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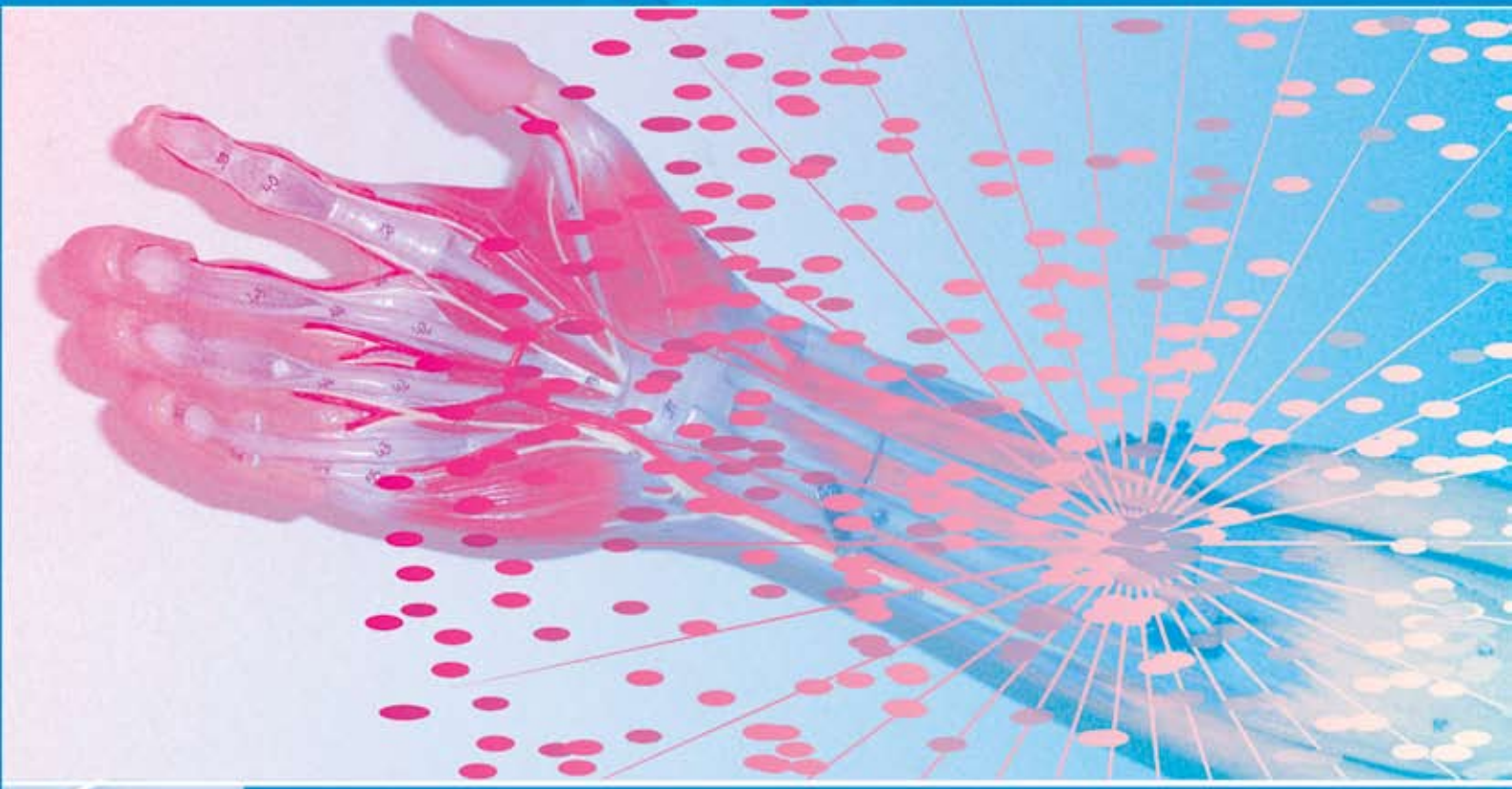

A Peer Reviewed International Journal for the Advancement of Clinical Skills
- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Executive Board

IJOCS
DOCENDO AC DISCENDO

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The International Journal of Clinical Skills looks forward to contributing positively towards the training of all members of the healthcare profession.

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Foreword

Globalisation and Clinical Skills

The International Journal of Clinical Skills (IJOCS) – the new road to new skills? Maybe – but it has certainly opened a platform for the globalisation of clinical skills. The World Health Organisation's (WHO) programme on globalisation targets public health risks, security and outcomes. Driven by the concept of "global public goods" and cross-border health risks, the underpinning issue is to promote health for the poor by way of achieving national health targets. As with the IJOCS, the WHO strategy seeks new technologies in the clinical arena to provide investigative tests – with the WHO being particularly interested in those tests which are suitable for developing countries along with new drugs for endemic diseases. The aims are indeed noble. Investigative and therapeutic technologies create a vacuum for the dissemination, sharing and globalisation of clinical skills, which remain the main asset and commodity which clinicians of poorer nations exercise, promote and share. The IJOCS has released a bolt for health professionals to do just that – share knowledge.

