

Self-Study Courseware Packages to Enable Students Attain Key-learning Outcomes Specific to a Compulsory PRS Module

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There is a world wide trend to review time honoured teaching methods for their relevance to contemporary learning. The traditional lecture format which disseminates didactic knowledge must be in its final death throes. What we envisage is the packaging of knowledge in smaller, shorter, presentation formats that can be controlled by the student. This strategy is exemplified by the Khan Academy, which is gaining in popularity and support. We are looking at this approach to fill a significant gap in the current syllabus for medical students. There is no room in the current curriculum to address this deficiency. Our hope is that taking a pro-active step in new models of teaching will inspire those who design and implement the curriculum to allow traditional ways to fade in order to make way for models more appropriate to our technological environment.

The Medical Curriculum of the Chinese University of Hong Kong does not have a dedicated Integumentary System panel. Such students reaching the final year of the five-year course do not have a focused repository of knowledge on which to base their clinical study of the integumentary system in Health and Disease. In order to enhance the learning experience during the clinical attachments we propose to develop a series of self-study modules that will focus on the basic structure and function of the skin. Before discussing this exercise it is relevant to review the background to the current situation. First we have to look at some very basic terms, beginning with the curriculum and syllabus. How many members of the teaching faculty appreciate the difference? Let us allow the students to explain, and also to explain how they do this.

Two minute presentations

A 'two minute project' has been incorporated into the teaching week. Groups of 17–18 final year medical students are attached to the plastic surgery team for one week in every five weeks. Monday morning is a time to share an introduction to this wonderful and mysterious surgical speciality, plastic surgery, after which the class is divided up into groups of two and each pair is allocated a topic. The assignment is to prepare four slides over the extended lunch break and to present the assigned topic in two minutes in the afternoon. Each presentation is discussed and then the students have the opportunity of a few days to refine the style and content and represent the topics on the Friday afternoon. The final presentations are then posted on the Department of Surgery intranet and labelled 'By students, for students'.

One of the allocated topics was to describe the difference between the syllabus and the curriculum. In Figure 1 the student presentation can be seen. In simple terms, the syllabus is content i.e. what is taught; whilst the curriculum is how the syllabus is taught and the teaching / learning assessed.

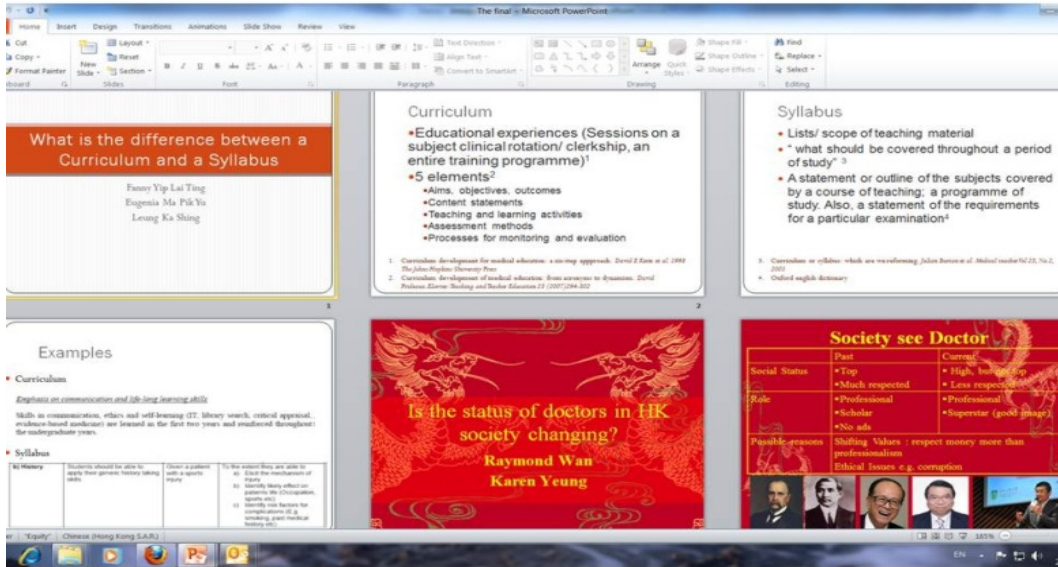


Figure 1

The Integumentary System

When the new curriculum was introduced, the concept of system-based panels was very exciting. Do we all know what a system is? Indeed, do we all appreciate such fundamental concepts as cells, tissues, organs and systems? Our final year students do not!

