Rev Cubana Educ Med Super 2000;14(1):63-73

AUTORES INVITADOS

University of New South Wales
Australia

TEACHING OR LEARNING?

Dr. Ken R. Cox[1]

SUMMARY

Starting a new graduate program for teachers of health professionals forced us to rethink our ideas on education. Our goal was that these teachers would help undergraduates to learn effectively. To help out trainee teachers to do this, we required them to retrace their own patterns of learning from school through to clinical practice. Discussion of learning opened up the whole field of good and bad learning experiences as a result of good and bad teaching. From analysing that teaching, they began to choose how to set out their own teaching program . They also examined their own learning within the processes we used in our teacher training program, and critiqued their effectiveness for them as adult learners.

Subject headings: LEARNING; TEACHING; EDUCATION, GRADUATE.

I appreciate the honour of writing a paper for the first number of this journal with a new editorial board to which I wish all the greatest success in this important venture in medical education, as well as to the students at the Master of Medical Education held at Havana.

I chose the title because I was slow to understand what 'education' really meant (literally, leading out or drawing out the student). For a long time, I had concentrated on what I was to say to my medical students, and how I would say it. I knew what they needed to know about diseases and treatments, so I told them. But telling them

[1] OAM, MD (Hon), MB, MS, MA, FRCS, FRACS, FACS. Emeritus Professor of Surgery; Formerly, Founding Head School of Medical Education, and Director, World Health Organization Regional Centre for Health Development.

didn't mean that they knew it. And even if they remembered what I'd said, that didn't ensure that they could do it themselves.

I focused on sharpening my teaching. I polished my style of presentation and my slides. I made lists and summaries. The students were grateful for the help these gave them in preparing for the examinations. But what I had achieved was some improvement in their examination performance, but not in their clinical performance! I was trying harder and harder, but my method of didactic teaching wasn't really effective in achieving student 'learning for doing'.

In 1973 the World Health Organization set up a WHO Regional Teacher Training Centre (for the Western Pacific Region) in our Faculty of Medicine Centre for Medical Education, Research and Development. I was asked to take charge of those Centres in 1975, and launched our Master of Health Personnel Education degree program in the second semester of that year.

We were now 'teaching teachers to teach'. We and our graduate students had come from medical and nursing schools where the principal teaching method was lecturing. That was the model we knew and understood. But our personal experiences of being lectured were often unsatisfactory; and research on teaching showed that only about 25 % was remembered a month later! Lecturing was efficient for teachers in sending large amounts of information out, but inefficient for students in taking that information in!

Our Centre's goal was that our graduate students would become more effective teachers of doctors, nurses, physiotherapists, dentists, and so on. But how were they to reach that goal? By teaching better? Or by helping students learn better? That seems a simple question. The answers were not so simple, however.

To work through the issues that question raised, we split our trainee teachers into groups to debate the following propositions about education.

Traditional Education

1. The subject matter of medical education consists of bodies of biomedical (or and skills, worked out up to the present biopsychosocial) knowledge.
2. The chief business of the medical school is to transmit the knowledge and skills to the new generation.
3. Teachers are the agents through which knowledge and skills are communicated.

Contemporary Education

1. The subject matter of medical education consists of the problems of illness and disease in the community and of the doctor's tasks in dealing with these problems.
2. The chief business of the medical school is to help students work out how to solve these clinical problems.
3. Teachers are the agents who manage the content and sequence of the students' learning.

4. Students must, on the whole, be obedient and receptive.
5. Learning means acquiring what is in textbooks and in the minds of the teachers.
6. Existing knowledge is the end of medical school education. Examinations certify the student's grasp of existing knowledge and skills.

4. Students must, on the whole, be questioning and exploring.
5. Learning means ability to use knowledge and skills in the real world.
6. Existing knowledge is a means, not an end. Examinations certify the student's competence in using existing knowledge and skills in working out clinical problems and deciding what to do.

Those propositions polarised the debate around the different purposes of education for knowledge, and education for practice.

