The Future of Medical Education in Nigeria

E Oluwabunmi Olapade-Olaopa,1 Bosede B Afolabi,2 Olabode A Falase3
1Senior Lecturer, Department of Surgery, College of Medicine, University of Ibadan
2Lecturer, Department of Obstetrics and Gynaecology, College of Medicine, University of Lagos
3Research Fellow in Cardiothoracic Surgery, Aberdeen Royal Infirmary, Aberdeen, Scotland, United Kingdom
Correspondence:
Mr E. Oluwabunmi Olapade-Olaopa
Department of Surgery, College of Medicine, University College Hospital, University of Ibadan, PMB 5116, Ibadan, Nigeria
e-mail: okeoffa@yahoo.com

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ABSTRACT
Societies continue to change and medical education has to adjust regularly in response to these changes in order to remain relevant. In addition, the scientific bases of medicine are universal and there is a high degree of uniformity in medical schools worldwide. As such, common international standards can and have been defined for basic medical education. This considered, doctors are now expected to acquire competencies that would meet the current needs of their society while ensuring that global standards of medical education are maintained during their training. In summary, current and future medical practice requires graduates with excellent clinical, research, computer and entrepreneurial skills, and who possess a problem-solving and a life-long learning attitude. This article focuses on the aspects of medical education considered to be central to the production of doctors with these skills. These are curriculum review, web-based learning, healthcare informatics and the involvement of stakeholders.

INTRODUCTION
As societies continue to change, medical education has to adjust regularly in response to these changes in order to remain relevant. The Nigerian society and its medical schools are no exception, and the future of medical education in the country is dependent on the development of curricula that take the changes in the society into consideration. Medical schools are now expected to offer ‘socially responsive’ medical education.1 By this, it is expected that medical school curricula should be directed at producing graduates that would have a positive impact on the public and population health of their host environment, and thus should be guided by the same whilst ensuring that global standards of medical education are maintained. This considered, doctors are now expected to acquire competencies that would meet the current needs of their society during their training.2 Furthermore, the scientific bases of medicine are universal and there is a high degree of equivalence in medical schools worldwide. As such, common international standards can and have been defined for basic medical education.3 The future of medical education in Nigeria is
therefore made further complex by the need to meet up with these standards in order to produce graduates with internationally acceptable competencies. These needs can be summarized as being for medical graduates with excellent clinical, research and entrepreneurial skills, who possess a problem-solving and life-long learning attitude.

**CURRICULUM REVIEW**

Curriculum review is a continuous process that should result in periodic curriculum modification in order to accommodate the changes in the society. The curricula of most Nigerian medical schools are largely as they were at their inception both in content and in design. This stagnation becomes more important when the changes in the society and educational systems are considered. The process of curriculum development or review begins with each medical school defining the objectives of its curriculum (figure 1). These guidelines should guide the design of effective methods of assessment and evaluation of these competencies. Finally, necessary revisions should be made to the curriculum that would direct the students along a learning path, leading to the acquisition of core competencies required to pass examinations.

**Components of Curriculum Review**

The primary components for the revision and implementation of curricula are: a) review of curriculum content, b) staff development, c) the assessment and instruction of students, and d) regular curriculum audit. However, to ensure a smooth and effective curriculum revision it is important for medical schools to prioritize the order in which the necessary changes in the curriculum will occur. This is to avoid the chaos that would attend multiple changes taking place simultaneously, resulting in a worse curriculum (and medical training) than the one being reviewed.

**Review of Curriculum Content**

It is unlikely that the pre-existing curricula can produce physicians equipped with the competencies currently required for effective practice. Thus along with current trends, our medical students now need to be competent in areas such as, molecular medicine and bio-informatics. Health economics and management, ethics and research, palliative care and end of life issues that are in the present curriculum need greater emphasis. The curricula should also be more general/community practice based. In addition, as most of the graduates of this medical school will practice outside the teaching hospitals, the curricula should be more general practice/community-based. This would ensure that students are better exposed to the various levels of health care in the community in order to prepare them for the reality of medical practice on graduation.