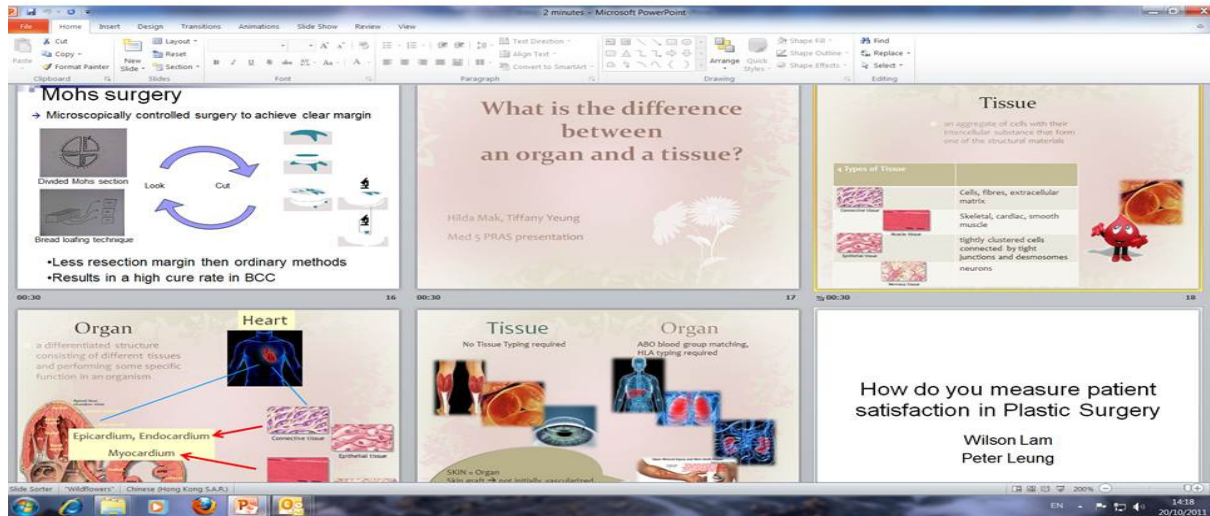


Figure 2

Not until they are directed to find out the difference! (Figure 2) What about the teachers? How many think of the skin as being an organ, with multiple functions? A favourite series of questions to ask our final year medical students goes as follows: In the last four plus years have you heard about liver failure? Yes. Renal failure? Yes. Heart failure? Yes. Respiratory failure? Yes. Adrenal failure? Yes. Skin failure? What? Skin failure? No.

Our final year medical students have never been introduced to the failure of the largest organ in the body: the skin. How many of the teaching faculty can list eight principal functions of the skin? This is basic biology. You can begin to see how this is unfolding. What about the integumentary system? Do our final year students know what it is? Never heard of it. So what is the integumentary system? (See Figure 3)

