

## Embracing a dialogue about cost and value in physiotherapy education

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### Key tips for cost-aware educational design

1. Personnel costs
  - a. Design for economies of scale
  - b. Consider costs from the perspective of fixed and variable
2. Facility costs
  - a. Aim to minimise the volume of in-room time
  - b. Match educational needs with the lowest cost facility type
3. Equipment costs
  - a. Design for economies of scope
  - b. Cost is not always an indicator of educational value
4. Client input costs
  - a. Consider all relevant stakeholders
  - b. Look out for cost-shifting between stakeholders

### Introduction

Resources for education are limited. Choices must – and will – be made about their allocation. As educators, it is our responsibility to not only consider optimal learner outcomes, but also the cost of achieving these outcomes. Consideration of cost is necessary to ensuring efficiency and sustainability of physiotherapy education practices ([Maloney, 2017](#)).

Despite the importance of resource allocation, physiotherapy education appears to be occurring with little systematic thought on the economic costs involved. A quick PubMed search (conducted January 3, 2018) combining MeSH terms for physiotherapy education and cost analyses returns a paltry 9 articles, compared with 208 and 1199 for nursing and medicine respectively.

Issues of cost are ubiquitous – affecting the viability of existing programs, the introduction of new programs, and the uptake of educational innovations. The cost of education will play a key role in the future development of the global physiotherapy profession, particularly if we are to attain the educational standards outlined by the World Confederation for Physical Therapy ([World Confederation for Physical Therapy, 2015b](#)). For example, building capacity for independent autonomous practice, which is currently met by only 63% of countries ([World Confederation for Physical Therapy, 2015a](#)), requires additional training in analytical and research skills ([Bithell, 2007](#)), as well as further professional mentorship and clinical experience ([McMeeken, Webb, Krause, Grant, & Garnett, 2005](#)) – all of which is likely to result in qualification inflation (i.e. increase from 3-year diploma to 4-year baccalaureate).

Improved management of educational resources will generate better learner outcomes (or a higher number of graduates) for

the same cost, or the same learner outcomes for a lower cost ([Maloney et al., 2015](#)). Respectively, these features of improved management addresses the growing demand for physiotherapy services ([Pretorius, Karunaratne, & Fehring, 2015](#)), and the heightening budget constraints on educational programs ([Walsh, 2010](#)). From this, it is clear that 'value' in education is dependent on two factors, the educational outputs, and the cost of resource inputs. In this editorial, we explore how purposeful educational design can be used to address the latter of these two elements – cost.

We explore the concept of costs, drawing on Levin's Ingredients Framework, a framework commonly used in the field of educational economics ([Levin, McEwan, Belfield, Bowden, & Shand, 2017](#)). Levin proposes several key categories of costs to consider, including personnel, facilities, equipment and materials, and client inputs ([McEwan, 2012](#)).

### Personnel costs

The largest recurring cost in a physiotherapy program is likely to be personnel costs ([Finucane & McCrorie, 2010](#)). Personnel costs include direct teaching staff, administration, support services, and those related to clinical education. Curriculum designers may optimise personnel usage by considering *economies of scale*, and the associated concepts of *fixed costs* and *variable costs*. Fixed costs are educational costs that occur regardless of the number of students taught, whereas variable costs change based on the number of students.

Technology enhanced learning (e-learning) approaches provide useful examples of fixed and variable costs. They typically require large initial investments to develop (fixed cost), however once established, the program is often usable by a large number of dispersed learners and for multiple iterations ([Cook, 2007](#)) – thereby lowering the per student variable cost. In their

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randomised controlled trial, [Maloney et al. \(2012\)](#) show that there is no difference between traditional face-to-face teaching and pre-recorded video teaching for physiotherapy practical skills when measured by Objective Structured Clinical Examination. Massive Open Online Courses (MOOCs), such as the one conducted by Harvey and colleagues teaching thousands of physiotherapists about spinal cord injuries, are an extreme example of the economies of scale principle ([Harvey, Glinsky, Lowe, & Lowe, 2014](#)). Several other factors related to economies of scale are presented in Box 1 below.

### Box 1. Applying economies of scale in physiotherapy education

#### Look beyond physiotherapy

Physiotherapy and occupational therapy content is sufficiently similar to allow for sharing of educational resources ([Brown & Jennifer, 1999](#)). Sharing of resources can lower both fixed and variable costs, and may be applied more broadly to the generic elements of physiotherapy education, including anatomy, physiology, biomechanics, and evidence based practice ([Maloney, Moss, Keating, Kotsanas, & Morgan, 2013](#)).

#### Optimise student-teacher ratios

There is currently no 'gold standard' model of clinical education, that is, a 1:1 student-teacher ratio has no clear benefits over a 2:1 ratio ([Lekkas et al., 2007](#)). Using a 2:1 ratio may potentially reduce clinical educator time per learner through economies of scale and peer-peer learning.

#### Match learning objects to period of use

Developing an e-learning object is often expensive ([Cook, 2014](#)). This may be appropriate for anatomy content which can be used over a long period time, however may not be the best option for content on the latest evidence for back pain management.