The provisions of the healthcare industry in developed countries by sheer volume and demand, streamlines clinical skills into sub-specialised areas. Clinicians (medical, paramedical and nursing) in these areas gain clinical expertise that are unique to their field and emerge from rich patient-clinician interactions. The clinical skills of dealing with children with disabilities, rehabilitation medicine and terminal care are mere examples that are deficient in the poorer health economies that spend the best part of their human resources to combat diseases of malnutrition and poor sanitation.

The IJOCS provides a global resource centre for sharing and promoting clinical skills between clinicians and health professionals. Senior clinicians, who practiced medicine during the last four decades, will have recognised a gradual and progressive pattern of dependence on technologies with less reliance on clinical skills. The IJOCS provides a platform for sharing and debating the inter-phase and interactions between new technologies and clinical skills. It promotes the development of a new layer of clinical expertise that will emerge from the interpretation, application and/or exclusion of new technologies, for the benefit of clinical care.

I trust that clinicians practicing in poorer health economies will enhance the Journal by sharing their clinical skills and knowledge. Their special expertise of managing clinical needs, within restricted resources, expectedly stimulates the human ingenuity and creativity, leading to the development of clinical skills suitable for each unique circumstance. I, for one, will be actively supporting the IJOCS innovative approach to collaboration of skills. The IJOCS will provide a vehicle for the transmission of these skills across the globe for sharing expertise between different health economies to enrich the overall clinical skills arena.

Hippocrates recognised the professional responsibility of the individual clinician by stating that physicians "must have a wealthy …medical knowledge, clinical skills, medical ethics, interpersonal skills,…". The IJOCS improves the physician's opportunity to enhance his/her clinical skills "by teaching and learning".

Dr Atef R Markos FRCOG FRCP

Using simple learning objects to enhance early skills learning

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Abstract

Clinical skills centres commonly employ a mixture of peer physical examination, live simulated patients, real patients and training models/aids to facilitate clinical skills learning. A wide array of training models are now commercially available, ranging from part-task trainers to high fidelity manikins. However, they are relatively expensive and models to demonstrate or complement a specific skill may not exist. In particular, medium-high fidelity simulators may not be used to their full potential at the basic skills level and the cost-benefit ratio has to be considered. We suggest that there is an alternative solution in some cases: centre staff can create simple cheap learning objects to illustrate some of the context, findings, or application of basic examination skills. Unfortunately, very few of these locally derived learning objects are shared more widely in the literature. One of the reasons for lack of dissemination may be problems in designing meaningful evaluation strategies for these objects. This paper describes the development and deployment of four learning objects introduced into early clinical skills learning within the medical programme at The University of Auckland: (1) percussion tubs to illustrate different percussion notes, (2) hen's eggs for demonstrating transillumination, (3) an intravenous fluid set to illustrate principles of jugular venous pressure, and (4) socks with objects inside to help develop descriptive skills for palpation. Formal evaluation of the objects has not been carried out. However, informal feedback from students was positive. Through using the objects, students were able to gain insights, confidence and understanding. All of the objects offer immediate feedback to the students which they found rewarding. In conclusion, we feel that simple, cheap learning objects can play an important role in early skills learning. Although there are some barriers to formal evaluation, we hope to encourage other centres to share their innovations and evaluation strategies.

Background

Clinical skills centres have developed in a fairly generic fashion [1] and commonly use peer physical examination complemented by live simulators and real patients for learning physical examination skills. Training models and manufactured simulators have also become a core element of the teaching and learning resources used in skills centres. Therefore, in parallel with the evolution of skills centres there has been a ready market for a growing number of commercial training model manufacturers. Part-task trainers, in particular, have become embedded in the staged learning of skills such as female pelvic examination and digital rectal examination. Medium to high fidelity manikins have also been used for basic skills training but may be employed below their potential, e.g. for practising a part-task or listening to heart sounds. Many of the basic skills taught primarily using peer physical examination do not require expensive commercial models. However, most skills teachers will have come across situations where a model or learning object would have complemented some of these core examination skills, but no commercial model exists.

