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INNOVATIVE STRATEGIES IN TEACHING OF BIOMEDICAL SCIENCES TO HEALTH PROFESSIONALS

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Being The Text Of The Lecture Given By Dean, School Of Health Sciences, Kampala International University, Uganda At The Occasion Of The 25th Annual Scientific Conference And Silver Jubilee Celebrations Of The Physiological Society Of Nigeria Held At The University Of Port Harcourt, Nigeria

Knowledge and skills in biomedical sciences have reached a level, which is difficult to pass on to students in the traditional one to two years by traditional lecture methods and are still expanding. Recently, innovative methods of enabling the students to acquire the knowledge and skills have been evolved, and include student-centered and problem-based learning strategies, among others. These are strategies in which the student is taught how to learn for him/her self and then becomes responsible for his/her own learning with a certain minimum amount of guidance from the teachers. Other advantages of using these strategies of learning and teaching include development of competencies in continuous self and peer evaluation, self-directed learning leading to continuing medical education for life, team work, professionalism and professional ethics. These strategies also increase the chances of attitudinal molding, enhancing good personal characteristics while discouraging bad ones. Communication skills are greatly enhanced.

Introduction

Training of health professionals started with simply teaching the students the art i.e. the practice of the profession. This was during the era when the science related to the practice was hardly known. As the science was discovered, it was introduced in the training. The training period, however, remained the same. That meant that the time for learning the art (apprenticeship) became shorter. Eventually, graduates came out of the schools without the necessary competencies to enable them to practice the art in a way that was safe for the patient. Thus about half a century ago, a probational period nicknamed "internship" was introduced for the purpose of skills training to improve the competencies of the graduates to an acceptable level before allowing them to practice the profession independently.

Various schools have been playing around with the total period varying the percentage of time allocated to the sciences. Usually this has been about 40% of the total time. This period of two years in the five-year medical programme has now proved to be insufficient because of the science knowledge and skills explosion. The situation can only get worse.

To compound this, the methodology of making the students learn the sciences has been and in most places still is by a series of lectures. As the science base has become wider and deeper, the lecture time requirement has increased. The extra time cannot be found without lengthening the duration of the programmes. For many reasons, increasing the duration of the programmes is not the appropriate answer.

Therefore, it has become necessary to introduce strategies, which will enable the students to learn the science, each person at his/her own pace, continuously and indefinitely. The backbone of such methods is to teach the students how to learn by themselves. "The SPICES Model" of education described by Harden R.M et al (1984) contains some of such strategies.

Methods

The word "innovative" implies change or introduction of new ideas. The methods of teaching and learning described here are not really new. What is new, however, is that they have generally not been used in teaching biomedical sciences. The strategy to be

discussed here is that of student-centered problem-based learning, which is part of the SPICES Model.

The concept of Student-Centered Learning (SCL) focuses on the realization of the fact that in the school of health sciences the most important thing is that the student must learn. All other things must be done to facilitate this process of learning. Thus, facilities must be created to enable the student learn. The student is placed at the centre of this sphere of facilities so that he/she can utilize any of them at any time and carry out his/her learning.

The facilities are numerous and include infrastructure, skills laboratory and other laboratories, libraries and other book collections, which may be in hard or soft formats, computers, Internet facilities and so many others. Above all, however, facilitators, normally called teachers, must be available.

The roles of these facilitators are to ensure that the appropriate facilities are available for the student use, and to guide the student during the learning process. Such guidance may take the form of overview lectures discussing the scope and depth of learning required. It also takes the form of educating the student about the appropriate use of the various facilities during the learning process.

The other major role of the facilitator is to provide continuous assessment of the formative type and, at specified intervals, of the summative type to show that appropriate learning is taking place. Otherwise, the learner is responsible for ensuring that his/her learning takes place most of the time.

The concept of Problem-Based Learning (PBL) implies that learning shall be stimulated by use of tutorial problems. A tutorial problem may be simply an objective, a statement of fact, an idea, a description of a human experience, a description of a patient's illness, and a description of some phenomenon, occurrence or event, a situation which may be clinical, theoretical, research based or real life.