**Faculty Development**

It is now accepted that the medical school faculty should be given the opportunity to train (preferably formally) as medical educators and assessors, and as program evaluators. In the alternative, medical schools may organize training workshops and symposia on these competencies. Such training would equip medical faculty with the skills required not only to effectively impart knowledge, but also to inculcate the principle of life-long self-directed learning in students using directed self-learning methods. Lecturers should update themselves regularly in their chosen fields and acquire computer and bio-informatics skills so they can deliver current information effectively to their students. Faculty staff also need training to recognize and manage the psychosocial problems of medical students that affect their ability to learn.

Staff development programs must include the non-academic staff. This will not only ensure improvement in the administration and management of medical schools, but will also assure better cooperation between the academic and non-academic staff. In addition, senior academic and non-academic staff should be encouraged to take courses in leadership and management.

**Student Assessment and Instruction**

Effective student assessment and instruction depends on the objectives of the medical schools as regards the type of medical graduates they wish to produce. It is now accepted that assessment drives learning, and that students will adapt their learning techniques to suit the assessment method being used to evaluate their competencies.

**Student Assessment (and learning)**

There is a need to standardize the assessment methods used for the summative (end-of-posting and final) examinations in the medical schools both within and between departments. Such standardization would allow more informed attempts at improving the training methods. This is particularly important considering recent evidence on the effectiveness of the various assessment techniques in African medical schools. Furthermore, it is important to raise the profile of feedback in medical schools in Nigeria. Feedback is defined as an informed, non-evaluable (ie, not used as part of the final assessment of the student), and objective appraisal that is aimed at improving the
student’s skills rather than estimating the student’s personal abilities. This type of assessment differs from summative in that it is instant, interactive and formative. Thus, feedback is better targeted at specific attitudes, skills and knowledge and should be given on a continuous basis.

Student Instruction
A lot has been said and written about the newer curriculum methods in use in the developed countries, especially learner-based approaches (system and problem-based learning curricula). While these methods are effective for some teaching modules, there have been recent doubts as to the universal effectiveness of any one curriculum for all types of teaching scenarios. Accordingly, each medical school needs to evaluate its present teaching methods, modify and direct its curriculum towards a more self-directed learning process by the students. This may then include a shift towards a more community and system-based instruction with the use of problem/project-based learning methods during tutorials. Furthermore, medical teachers should improve their repertoire of teaching skills by taking advantage of resources available on the various techniques especially lecturing and small group sessions.

Regular Curriculum Evaluation
For the curriculum review procedures proposed above to be effective they must include measurable objectives, so as to allow regular evaluation of the curriculum as it is being implemented. This is with a view to making further changes necessary to improve the process. Curriculum evaluation should involve the assessment of the outcomes (student and faculty evaluation) as well as questionnaires to all stakeholders to evaluate the curriculum. A timeframe of 5 years is considered satisfactory for measurable outputs to be generated.

THE ROLE OF WEB-BASED LEARNING
Web-based learning (WBL) refers to a system of learning in which the computer and the Internet play a major role. It is traditionally housed in the distance learning department of an institution, although there are some institutions which are originally web-based or virtual. The different ways in which the Internet can be used for teaching and learning include posting lectures online or live projection of lectures, e-mail for direct communication and discussion forums, and video conferencing. Links can also be put on web pages to other parts of the web, enabling access to large and relevant amounts of information.

Web-based Learning
Learning can be divided into web-enhanced and web-delivered learning. In the former, technology is used to supplement the traditional classes, while in the latter, also known as distance learning, all the learning material and exercises are disseminated electronically. A web-delivered learning program uses a ‘virtual learning environment’ (VLE) which is a virtual space or software package that combines functions of teaching and learning such as discussion boards, chat rooms, student assessment, tracking of students activities and course administration. Although some universities are purely web-based eg, the Open University of Catalonia in Spain, Michigan Virtual University in the USA, many organizations employ a blend of traditional face to face teaching together with web-enhanced learning as part of their program. Others offer online degrees in some courses alongside their regular traditional degrees.

