2007.

Moni RW, Moni KB, Poronnik P & Lluka LJ (2007) *Biochemistry and Molecular Biology Education*, **35:** 255-265.