#### Collaborate with other professions, institutions, and countries

The National Simulation Project is a collaboration of 16 Australian Physiotherapy programmes through which 45 simulated patient scenarios were developed, implemented, and evaluated. These scenarios and information about the project is available on their website (<http://lamp.physio.curtin.edu.au/simproj/>). Through sharing the cost of development, the per institution fixed cost is likely to be lower than if the institution developed the same learning resource independently.

## Facility costs

Facility costs refers to the physical space required for the educational intervention ([Levin et al., 2017](#)). Factors to consider include seating capacity, technological requirements (e.g. projectors, computers), and room fittings (e.g. oxygen ports, ceiling hoist tracking). Other hidden costs include utilities, cleaning, room maintenance, and building depreciation.

From a facility cost perspective, educational design should maximise outside-classroom content. Blended learning pedagogies may achieve this goal by reducing face-to-face contact hours in favour of e-learning objects. Flipped classroom models may reduce facility costs through enabling shifts in class time allocation and the type of rooms ([Chen, Lui, & Martinelli, 2017](#)), and has been shown to yield improved student learning compared to the traditional approach ([Hew & Lo, 2018](#)).

However, such approaches are highly heterogeneous ([Liu et al., 2016](#)), and depending on implementation, facility costs may not necessarily be different compared to traditional approaches ([Maloney et al., 2015](#)).

## Equipment and material costs

In this section we will be discussing 'larger' equipment costs such as real-time ultrasound machines, standing hoists, simulation mannequins and rehabilitation gym equipment. It is acknowledged that 'smaller' material costs also exist, such as alcohol swabs, rigid tape, and office stationery – which may be relevant particularly in a low-budget setting.

Equipment costs can benefit from the *economies of scope* principle, which is the efficiency formed by variety. Often, physiotherapy programs use specialist equipment for only one or two weeks in the year, and then go back in storage until they are needed the following year. If a university teaches a variety of health professional courses, then the use (and cost) of the equipment can be shared accordingly. For example, it may be less costly to purchase a top-of-the-line simulation mannequin to be shared between a physiotherapy and nursing program, rather than each program buying a mid-tier mannequin that fits their individual needs.

With equipment, it is also important to note that more expensive does not equal better education. For example, while high-fidelity simulators are typically much more expensive than their low-fidelity counterparts, evidence suggests that there is little difference in learning outcomes ([Norman, Dore, & Grierson, 2012](#)), although formal cost analyses in simulation are lacking ([Zendejas, Wang, Brydges, Hamstra, & Cook, 2013](#)). Overall, physiotherapy programs should carefully evaluate educational value and costs when looking to purchase equipment, and also consider alternatives such as lower-cost options or rentals.

## Client input costs

All costs thus far have been discussed from the perspective of the educational institution. In physiotherapy education, costs may also be incurred by patients, governments, healthcare facilities, clinical educators, the broader community, and learners themselves ([Haines, Isles, Jones, & Jull, 2011](#)). The allocation of costs between stakeholders is largely driven by the education system, and the degree to which education is private or publicly funded. In his editorial, [Walsh \(2015\)](#) highlights an increase in private medical schools, referring to India and Brazil as examples, suggesting that privatisation may improve overall efficiency, although we must be cautious that this does not occur at the expense of the educational mission. Related to privatisation is the issue of student debt, which is widely recognised as an ongoing issue for medical education ([Steinbrook, 2008](#)). The issue of debt has been explored to a lesser extent in the physiotherapy literature, with the most recent estimate of student debt from a Doctor of Physiotherapy degree in the United States put at US\$86,563 ([Shields & Dudley-Javoroski, 2018](#)).

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Designers of physiotherapy education should keep relevant stakeholder groups in mind (the client), as what initially appears to be a cost-saving, may actually be a cost-shifting to another stakeholder ([Maloney et al., 2017](#)). For example, in the evaluation of an interprofessional student clinic, compared to a conventional hospital-based placement, Haines et al. found a cost saving of AU\$115 from the government perspective, but an increase of AU\$289 to the university per student day ([Haines, Kent, & Keating, 2014](#)).

Educators should consider the impact of their decisions on learner time, both in-class and out-of-class. In a study assessing the cost of a repeat physiotherapy clinical placement (after failure), the cost to students was found to be US\$4574 (for a five-week repeat), but would reduce to US\$856 if a one-week repeat structure was utilised – in which the largest contributor to cost was time ([Foo et al., 2017](#)). In addition to time, educational design can influence learner travel and accommodation costs.

## Conclusion

In this editorial we have explored educational design concepts related to the cost of personnel, facilities, equipment, and client inputs. The examples provided are not an exhaustive list, rather, they have been provided to stimulate your interest and thought towards the role of economics in advancing physiotherapy education practices. Understanding principles of cost-conscious design, known as 'economic literacy', is a key skill for educators. Economic literacy not only promotes more efficient and sustainable education systems, but also supports educators in advocating for change through the ability to make economic arguments.

Evidence in this field is currently lacking. There is a need for organised, prospective research, grounded in educational and economic theory, and designed to compare multiple alternatives in terms of both costs and educational effects. Cost is just one element of the decision-making process, and should be considered together with factors such as educational value, equity, and inclusiveness in education.

We, the education community, have long avoided discussions of cost, perhaps in fear of sully the sanctity of the scholastic mission. However, resource limitations are a reality, and we must learn to embrace a dialog about cost – or risk making ill-informed decisions.

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## Peer review reports

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