Centre staff can create simple cheap learning objects (LOs) to illustrate some of the context, findings or application of basic skills. This will not be a new idea to most skills centre staff; necessity being the mother of invention. But most of these local solutions remain local, with very few of these learning objects appearing in the literature. Bradley describes a simple eye model for learning the skills of fundoscopy [2] and a neat technique for learning rectal examination using the student's hand as an LO [3]. Both of these papers have been rarely cited, but anecdotal evidence suggests that the techniques are used in a number of skills centres. Taking an example from an advanced skills setting, Matsumoto compared a cheap low-tech local solution for learning uroscopy techniques with a high fidelity commercial training aid and found the in-house LO to be as useful [4]. In all three cases the LOs were evaluated formally and this will have been a major factor in publication. Scour the literature and it is hard to find any other examples. But these examples are probably the tip of the iceberg in terms of creative solutions which are being used day to day in skills centres.

From personal experience, discussions and presentations at conferences and online skills forums can be used for dissemination of LOs but this is ad hoc and limited. One of the reasons for lack of dissemination may be problems in formally evaluating these LOs. Certainly, new educational initiatives should be evaluated and this is a requirement for publication in educational journals. However, in our experience, skills centre LOs are often developed to meet an immediate need, are implemented quickly, have high user value but rarely receive formal evaluation. In some cases the value, or face validity, seems self evident but an approach to evaluation is less clear. Attributing causality to an element of the skills learning process can be difficult to unravel in outcome measures. The outcome measure itself needs to be chosen carefully. In an editorial by Norman [5], he takes an unpopular stance in asking us to reflect on the true validity of some of the research methodology used around high fidelity simulation.

In this paper we describe four locally derived learning objects, discuss their utility in practice and offer some reflections on the way forward in terms of dissemination of ideas and evaluation strategies.

Methods

The following four learning objects were introduced into the first year clinical skills learning sessions within the medical programme at the University of Auckland, New Zealand:

1. Percussion tubs to illustrate different percussion notes
2. Hen's eggs for demonstrating transillumination
3. An intravenous fluid set to illustrate principles of jugular venous pressure
4. Socks with objects inside to help develop descriptive skills for palpation

(1) Percussion Tubs:
Chest percussion was developed in the 18th Century by Leopold Auenbrugger who attributed the discovery to watching his father tapping barrels in order to define the level of fluid inside [6].

In the setting of a 'Respiratory' clinical skills session, we wanted students to learn and practice percussion, and to understand the clinical applications of percussion sounds. To help students appreciate varying degrees of resonance, we drew inspiration from Auenbrugger's original observation by using our own plastic 'barrels'.

We purchased three empty plastic 2 litre paint tubs and filled two of them with materials of different density. The resulting tubs represent three percussion notes:

A. Empty tub: Hyper resonant
B. Polystyrene bean-bag filler: Resonant
C. Rolled oats: Dull

The students read about percussion technique, had illustrative photographs to refer to and had the technique demonstrated. They were then asked to practice percussing by using the examination couch surface and the normal chest (peer examination). Next, students moved to percuss the three tubs which were labelled, 'A', 'B' & 'C'. A key was provided to describe the note that they would expect to appreciate from percussing each tub.

Students were therefore able to gain confidence with their percussion technique and to begin to differentiate different percussion notes. The tubs provided immediate feedback to the students.

Figure 1: Percussion Tubs. Medical students practise their percussion technique and interpretation with the three different percussion tubs.

(2) Hen's Eggs for Transillumination:
Transillumination is sometimes used to distinguish solid form cystic structures, typically in the testicular/scrotal examination but also elsewhere. In the context of a 'Genitourinary' clinical skills session, we wanted to demonstrate transillumination of the scrotum, without using live models or peer examination. This sign is nicely illustrated with a fresh and a boiled hen's eggs plus a pen-torch.

We instruct the students to hold the pen-torch against each egg, touching the shell, so that the light is shining through the egg towards their eyes. In a darkened environment, when the student shines the light, one egg (fresh) will 'glow' (transilluminate) with a central shadow caused by the yolk. The other egg (boiled) will not 'glow'.

We explain that the fresh egg that 'glows' represents what they would find with a hydrocele – the fluid would illuminate and the testis appear as a small shadow. In contrast, the boiled egg that does not 'transilluminate' could represent a tumour or opaque fluid (e.g. blood). We also explain that there is a degree of transillumination in the normal scrotum, with the testis presenting a large opaque shadow.

Using this simple learning object, students were able to see how a simple clinical sign can help determine whether a lump is solid or cystic.

(3) Intravenous (IV) Fluid Set to illustrate Jugular Venous Pressure (JVP):
The concept of the internal jugular vein as a manometer to indicate the pressures on the right side of the heart is useful for students to visualise. We have found that students find it difficult to understand the relationship between the angle (anatomical position related to horizontal) of the patient and the height of the JVP.