1. The first proposition dealt with selection of subject matter. Are we to teach sets of scientifically verifiable, propositional knowledge derived from careful studies of many instances and experiments, and summarised in textbooks? Do we assume that students cannot solve clinical problems until these facts and principles have been learned first? Yes, if practice is seen as the application of generalizable theory to particular cases. The learning of basic sciences therefore must precede attempts at their application. The teachers developing that scientific theory are the ones who should select the subject matter. The subject matter selected for continuing education similarly comprises newly found scientific evidence that increases the understanding of disease, and hopefully can be applied to practice.

Or, should the illnesses seen within clinical practice have priority in controlling the subject matter? If the medical job is to manage the problems patients present with, and to reduce the burden of illness oppressing society, then those problems identify what doctors and nurses must learn to manage. The knowledge needed for that job is what can explain the diseases causing the illnesses, and the treatments that could alleviate them. If so, learning begins with the clinical problems, and works backwards from the problems to explore which aspects of science can help explain the diseases and guide practice? And also guides strategies for tasks like prevention, health promotion and terminal illness care.

The practical question for choosing the subject matter for the clinical curriculum asks What scientific knowledge must be learned before engaging those problems? and How much science can be learned as explanatory knowledge within the process of working those problems out?

2. The second proposition dealt with the sequence and presentation of subject matter. Teachers are experts in their field. Their breadth of reading, research and practice

enables them to select the essentials, and to present a logical and coherent picture of diseases that makes sense to the naive student. Teacher education spends much time on the design of curricula that work sequentially and steadily through this subject matter, which in medicine usually covers two or three years.

Or are such curricula too inefficient because students forget what they were told, if the knowledge is not applied soon in real life? And also ineffective, because teaching about diseases and treatments is not automatically converted into the practical 'working knowledge' used by doctors in working out what's wrong and what to do about it?[1] Can the scientific knowledge taught for practice be limited to what is useful in managing clinical problems?[2]

Does struggling to explain clinical problems (in groups guided by teachers) help students learn how to access usable science more effectively now and in the future, compared with learning science as coherent, propositional knowledge before using it? That is, will basic science be used more by students after graduation if they have discovered how to use it in explaining practical problems, than if they were required to remember the science for its own sake?

3. The third proposition dealt with the tasks of the teacher. The large size of the knowledge base and its exponential growth require teachers to select what knowledge is transmitted to students, and at what pace. Only someone who has already grasped the facts and principles can choose an optimal path for the student for whom this large amount of subject matter is an uncharted sea in which they may drown.

> To study the phenomena of disease without books is to sail an uncharted sea.
> To study books without patients is not to go to sea at all.
>
> W. Osler

Or should the teacher guide students' thinking through a series of clinical experiences, intellectual and practical?[3] Is the teacher best used for planning, organizing and evaluating the progress of the students' learning from the realities of illness and disease, rather than lecturing and examining around sets of facts, concepts and principles? Which takes precedence, the knowledge or the experiences? Knowing or doing?

4. The fourth proposition turned on teacher-student relationships. Time is short. Subject matter is huge. Students can become confused as they try to get their heads around these subjects for the first time. Teachers are there to ensure the basics are taught, even if that requires some simplification here and there. It's up to the students to get on with their study and learn this material.

Or is such a teacher thereby providing answers to questions the students have never asked? Do we learn more thoroughly, and remember longer, when we confront a problem to work out, when we try to think it through more deeply, when we discuss the areas we don't understand, when we question what doesn't seem to fit? What are we able to discover for ourselves, and what must we be told? At what age or stage?

5. The fifth proposition asked what is the student's task in understanding the subject matter. Students are often berated for their short-term goals of optimizing their scores in examinations. But what determines the students' motivations? Students vary in whether they choose 'surface', 'strategic' and 'deep' learning. But teachers, examinations and local expectations also determine how superficially or deeply students learn the subject matter! Teachers cannot escape responsibility for influencing student study patterns through their personal style and dependence on coercive examinations.

6. The sixth proposition considered the end-point of education in terms of what is to be certified as sufficient grasp of the subject matter.[4] Which again asks the question of what the subject matter is, or what the subject matter is for. Is the student's task knowing or doing?

In summary, the questions teachers must think through are:

What is the educational message? How is the message presented? How is its transmission organized? How is the message received? What is the purpose of the education? and Where does the responsibility of the teaching institution end?