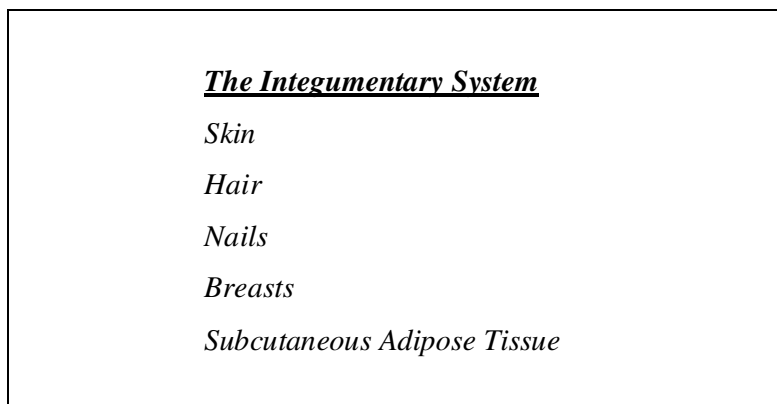


Figure 3

Another relevant aspect in the background of this project is the reality that students learn at different rates and respond to different methods and styles of teaching. In this respect, do take time out to watch the wonderful presentation by Sir Ken Robinson. *RSAAnimates – Changing Education Paradigms* (<http://www.youtube.com/watch?v=zDZFcDGpL4U>). The factory concept of education is thought provoking although the logistics of the timeless, modular concept must be a nightmare.

For some reasons which are difficult to explain, but perhaps relate to tradition and the conservative nature of medical education with a global fear of breaking out of the mould; medical educators just do not see what is right in front of them. People are covered and packaged in yes, you are right, the Integumentary System.

Looking at challenging new initiatives in the Medical School Curricula, the notion of ‘from gene to society’ at John Hopkins is very attractive. Can we do this within the integumentary system?

From Gene to Society

Illustrative topics

Epidermolysis bullosa – a deficiency of the gene which code Type VII collagen as an essential component of the molecular complex which forms the dermo-epidermal junction. A wonderful clinical illustration of genes, proteins, structure and function.

Wound Healing and Scarring –What could be more generic and ubiquitous in medicine affecting every organ and tissue but most visible, accessible and prevalent when involving the skin? Scars? And wound healing? Our generic doctor will see far more diabetic and vascular ulcers in their professional lives than acute abdomens, heart attacks etc.

Transplantation – The most common transplant performed in the world is a skin graft. It is an open window to biological processes and principles.

Immunology – Our understanding of the absolutely fundamental aspects of self and non-self? Yes, allogenic skin transplantation; the study of which is by Tom Gibson, a plastic surgeon and Peter Medewar, a scientist who has been awarded the Nobel Prize in Medicine.

Tissue Engineering – A medical dream, but where is it used in routine clinical practice? The integral a dermal regeneration template is used in plastic surgery for the treatment of burns, scars and other types of post-excisional defect reconstruction.

Stem Cells – Cultured keratinocytes have been used clinically since the late 1970s. While other system panels discuss potential clinical applications of stem cells, we are using them. What an excellent model for teaching the biology of differentiation, plasticity, clonicity and translational biology.

Pathology – Skin tumours. The basal cell carcinoma is the commonest form of cancer in Caucasians. Malignant Melanoma is the cancer with the fastest growing incidence in the world. But there is also a diverse spectrum of malignancy including appendageal tumours, dermato fibro sarcomas, lipo sarcomas and Merkle cell tumours.

Benign skin lesions; degenerative disease; inflammatory disease, infection disease... The list is endless.

Diseases of children including eczema, autoimmune disease, Behcets, diseases of the elderly; the integumentary system has them all.

Trauma – Cuts, bruises, grazes, abrasions and of course burns. Burns, electrical chemicals, radiation, thermal... The diagnosis, management, pathophysiology, acute and rehabilitative treatment cover so many aspects of medicine.

Congenital – Birth marks, vascular malformations, aplasia, ichthyosis... The list is not endless but is certainly extensive.

Ethics – I must add that the fundamental principles of contemporary medical ethics have their origin in the Dax case. Dax was a young man with extensive burns who wanted to die.

Ageing – Nowhere is the process of aging more apparent than in the Integumentary System. Skin wrinkles, fat sags... The implications for health and disease of the ageing process cannot be underestimated.

Cosmetic – Billions of dollars are spent each year in a global context by those who are not happy with their integumentary system. Surely we should look at this in medical school in the same way as we look at, for example, nutrition and preventive medicine.

