



Physiology Education

Towards Individualized Physiology Lecturing in Africa

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ABSTRACT

Physiology lecturers meet students with variable knowledge. The teachers follow their own habituation and experience to fulfill accepted teaching program goals. Internet allows free of charge survey tools for a formative assessment. With hand-held response devices (clickers) it is possible to start every lecture with sets of multiple choice questions to allow an orientation to students' cognitive skills before a lecture entity. The responses can be collected with hand-held clickers or smart phones in a flexible and fast way using instant and complex calculations which enable even in depth analysis to tailor the lecture for that specific student group. A continuous feedback data collection and analysis including monitoring of learned issues through different courses enables quality assessment of teaching and learning processes. Our Department of Physiology began the development of Interactive Presenter TM software to provide a text format and validated test question bank for all teachers and to allow building of level thresholds in physiology teaching in 1995. The idea was also to provide a library of physiology slides, animations, diagrams and problem illustrations and real life case films in digital form. Digital storage brings them easily available and modifiable to all teachers with the software that works as integration platform for all digital material and feedback data. Open import from validated text format question series and seamless use of any computer program or internet source simultaneously broadens flexibility. An open connection to all free of charge internet sources was also integrated. In student groups there are usually participants who have experience due their former studies and work service to suggest problem cases. Thus a dialog with a large group using ad hoc posed questions serves to discuss opinions and prelearned beliefs, understanding and interpretations. If the digital technology is used as an aid and not as a replacement, new forms of modern constructive lecturing are made possible. Several experiments on new ways to have lecture sessions confirm the positive impact on learning and enhanced participation of the students in the university lecturing of the 21st century. The case banks can naturally be collected and shared in digital format. Using technology in a right way to enable student understanding serves the needs of participating students like the university needs in monitoring and guidance of achieved cognitive levels.

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INTRODUCTION

A few hundred years ago (in 1686) the administration of Finland and Sweden passed a law that people could

marry only, if they were able to read. Thus physiological needs were used to encourage people to learn. Although the organized teaching was minimal, the law had a great impact. The whole population was covered, both men and women. This was probably the first example of the equality of sexes at least in Finland. Many learnt at the same time also to write and most to calculate. This may suggest us that we could modify our lecturing to meet the challenge of the generation Y (students born after 1990) as they have adopted new ways and habits in learning.

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The digital information age started some three-four decades ago also in teaching (e.g. Antila and Hänninen 1971). Practically anybody can copy and paste any source leaving still a deeper cognitive understanding aside. This is to be guided by the older generation. The old Finnish wisdom of the priests can thus be applied in education. The lecturer should be a wise guide and coach during a modern lecture session using social needs and allowing individual feedback by several means.

Academic teaching is based on assumption that students have reached an acceptable level in their high schools and in their former studies. Some medical preclinical students may already have a masters' degree e.g. in biology or have a diploma e.g. in nursing. Thus chemistry, physics, biochemistry and biophysics as well anatomy have been covered. The cognitive basis and skills as well as the interpretation of individual students are variable despite of minimal levels required.

Measuring the actual cognitive level of understanding helps us to improve our guidance of a group and also individual students. If problem solving and constructive learning in pairs or in teams during a lecture is applied a traditional university lecture can be turned into a real learning experience. Measuring the starting point, finding out false interpretations and misunderstandings and monitoring the development in understanding and cognitive problem solving skills serve as tools to

reshape our teaching during a lecture. This also may have an effect on course outcome.

Sharing In Paired And Team Learning Even During A Lecture

Students who have already experience in health care service, perhaps even are already health care professionals remember cases, both serious and funny. Sharing their experiences with the lecture mates, the sessions become unique and help other participants to understand both theory and praxis. These interactions are also the best way to save in memory the important practical matters for their futures in field situations.

Multimedia Libraries Of Physiology And Pathophysiology

There is already a lot of stored digital material in various data banks and those are growing (Pekkarinen and Ripatti 1994). Joint progress is organized also by physiology associations e.g the American Physiological Society. Sharing is available both in knowledge and skills. Good lectures and other learning events can be shared globally as the cloud server technology allows on demand and good quality access throughout the globe in near future.



Fig. 1 Sharing team learning during a lecture discussion in the University of Vienna, Austria where the approaches described here have been used already a number of years in the Medical Faculty.

Health Education

We have been successful in getting “health knowledge” as a new study object in all Finnish schools. It is actually the most favored subject at present. Education starts with the first school year and continues throughout the whole school time. The contents are adjusted to meet the physiological development of the students and their natural interests. Actually the system is based on the same ideas as the demand of learning to read during the early centuries in Finland. Of course some such elements have always been universally included in the school programs especially related to e.g. physical education, but now the learning takes place with growth and thus simply understandable physiology i.e. it is easily linked with the development of body measures and its functions as well as the psycho-social progress of the young.

The idea of using new methods we suggest requires of course a new approach and modification of teacher education. Teachers in medical faculties in Finland have been willing to adopt new approaches as that helps in their work. Easiest the new program has been to introduce to the curricula of physical educators and biologists.



Fig 2

Maria Theresia, Austrian Empress, also the Queen of Hungary, had activities two and half centuries ago in Africa, too. Therefore Hungarian is still spoken by some native Sudanese. Maria Theresia was popular in Sudan, and her silver coins still circulate there as treasures. Therefore we use them as indicators European and African collaboration across the borders and ages.

DISCUSSION

By networking we can help the everyday work of physiology teachers and all other medical educators. The electronic means allow us store and use huge amounts of digital material. The exchange and sharing of the learning materials is easy. The networking of lecturers and exchange of experience is easy across the borders with the aid of internet. There are material banks which store more and more illustrative medical cases and techniques. Thus we can promote globally our professions’ knowledge and learn new skills to improve the learning of our students. Let us help not only ourselves but also our colleagues in countries which at present have fewer resources in their universities. (e.g. Juvonen et al., 2004) Technology makes information and guidance in individual interpretation possible for the benefit of both healthy and diseased citizens.

The 1686 old law and the rulers who prepared it had a good understanding how people are motivated to learn – not only to read, but also to write and calculate. They applied the wisdom of nature - physiology - that moves us all. The present health knowledge learning law uses the same wisdom. Therefore it is easy understand that this subject is most popular among the study subjects in Finnish schools, which is now appreciated in international PISA evaluations from successive years.

Understanding the modern young generation in the digital environment is achieved by learning together, allowing them to teach us the ways to use technology and still maintaining the role of a guide, coach and interpreter to help them to achieve further levels in science than we ever did. Social media, Twitter, emails, IRC-chats and smart cell phones as well as cloud server storage are our present reality, but the human physiology and psychosocial needs remain as they have been 300.000 years or more.

Let us teach each other, share the materials and learn the use of modern tools together and with our students to spread our knowledge and experience. Of course we need still good text books (e.g. Silverthorn 2013), but now the on-line computerized systems provide quantitative means for teachers to adjust their education to meet the needs of their students and every teaching session will be unique. We can also quantify our success (as also failures). We are again stepping towards better sharing of our efforts, and at the same time we will have more time to train the manual and social skills needed in clinical work. The lowering costs of electronic information makes it easy to transfer of learning materials between Universities will help us all to teach better and interact also in educational research.

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