We have not answered the questions raised by this polarisation of propositions about 'traditional' *versus* 'contemporary' education. Attempts to answer these questions fill libraries and educational research conferences. Restricting of this discussion to clinical education strongly biases the responses towards 'learning for doing'; but doesn't eliminate controversy on what and how to teach.

But too often educational argument is about which approach is better (and I have deliberately posed it that way here as an educational tool to sharpen the debate). Instead of *either/or* conclusions, I prefer *both/and* discussion that acknowledges many different strengths and weaknesses within each approach.[5] Educational choices should be more specifically about what is likely to be more effective for learning this capability by these students at this stage.

That approach is catholic in accepting that 'all of the above' are true 'some of the time', and eclectic in choosing what/which/where/when/how in this instance. What teachers need is educational judgment, not a chase after some spurious educational 'truth'.

How did you learn?

We realised that for our teacher training program we had to re-think our whole approach to education, if we were to help medical educators to concentrate on student learning, rather than their own didactic teaching. We took advantage of two obvious circumstances. All of our trainees had been students themselves once; and all of them were now students again with us! We made them their own 'unit of study'.

We required each to explore their personal pattern of study and their learning as a student, on the assumption that the more you understand about student learning, the better you'll be able to design your teaching. The first task was to recall their time in secondary school, starting with a mental picture of their classroom, desk, and place in the room. Then to add a teacher they remembered, then the atmosphere of the classroom, even the smells. More memories were built up until each had their own clearer picture of their school activities, and their study habits at school and at home.

We asked Did you make conscious choices of how to study? Or was your study a response to school work imposed on you by teachers? Did you study in order to understand, or only for examinations?

We moved on to their first year in medical school. Where did you study? What different study methods did you use? How much time, proportionally, was spent on each of the study methods you used as an undergraduate? Which worked best for your learning as a student? Which worked best for passing examinations?

The questions (as group discussions, and as private recording of memories) explored what contributed to effective learning for each of them as students. Their experience began their documentation of what students really do. Their own undergraduate experience provided them with a remembered picture of themselves as students, and of some of the circumstances within which their current undergraduates learn.

Some systematically planned their program of study. Some learning was solely in response to the intermittent external demands of tests and examinations. Some felt freer in their approach and more in control when they were a university undergraduate. Others felt that the lack of strong direction, guidance and sequential planning from university teachers, compared with their high school teachers, made study haphazard, unpredictable and more difficult. School study patterns persisted for most, but some worked out new methods.

The questions were exploring how much learning derived from factors *within you*, and how much from factors *outside you* (and over which they felt you had little or no control). What worked for each constructs their personal '*implicit theories of learning*' which they assume will work with their students. The group discussions, however, showed how each might differ in their methods from their colleagues, and in how they were shaped by their experiences and by their personality. What is true for one may not be true for others, or for their students.

How did you learn clinically?

We moved on a few years to cover their clinical learning. This shifted the focus from study in general (principally through reading and writing words) to what went on when each became a clinical student dealing with people and illness. As with their school memories, we had them imagine the wards and the patients, to shut their eyes and picture the beds, the uniforms, the hospital smells, the noise, the busyness. Many had anecdotes of those first days to record, and possibly share. We asked *What 'sticks in your mind'? Why have those memories remained and not others?* They noted down their anecdotes to share later with their students; anecdotes can carry messages at many levels of understanding.

What we remember is what we have 'learned', much of which may be termed 'incidental learning' to separate it from more deliberate, formal learning, usually of written material. Much of clinical learning is sensory or 'perceptual' when we take in sight, sound, touch and smell sensations.[6] Describing clinical learning may not be easy, however. Clinical learning can't be as neatly packaged for study as science can be in books. We had them make notes of episodes of both formal and informal learning of the cases they came across, especially *Which were the most frequent? Which were the most powerful?*

What was easy to learn? What was difficult?

We had them think about which things they found easy to comprehend. Do you remember how you learned that? What helped make it easy to learn? Did it turn on particular details? Or did that reveal a general educational principle? Or a particular teacher?

Did you find some things difficult to understand? I still don't understand hydronephrosis. Are there 'holes' or 'blanks' in your clinical capabilities? Do you avoid some clinical tasks or maladies because your confidence in handling them is low? What made them difficult? Was the difficulty in the subject matter, or in its teaching, or your distaste for that area, or how you went about studying it?