As far as medicine is concerned, as at 2001, there were no colleges claiming to offer e-medical degrees. However, medicine has a lot of online learning content already, especially in the developing countries. In the basic medical sciences, for example, WBL can be used to provide many resources such as anatomical and pathological images, and can be used for clinical sciences support in the form of online video demonstrations, images and slides.

Role of Web-Based Learning in Nigeria
In many Nigerian medical schools, the emphasis on undergraduate training over the years has been towards specially-based didactic teaching, reducing the students’ motivation to search for information themselves. This reduces their flexibility as regards knowledge acquisition, and limits their access to current and relevant information for clinical decision-making. Thus by the time they become doctors, they may have passed the necessary exams but they tend to have limited ability for sustained, self-directed learning that is a strongly recommended attribute for the physician of the 21st century.

The teaching of computer and Internet use skills to medical students has been shown to improve their computer literacy with the hope of making them lifelong learners. This has also been shown here in Nigeria in an unpublished work by one of the authors of this paper (BBA). Different aspects of WBL can thus be incorporated into a traditional medical school curriculum, in order to enhance the learning experience of the students, especially in our resource poor environments. The important steps are to acquire a basic but functional and robust Internet connectivity system with well-trained support staff and to teach students and teachers computer literacy and Internet search skills. Finally, the areas of need in the curriculum should be identified and appropriate web content should be applied to meet those needs.

The ways in which web-based learning can be used in our environment include:
1. The provision of teaching materials such as images, lectures, handouts and articles online. This encourages students to become independent and active learners. It reduces the amount of time spent in the traditional lecture setting and helps the students learn more easily, especially if the learning material is structured in an organized and easily assimilated fashion. It is vital to avoid simply creating websites that are merely stores of knowledge without adequate feedback, communication and assessment facilities, however, as this becomes boring for the students and limits their gain from the facility.
2. Communication and feedback between students and teachers via e-mail and discussion boards. Both teachers and students can gain immensely from this with an improvement in their teaching and learning styles respectively. The traditional barriers between teachers and students in our environment need to be lowered for this aspect to be effective. Teachers would be pleasantly surprised to learn that they gain the respect of their students when they communicate freely with them and understand their needs.
3. Formative and summative assessments: Formative (or feedback) assessment, in which the grades given do not
affect the students' final score, is particularly compatible with online learning, as the feedback can be given by e-mail and the answers can be checked soon after taking the test. Summative assessment, the traditional form of tests and exams, can also be done online but it is important to predetermine what is to be assessed. Knowledge reproduction can be easily tested with multiple choice questions online but assessment of functions such as analysis or synthesis, which are relevant to medicine need more complex tests which would require more work from the teacher. 

4. Provision of information such as course content and outlines, student statistics and records. This helps both the teachers and students to plan and organize their time.

5. Provision of links to useful websites. All this information can be made available at any time and from any location.

Disadvantages and Drawbacks of WBL
1. For WBL to be successful, the supportive infrastructure must be robust. If the equipment or the Internet/Intranet connectivity is poor, learners find it frustrating and the purpose of enhancement of learning is defeated.

2. Poor quality information is freely available on the Internet and it may be difficult to ensure that students have access to accurate and current information. Information overload is also a problem with WBL, so signposting and guidance is needed.

3. Students may feel isolated when studying alone but this can be helped by either going to their computer points in groups or by the teachers making an effort to answer e-mails and participate in discussion boards promptly.

TEACHING HEALTHCARE INFORMATICS
A lot has changed in medical training over the last decade and another imminent change in the Medical School curriculum is that of teaching health informatics. Health informatics has been around for a while and most of us would have been applying many of the principles it describes without knowing we were practicing health informatics. The computer revolution has resulted in the application of computers in various aspects of informatics with a resulting expansion of the field of informatics. Data is generated and used daily in healthcare institutions and by all healthcare practitioners. This data takes varying forms ranging from the output of an electrocardiography ECG monitor, results of a Medline search, operations lists, drug formularies, patient records, etc. Health informatics is the common thread that helps us to understand why such data is being collated, organized and used to improve services provided by healthcare institutions.

