COMMUNICATING PHYSICS WITH PHYSIO STUDENTS

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Problem

A good foundation in physics enables the practising physiotherapist to effectively design and implement treatments for his/her patients, to better interpret medical imaging diagnostics, and to critically review new techniques. Thus physiotherapy students need to learn the physics that underpins the mechanics of the human body, and techniques both low-tech (eg: icepacks) and high-tech (eg: ultrasound, laser-based therapy, MRI). However, in university physiotherapy programs there is generally poor uptake of physics principles as students (who are generally physics novices) may not appreciate how physics is relevant. Further, no single set of resources suitable for the breadth of this educational aim has existed. Problems of student understanding are exacerbated by the mass of information in a physiotherapy degree curriculum acknowledged Australia-wide as crowded. Student responses show that knowledge needs to be communicated in meaningful and manageable pieces.

Plan

We aim to provide learning materials with which physiotherapy students can gain empowering deep knowledge of the physics relevant to physiotherapy. Building on previous work for students in the biomedical/health sciences where contextualisation of physics resulted in significant gains in student engagement, learning of physics concepts, and critical thinking, we have packaged information about physics fundamentals in a different way. We have developed novel course materials - a focused suite of learning resources tailored for the audience of introductory courses for physiotherapy undergraduates and postgraduate-entry students - integrating physics and physiotherapy. The objective is to clearly convey links between the enabling science and the service discipline through the practical application of physics principles in physiotherapy.

Action

The materials have been developed as a balanced collaboration between disciplines, by a team of academics and research assistants with individual strong backgrounds in physics and physiotherapy, all experienced in the relevant teaching. A set of modules, each focusing on a particular treatment modality, has been created. The iterative design process included evaluation through student trials (with both undergraduate and postgraduate-entry students), surveys of students and tutors, and focus groups.

Each module is structured as a succinct “manual” for a specific physiotherapy treatment modality, and includes text, images and equations. Physics is introduced via why the technique is used, and how it works. Guidance for use of the technique connects theoretical concepts and clinical applications. Particularly successful aspects are:

- front page side-by-side “Physics Fundamental” and “Physio Aim” sections
- photo of the treatment in action, overlaid with a schematic (eg: electric circuit, arrow in direction of heat flow) that helps students visualise the abstract.

Reflection

The developed resources have benefitted students through increased relevance and clarity. They have improved student perceptions of the relevance of physics knowledge and skills in the practice of physiotherapy, and of their understanding of the physics inherent in physiotherapy.

Students show they value these resources as they envisage using them at different stages in their learning - when first dealing with concepts/techniques, in practical sessions, when revising, as a reference during their workplace practice, and to help explain treatments to patients.

This project models successful development of course materials for service teaching.

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