These are serious questions. Many clinicians have never learned aspects of medicine that were difficult to grasp as a student. Studies on postgraduate learning show that we go to things that we already feel confident in, and continue to avoid the fields in which we're weak. We asked Can you trace your gaps back to what happened, or didn't happen, to you as a student?

Have you experienced something difficult suddenly becoming easy to understand? Teaching can be seen as 'switching on lights' in the students' minds. How does that happen? Did that come from your study? Or from clear explanation by a teacher? Or through discussion with others? Or by your making the insight yourself?

Some students prefer learning from their reading and self study, some from audiovisual materials, some from listening to lectures and summarising what was said. Some like tutorial discussions with concepts being clarified and expanded and

many notions being aired. Some learn from seeing 'the real thing' and from the 'hands on' experience of interacting with patients.[7] Bringing out their individual differences opened up for them the field of 'learning preferences' among their students, and the necessity to provide many formats of teaching, if they were to help all their students.

How did you learn as an intern?

We continued the same pattern of reflection on starting work as an intern, the ward they were assigned to, the nurse in charge of the ward, the blur of taking over the patients, the pride in being called 'Doctor' by everybody, and the ignominy of not knowing how to do some simple administrative tasks.

We asked What was important to you then? What did you want to learn? What did you have to learn? To whom did you turn for help?

The transition from student to doctor is fairly dramatic for most. The holiday period after final examinations and graduation comes to an abrupt halt when work begins as an intern. Those who got through more on 'bashing the books' than 'treading the wards' are confronted by a bewildering variety of unfamiliar organizational tasks.

Their book reading about diseases and treatments had not prepared them for everyday questions, such as "Should I put a catheter in?" or "What fluid should go into this drip?" Textbooks laid out for exposition and explanation fail to address the simple actions to be taken, and how to choose what to do. Effectively, the textbooks offer little to interns. And interns have little stomach for returning to textbooks so soon after having survived them and the examinations. With the familiar resource of textbooks failing to provide guidance, interns often suffer a serious gap in confidence. The gap was in not only not knowing exactly what to do, but also a fear of failure if they made a mistake. Beneath that fear is concern for patient safety, which had been a powerful over-riding value through all their clinical training.

Interns are usually consulted on the sorts of sessions they would like. In many systems, 'study time' of up to four hours a week is allocated to them as part of their award conditions of service. Despite the apparent need to learn many aspects of clinical work, interns frequently don't turn up to teaching sessions arranged on their behalf. Clinical teachers are often frustrated by this apparent lack of interest. The non-attendance is particularly galling to clinicians who have given up lucrative time from their practice for preparation and delivery of these teaching sessions.

We asked them to explain this paradox. Think back to whatever factors affected whether you attended teaching sessions during the early months of your internship. Note them down.

Human motivation is always complex. Few of us attempt to consider the multiple factors that determine what another person will do. We often label others as 'irrational' if their motivations differ from ours. Many factors were brought out around responsibility, rewards and punishments, preoccupation with other work, interest in

the subject matter, and wanting to get on with a normal life, especially among those just married.

The principal internal motivation among interns for learning was to be able to do the job, the personal need for effective and acceptable performance. This drive for 'self efficacy',[8] the confidence in one's ability, sustains motivation through internship and vocational training, and for many throughout their life. Self confidence and self-efficacy can help build self-esteem; but attempts to bolster self esteem without real achievements in capabilities and skills are spurious and will founder. Self-efficacy is task specific; that is, capability in one procedure does not guarantee capability in any other.

Some teachers worry that 'learning for doing' may be shallow 'training', rather than thoughtful education. But you can't 'do' unless you 'know' first. Doing subsumes knowing, just as clinical working knowledge subsumes the sciences on which it is based. Practice is far more complex and difficult than the underlying science.[9]

How did you learn as a trainee apprentice?

After the intern year, trainees usually focused on specialty training. The attachment to a 'expert as teacher' ideally enables skilled performance to be observed, adaptation of the performance to different contingencies that emerge within the case, and judgment to be displayed when trade-offs are difficult to resolve. Skills are learned by the trainee through the expert's 'coaching' within supervised practice with feedback on points needing improvement. Responsibility is progressively increased as the trainee becomes more proficient, until the trainee is allowed to function independently, calling on the expert teacher only when difficulties arise.