Pharmacology – The skin is a conduit for drug administration. The skin is the target for a wide spectrum of agents. How do they work?

Psycho social – What an influence the colour and the appearance of the skin has on psychological well being, but also what an influence it also has on societal integration and harmony on the one hand and discrimination and racial discord on the other. What does it mean to be a ‘gweilo’ in Chinese society in terms of health related issues or to have black skin in a largely brown skinned country?

Is the Integumentary System relevant?

A recent study in the UK published in one of the highest impact factor dermatology journals (Figure 4) indicates that 24% of consultations in UK general practice relate to integumentary system disorders. Thus, of course the integumentary system is relevant, especially to our generic doctor.

Skin conditions are the commonest new reason people present to general practitioners in England and Wales

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Summary

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Background Knowledge of the prevalence and incidence of skin conditions is a prerequisite for designing clinical services and providing appropriate training for primary health care professionals. In the U.K. the general practitioner and practice nurse are the first point of medical contact for persons with skin conditions. Objectives We aimed to obtain contemporary data in age-, gender- and diagnosis-specific detail on persons presenting to primary care with skin problems. Comparisons were made with similar data for other major disease groups and with similar data from other recent years.

Methods We used surveillance data collected in the Weekly Returns Service (WRS) of the Royal College of General Practitioners during 2006 and trend data for subsequent years. The WRS sentinel practices monitor all consultations by clinical diagnosis in a representative population of 950 000 in England and Wales.

Results For conditions included in chapter XII of the International Classification of Diseases Ninth Revision (ICD9), 15% of the population consulted; a further 9% presented with skin problems classified elsewhere in the ICD9, making a total of 24%. There was no evidence of increasing or decreasing trend since 2006. Skin infections were the commonest diagnostic group, while 20% of children

Figure 4

We need it. Where to Place it?

The present medical curriculum is very cumbersome and overloaded. To incorporate the integumentary system would be the final straw. In addition we do think we need a complete overall of our curriculum in order to deliver the doctors we need in the 21st century. So, frankly, we do not propose or want the integumentary system being caught up in, or bound down by, an anachronistic curriculum.

The Cloud

We need some latitude here because we are looking into a future that is so rapidly changing. The world is changing so rapidly in such an unpredictable way; technologically, economically, and politically that we think we should be looking at an organic syllabus, which is responsive, changing, adapting, and evolving. We have some brilliant minds in this university. Their talent cannot just be measured by the impact factors of the journals they publish their papers in. It needs to be measured by their thoughts, vision, drive and enthusiasm. Let us use the integumentary system as our trail blazer, or as our experimental module. Let us put it in the 'cloud'.

We can create a mesh; a network of all things related to the integumentary system. We can use multimedia, Android & Apple based media. We can have dynamic and evolving information repositories like Wikipedia but call it 'Medipedia' and when we get to a critical mass, agreed by the majority, we can selectively remove firewalls and link with other world schools. We can involve the students in writing the syllabus. We should encourage blogs. We can experiment with assessments. We will never rest. We will extend our perspectives from

genes to society. We will have a panel which contains ‘magnets’ to draw students into the environment. We will engage in commercially sponsored, incentivised assessments.