Different Definitions of Health Informatics

Medical informatics is located at the intersection of information technology and the different disciplines of medicine and health care – van Bemmelen and Musen.

If physiology literally means 'the logic of life', and pathology is 'the logic of disease', then [health] informatics is the logic of health care.

How healthcare (or medical or clinical) informatics is defined or used, depends on what role the person defining it has. Tolentino identifies six groups of 'stakeholders involved in health care delivery and regulation who all have differing perspectives. These are: 1) taxpayers, 2) industry and insurers, 3) patients, 4) healthcare workers, 5) clinics and hospitals, and 6) regulatory bodies.

Some Aspects of Health Informatics
Depending on the stakeholder as mentioned earlier, different aspects of informatics are of more significance. We will try to highlight a few of these areas.

Information Databases and Modeling
According to Dr Malcolm Todd, one-time president of the American Medical Association, about half of all medical knowledge is outdated every ten years. Add to this the fact that new articles are published, new journals established and new treatments found and it is then not surprising that it has been said that if a diligent doctor read five articles a night on new treatments, after one year he or she would be 800 years behind! One solution to this information overload is to put summarized information about best medical practices for doctors on the Web. Internationally, the Cochrane Collaboration is perhaps the best known organization writing these treatment summaries, and some of these are now available on the Web.

Organizing data into databases involves creating models of the environment about which we are collecting data eg., patients presenting to a unit for surgery. Such modeling requires understanding of the Object-oriented Modeling Language (OML) or Unified Modeling Language (UML). The medical practitioner is not necessarily required to understand the nitty-gritty of designing complex databases, but should be taught the basic principles so that they can understand and use databases efficiently.

Evidence-based Practice
It is now accepted in the Western world that medical practice needs to be based on sound evidence. This evidence has to be compiled and made easily accessible to medical practitioners. Based on the evidence available, guidelines and protocols can be drawn up to guide an evidence-based practice. Once such evidence and guidelines have been compiled it can be assembled in a database, which resides on a computer (server) linked to and available to several users simultaneously within an organization (Intranet) or in the World Wide Web (Internet). Medical students should be taught how to search different databases (OVID, Medline, PubMed, etc) efficiently using proper search terms and parameters.

The Informed Patient
Evidence-based practice ties in with the concept of the informed patient. In modern medical practice the patient needs to be involved in a discourse where viable treatment options are outlined, and the risks and benefits of the regimes being considered and potential complications discussed. To do this, the practitioner needs to have kept himself or herself up to date with recent evidence as it is not unusual for the patient to arrive with a bundle of information downloaded from the Internet.

Health Records
The patient's records have been, for much of the history of healthcare, the central tool for collecting data and extracting information about the patient. Its structure and function have changed over time from 'case histories' each entry describing the
condition or the patient over time (time-orientated), towards records that are 'problem-orientated' and 'patient-centered'. Developments in patient care present new demands for the patient record. Paper patient records are extraordinary entities having legal status, which contain information that ranges from numerical objective data to idiosyncratic value judgements. Paper records have a number of advantages:

1. They can be carried around easily
2. There is a lot of freedom in recording information
3. Easy data browsing
4. They require no special training or 24-hour support on hand
5. They are never "down" as computer systems can be.

The increasing demand for well-structured and accessible patient data, in combination with developments in computer science, sparked a great interest in the development of an electronic patient record and the more inclusive electronic health record. This has led to national and international initiatives to promote and encourage healthcare organizations to implement electronic patient records. Electronic patient record (EPR) describes the record of the periodic care provided mainly by one institution. Electronic health record (EHR) describes the concept of a longitudinal record of patient's health and healthcare — from the cradle to the grave. It combines both the information about patient contacts with primary healthcare as well as subsets of information associated with the outcomes of periodic care held in the EPRs.