The essence of PBL is that a TP, when analyzed, gives rise to a series of questions. To some of these questions the learner can provide answers on the basis of his/her previously acquired knowledge (prior knowledge). To answer the rest of the questions, the learner must actively search for information; this is what leads to the process of learning. This learning process takes place in the background of the prior knowledge, and is therefore a build-on process.

Results

When the two strategies of Student-Centered and Problem-Based Learning are applied together, a number of results are achieved, including the following:

Stimulation of epistemic curiosity (intrinsic interest) by relevant TPS by activation of Prior knowledge. TPS provide chances for contextual learning. This allows for easier retrieval and application of the knowledge acquired. This is so because the information is acquired in a structural format. This information is also acquired already integrated and not stratified as anatomy, physiology, biochemistry e.t.c.

Student participation i.e. active learning is enhanced and the knowledge so acquired is retained for a longer time. Teamwork is enhanced because learners work in small groups. This also leads to improvement of communication skills. Self-directed learning skills are developed, leading to life-long self-learning. Problem-solving skills are also developed.

Discussion

A number of issues have been raised regarding Student-Centered/Problem-Based (SCPB) Learning strategies by institutions wanting to adopt strategies. The main issues will be discussed here. The first issue has been whether SCPB as a learning strategy actually works (Vernon and Blake 1993). Institutions, which have used this strategy properly, have found that it works. The operative word here is "properly". This implies that students must work in small groups of five (5) to seven (7) in which the chairperson of the group can make every member of the group contribute during the tutorial process.

Each group must use the tutorial process properly, as outlined by the institution, i.e. follow every step without looking for shortcuts. This will ensure that problem-solving skills are developed, including proper sourcing for information i.e. proper utilization of the Self-directed Learning (SDL) time and getting used to learning the active way and for oneself. Properly written tutorial problems must be used as the stimuli for learning and must not be repeatedly used, except after a number of years of being kept in the bank.

Another issue has been staff requirement. An institution that has the correct

staff-to-students ratio has enough staff for the SCPB. Moreover, in this system, the distribution of the staff in each discipline is not as crucial as in the traditional system because junior staff (Assistant Lecturer levels) can effectively oversee the tutorial process. Nevertheless, Senior Staff are required for guidance purposes through overview lecturers and other processes.

Issues regarding the cost of implementing SCPB have also been raised. This strategy requires a good library, an internet facility for students, a learning resource center and other facilities that are not really so different from those traditional institution should have been when it is using the "I know it all and can give it to you" type of teaching system.

The argument that this system is significantly more expensive to implement than the traditional lecture system (TLS) is usually based on a failure to examine the real requirements for the two systems. Moreover, considering the benefits of using the SCPB strategy to the graduate over and above those of using TLS, this strategy become more cost effective than the TLS.

The advantages include encouraging active learning by activation of prior knowledge H.G Schmidt (1993) stimulating epistemic curiosity and providing a chance for elaboration of the subject matter and thus encouraging knowledge consolidation during tutorial discussions; providing a chance for contextual integrated learning and allowing knowledge to be stored in a structural format which is easier to retrieve and utilize; development of self-directed learning competencies leading to life-long self learning; improvement of communication skills through continuous groups discussions. (Mennin & Major, 2002; Nshaho 2004).

During the Silver Jubilee celebrations, the members of the Physiological Society of Nigeria and indeed all Biomedical Scientists need to rethink our educational strategies with a view to introducing those that will enable us to empower our students to acquire an ever increasing load of sciences at their own pace and over a prolonged period even beyond their studentship period. One such strategy to be considered is the SCPB Learning one.

Summary

The scientific load to be passed on to undergraduate students in health professional programmes is increasing all the time. It has reached a level where it can no longer be passed on effectively by the traditional lecture system. It is argued that time has come when strategies which can enable the student cope with such a heavy load should be introduced. A case has been made for introducing the SCPB strategy because of its so many other advantages it brings to the graduate trained using the strategy.

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