The apprentice-expert relationship provides 'scaffolding' of the trainee's efforts, discussing patients and practice, thereby transferring 'working knowledge'. The relationship may include mentoring with advice and support in career development.[10] The close relationship also includes surveillance of professional behaviour,[11] with close socialisation into professional standards.

Unfortunately, not all apprenticeships in vocational training offer such a rich one-to-one relationship. We asked *How much do you remember as a positive experience of deliberate support by superiors? How much of your learning took place within such close guidance?* Most had received little support, which may explain their own readiness (or lack of it) to engage in such supportive activities with their trainees.

How can teachers help trainees and students to learn?

Having explored their personal learning, we all began to look at some principles of learning from educational research. We examined the practicalities of how each principle could be translated into teaching practice for them. The following are some principles of learning agreed upon by our trainees.

1. We learn and remember more when we are actively engaged, physically and/or emotionally in what's going on, when we are 'switched on'.
2. We need to be 'ready' to learn. Partly this comes from wanting to learn (motivation) and partly being 'up to that stage' (preparation) so that new ideas fit into what we already know and can do, and partly that we know what we're doing and can handle it (confidence). Readiness is encouraged by realistic goals, manageable learning steps, and reassurance about progress in learning.
3. We learn more broadly when ideas from previous learning (anatomy, pathology, sociology, an illness in the family) are linked (integrated) with what we are facing now. Everything connects with everything else. The expert teacher can weave that web of connections and meanings. Extracting the lessons from each case (examined experience) and explanations from basic sciences and previous cases, integrate our understanding of how we could use the ideas next time (forward transfer).
4. If students cannot fit what they are hearing with what they already know, they are forced to memorise it by rote. Isolated ideas are poorly remembered; but those that fit a useful principle come to mind more readily when the principle is called upon. We learn when what we read or hear or see (experience) is translated as soon as practicable into what we do. We learn from experience when we think over what we have just seen and done (reflection), especially if we can turn reflection into working knowledge and practice guidelines.
5. We consolidate our learning with practice (repetition) and reviewing the ideas involved through parallel examples (reinforcement) from similar cases.
6. We enjoy learning more when we can undertake in our own way (learning style) and at our own pace (rate of learning, control). This way our confidence (self-esteem) is not shaken, and we are secure enough to admit our ignorance to a teacher who accepts us for what we are.
7. We learn better when the climate is challenging, but not threatening, supportive but not permissive, intellectually rich but not intimidating, and happy but not happy-go-lucky.

These educational principles of learning needed to be developed into teaching activities. But exactly which methods are used in any teaching session depends on what is to be learned, what methods the teacher is skilled in and comfortable with, how ready the students are and what their learning preferences are, and what the curriculum and examinations demand. That is, choices of how to help students learn are always local and specific. I must leave all that detail to those running your Master of Medical Education program in Havana. Good luck!

RESUMEN

El comienzo de un nuevo programa de postgrado para educadores de profesionales de la salud nos forzó a repensar en nuestras ideas sobre la educación. Nuestro propósito era que estos profesores pudieran ayudar a sus estudiantes e pregrado a aprender con efectividad. Para contribuir a que nuestros cursantes realizarán ésto, requeríamos que ellos analizaran sus patrones de enseñanza - aprendizaje desde la escuela a la práctica clínica. La discusión de estos aspectos abrió todo un campo en torno a las experiencias de aprendizaje buenas y malas, comenzaron a escoger cómo organizar su programa de enseñanza. También analizaron su propio aprendizaje dentro de los procesos que nosotros empleamos en nuestro programa de posgrado y criticaron su efectividad para ellos como adultos que están aprendiendo.

Descriptores DeCS: APRENDIZAJE; ENSEÑANZA; EDUCACION DE POSGRADO.

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Recibido: 3 de enero del 2000. Aprobado: 15 de febrero del 2000.
Ken R. Cox. University of New South Wales. Sidney, 2052, Australia. E-mail: Ken. Cox@unsw.cdu.au.