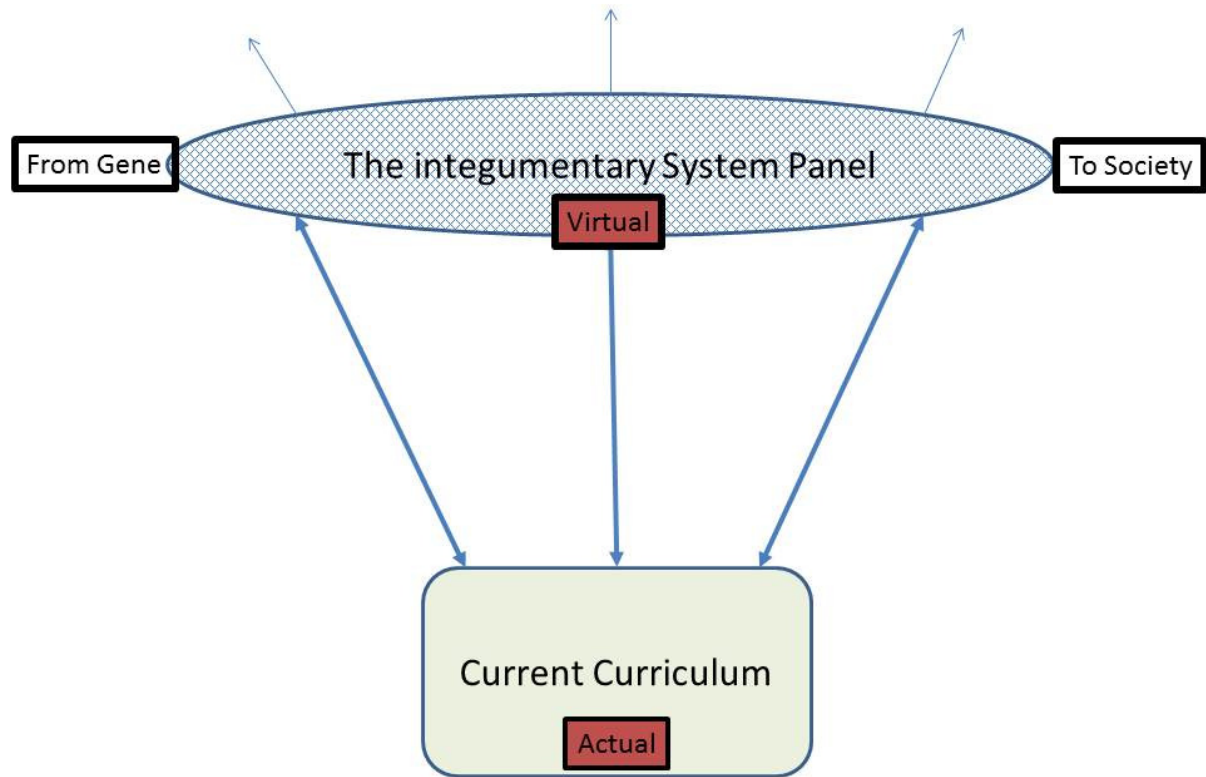


Figure 5

So back to the project and how is it evolving? The first part has been to develop a short film describing three boys from Hong Kong with a devastating genetically determined and inherited skin condition, recessive dystrophic epidermolysis bullosa (RDEB). This film was produced to aid with fund raising to research into treatments for this condition and is aimed at the educated lay person; i.e. a new medical student. By demonstrating the effects of this condition in the life and death of patients with RDEB it is hoped that new students will appreciate the fundamental importance of integumentary systems in health and disease.

The next stage is to produce self-learning modules. These modules will replace didactic lectures given eight times over the course of the final year. The nature of the technology involved is basically simple and is inspired by the teaching approach of the Khan academy. (www.khanacademy.org)

Basically, the teaching material is delivered in short videos that can be accessed by students at any time and watched, rerun, stopped and restarted by all the students. Then, when the students and teachers meet, it will be on the basis of having a common knowledge base on which to build the clinically relevant learning and information exchange.

Initially, six videos are being prepared; each lasting less than 10 minutes. These are entitled:

1. Structure and function of the skin : an overview

2. Epidermis
3. Dermo-epidermal junction
4. Dermis
5. Keratinocytes
6. Fibroblasts

In order to assess the validity of these videos as a teaching tool, we will be undertaking pre- and post-exposure assessments and comparing current students to historical controls. Six videos are just a start and it is envisaged that the eventual video bank will incorporate several thousand items that will do away with didactic lectures or classroom based learning and open up new pathways in Medical Education.