

# Chapter 6

## Language Support for First Year Human Physiology and Biology

**Karen Mate**

*University of Newcastle, Australia*

**John Rodger**

*University of Newcastle, Australia*

**Brett Lidbury**

*Australian National University, Australia*

### ABSTRACT

*This chapter examines student performance in Human Physiology and Biology in response to a number of interactive language-focused and career-oriented interventions that were integrated into both lecture and tutorial formats. The study took place at the University of Newcastle, Australia and involved around 1000 students on two campuses. Although it was not possible to demonstrate a clear overall improvement in student performance as a result of these interventions, the activities were viewed positively by the majority of students. Arguably, the major impact of the language and other interventions was in the level of student motivation and engagement with the course topic. Contemporary university students are highly focused on the relevance of a course to their chosen career path, suggesting that language-based teaching and learning strategies would be most effective if placed within a vocation-specific context.*

### INTRODUCTION

Learning the language of science is a major obstacle to many students in first year human physiology and biology. It is particularly difficult for those students who have not studied science subjects previously or recently, and consequently struggle to recognize and differentiate concepts.

These issues are exacerbated by the diversity of the student population in large first year courses in relation to background knowledge, their degree program and career path.

Students from the allied health programs (occupational therapy, speech pathology, nutrition/dietetics and podiatry) must complete first year human physiology as part of their program requirements for accreditation, but consistently perform poorly due largely to their lack of background in

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science (McCleary et al, 1999). It is obvious to those who teach human physiology that a basic understanding of the biochemical processes, cells and tissues that contribute to the functioning of human organ systems is essential in any clinical context. Many students, however, fail to recognize the relevance of physiological and biochemical processes that operate to maintain and integrate the specific organ systems that contribute to a healthy human body. Students often become overwhelmed with course content and question its relevance with comments such as “Why do I need to know all this? I just want to be a podiatrist/speech pathologist/occupational therapist etc”.

The situation for students undertaking first year biology, and student attitudes and engagement with particular subject matter in biology is similarly diverse. Students are enrolled in a variety of degree programs many of which require first year biology (e.g. Psychology, BSc Biology major, Biotechnology, Environmental Science and Management and Environmental Engineering). The unit which is the focus of the current chapter provides an introduction and overview of the animal kingdom and the principles of animal function. Inevitably this introduces the student to a very large array of new and often confusing technical terms and animal names in addition to the special uses and meanings certain ‘normal’ English words take on in biology (e.g. model, control, significant). As with the health programs, questions of relevance to the students’ specific program of study are often expressed, “Do I really need to know these funny names, etc?”

The aim of this study was to develop teaching methods and tools that increased students’ ability to see the interconnectedness between language and biological problems and situations. Students were also encouraged them to develop their own techniques to deal with language issues in biology, based on the resources provided. Some of the language-oriented techniques implemented were breaking down long words by identifying prefixes and suffixes,

1. exploring the roots and origin of words,
2. matching exercises with scientific terms and definitions,
3. flashcards for vocabulary revision and
4. role playing for students to practise conveying complex scientific information to their peers and the public.

Strategies were also developed to increase the motivation for embracing the language and concepts introduced. Vocation-specific clinical examples were presented as a “Disease of the Week” package in the human physiology course to enable students to put basic physiological information in a broader context with relevance to their future career. A series of regular online assessments were also introduced to provide consistent and immediate feedback to students on their progress. In the case of the animal function unit, examples were provided throughout the lecture material of how the particular animal group or its function related to:

1. Everyday life examples (e.g. Why the life style of some animals makes them dangerous parasites, or why certain stages in development are so critical for producing a normal baby);
2. Biodiversity and the environment (e.g. Kangaroo breeding and life in the Australian arid zone), or
3. How contemporary biology was engaging with evolutionary biology and taking it beyond anatomy and fossils (e.g. The major changes in understanding of animal evolution and relationships due to molecular biology).

## **METHODS EMPLOYED TO SUPPORT LEARNING IN HUMAN PHYSIOLOGY**

*Human Physiology* is a first year undergraduate subject taught over two semesters. It is arbitrarily

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