Medical Doctors and Informatics

It may come as a surprise to anyone reading this article that doctors need to be familiar with the principles of health informatics highlighted here. However, this is the current practice in developed countries, where there is increased accountability of the actions of professionals (including physicians). Members of the healthcare team have diverse responsibilities and most of us will find among the principles highlighted, those of most relevance to our immediate situations.

The importance of informatics to budding medical practitioners can be further emphasized by a look at a recent resolution of the World Health Organization:25

Recognizing that health and medical informatics is a very fast growing field which constitutes an essential component in the health information system of the health care services and in medical education.

Accordingly the organization calls on member states to:

1. Develop plans for the introduction of medical informatics in the health system so as to cover the needs of users.
2. Allocate financial and human resources to support health informatics plans.
3. Conduct awareness campaigns to sensitize health care professionals on the importance of medical informatics and their specific role in its use.
4. Make use of health informatics for development and administration of the health services and technical program.
5. Invest in human resources development in the information technology area.
6. Ensure the development of a plan for systematic and institutional implementation of health and medical informatics in health care institutions.
7. Initiate a model medical informatics curriculum for medical colleges, to be introduced during the early years of study.

STAKEHOLDERS' ATTITUDE

Improvement in medical education in Nigeria requires a change in the attitude of the stakeholders. The stakeholders are the government, the executives of medical schools and their teaching hospitals, the academic staff, students and their parents, and the local communities. It is particularly important that all stakeholders are involved in all the phases of the curriculum review. Special efforts must be made by the executives of the medical schools to ensure the active participation of the academic staff, students and the lay public in the process of improving medical education as they will be the "effectors", recipients and beneficiaries of the changes respectively. Such broad involvement would foster a sense of joint ownership of the resultant document and therefore ensure its acceptance and a commitment to its implementation and success by all parties.

This attitudinal change will correct the inertia in learning, teaching and assessment, and funding by the relevant stakeholders, and the subconsciously accepted misconception that the training received at the medical schools in Nigeria can only be inferior to that received overseas. (The unremitting demand for our graduates in developed countries is an important index that this is incorrect). Furthermore, this change of attitude will result in a high standard of undergraduate training that will prepare the graduates better for postgraduate medical practice and/or training (in Nigeria or overseas). It should, however, be noted that the continuing export of fully trained doctors is an unhealthy drain of intellectual and financial resources of the countries involved.27, 28 Of particular importance is the recent report that majority of the sub-Saharan doctors in the US are produced from only 3 countries and 10 medical schools.29 Urgent action is therefore required by policy makers (especially the government) to stem this exodus in order to ensure the achievement of our country's millennium development goals.30

Finally, governments at all levels must wake up to their financial and policy responsibilities to medical (and other) education and training. This does not simply mean giving more money to these institutions but rather the devolution of significant portions of policy making and sourcing for funding to universities that must be empowered to determine the training objectives of these citadels of learning, ie, university autonomy and the redistribution of the burden of the cost of medical training. This would also have the added effect of redistributing performance-monitoring of students and the system to include parents and other members of the public.

CONCLUSION

The future of medical education in Nigeria is dependent on the willingness of the stakeholders to modify the curricula with a view to producing medical graduates with the additional competencies required for modern medical practice. Web-based learning is feasible and can be a useful resource in achieving this objective in resource-poor countries. If properly organized and used to supplement the traditional methods of learning, WBL is extremely cost effective and could inculcate the culture of self-reliant, life-long learning. Furthermore, healthcare informatics is at the crossroads between information technology and medicine; it is an exciting field for exploration by medical practitioners. The recent upsurge of interest in this field makes it mandatory that it is included in the curriculum of medical schools and familiarity with its principles will help aspiring young doctors in many aspects of their developing careers, especially in fostering an understanding of why data collection is essential and the uses to which data collected is put.
References