The effect of varying patient angle on the position of the top of the venous column can be illustrated with an IV fluid set, food colouring, and a tourniquet. By injecting food colouring into an IV bag, attaching a giving-set, removing the burette, and turning it upside down, we created a 'model' of the heart (fluid bag) and internal jugular vein (tubing) in the neck. By tightening a tourniquet around the bag, we created stable pressure so that the column of coloured fluid partially filled the tubing.

The tutor, or student, holds the bag and tubing at 45 degrees with the bag resting on a surface. A student can be asked to hold a finger against the tubing to represent the clavicle. We can then show how changing the angle of the patient (tubing) changes the position of the JVP (represented by the top of the coloured fluid column) in the neck, even though the pressure remains constant (the vertical height from the centre of the bag to the top of column remains constant).

Students appreciated visualising this, and it made it easier to understand what they originally perceived as a difficult clinical concept.

Figure 2: Intravenous (IV) Fluid Set to illustrate Jugular Venous Pressure (JVP). Inset image shows close-up of the top of the fluid column which equates to the top of the venous column in vivo.

(4) Socks for 'Seeing With Your Fingers':
The context used for this 'learning object' is the Gastrointestinal/Digestive System session although it could be introduced at another stage in the early skills curriculum. At this session we cover basic skills for the palpation of the abdomen (peer examination). To simulate the experience of feeling an object that you cannot see, we use socks containing various objects. We tell students that one of the palpation skills that they need to develop is 'seeing with their fingers'.

To help students to develop this skill and a repertoire of descriptive terms we set up five socks, each containing an item that resembles some of the textures and shapes found in clinical practice. Students are instructed to feel and describe the item to the group and then turn over a card giving a description of the findings in a systematic way (size, shape, surface, consistency, and mobility). They are specifically instructed to seek out objective terms and descriptors.

The socks provide an engaging interactive experience. They encourage students to describe each object in a systematic way and the objects also provide a context for clinical discussion with a tutor. For example, we can discuss what a hard, fixed, irregular

mass could represent as compared with a smooth, cystic mass.

Figure 3: Socks with objects inside to help develop descriptive skills for palpation

The five socks are laid out with their corresponding objects (silastic testicular prosthesis, wooden beads on a cord, heart-shaped 'stress ball', teething chew, volcanic rock) and colour-coded descriptor cards.

Discussion

The main advantage of using simple learning objects is that they can be made 'in-house', they will usually be low cost and they meet a specific need. These objects can be used to illustrate various clinical signs or contexts that would otherwise be difficult to replicate without the use of real patients. Compared with real patients, these objects do not fatigue in the same way, are always available off the shelf (once produced) and pose none of the risks associated with novice learners.

In terms of enhancing early skills learning, informal feedback from students was positive. The students were able to practice and gain confidence. The objects also gave immediate feedback to the students which they found rewarding. For example, with the percussion tubs, they were able to hear straight away how correct technique could differentiate normal from abnormal percussion sounds. These features that enhance learning are reported in the literature. A recent systematic review of medical simulations [7] identified that two of the key features that lead to effective learning were: (a) providing feedback and (b) the opportunity to practice. Of course, learning objects cannot replace experience in the real clinical setting, but they can provide a step in the learning pathway and an adjunct to later learning.

We used a pragmatic approach to build these learning objects and used student feedback to make changes over time. Although this informal feedback loop is useful, to assess the effectiveness of the objects formal evaluation needs to be carried out. But this is not necessarily straightforward. Barriers to formal evaluation include time issues (e.g. desire to implement immediately, ethics application, staff time), setting up a control group (students may cite disadvantage), and choosing a suitable outcome.

Deciding on the context and an appropriate outcome measure can be challenging; e.g., with the percussion tubs, should we measure whether students can recognise the different tonal qualities alone, whether they understand what the different sounds mean, or correctly identify sounds, or whether the learning object helps transfer their understanding to the clinical application, or whether it advances their skill acquisition, or all of these? Or do we simply ask whether the students thought the LO was an effective learning tool. The context in which the evaluation is done is certainly important for the research to be meaningful. We hope to stimulate debate on evaluation strategies.

Conclusion

Simple, cheap learning objects can play an important role in early skills learning. Although there are some barriers to formal evaluation, we hope to encourage other centres to both share their innovations and evaluation strategies. There may be a place for a regular journal column describing locally developed learning objects that have utility in skills teaching.

Acknowledgements

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We would like to thank the students and casual tutors at the CSRC in Auckland who helped us by offering feedback and helping to refine the models. Finally we thank Nick Duggan for his patience in being dragged away from his desk to take photographs at various stages of development. Figure 3 published with the permission of MBChB3 students, Acrane Li and Abhijit Raj Mitra.

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