LECTURE

Learning Experiences and Assessment in the First 2 Years of the Medical Course at King's College London School of Medicine

Despo Papachristodoulou

Department of Biochemistry, King's College London School of Medicine, London, UK

(Received for publication on April 16, 2010) (Revised for publication on May 25, 2010) (Accepted for publication on June 17, 2010)

The medical curriculum at King's College London School of Medicine is a 5 year course; an extended program (6 years) and a graduate entry program (4 years) are also available. The first 2 years of the curriculum comprise phases 1 and 2. The curriculum consists of core material that is common to all students and student-selected components (students undertake three such components in the first 2 years). Phase 1 lasts 12 weeks and students learn the principles of tissue and organ structure and function. They are also introduced to the practice of medicine (concepts of health, communication, ethics, inter-professional education and medicine in the community). Phase 2 consists of 36 weekly clinical scenarios that place basic medical science in a clinical context. Phase 2 covers cardiovascular, respiratory, gastrointestinal, renal and musculoskeletal systems; nutrition; endocrinology; head and neck anatomy; neuroscience; genetics; and infections. Teaching continues in primary care and in the hospitals and includes basic and advanced life support. Learning experiences include lectures, tutorials, practical classes, dissection and prosection, communication skills, e-learning, student-led sessions and primary care and hospital visits. Assessment consists of in-course assessment (e.g., presentations, tests and essays) and end-of-year examinations which consist of written papers and an objective structured clinical examination at the end of year 2. The main strengths of the program include the scenario format of learning and the practice of medicine early on. The difficulties arise mainly from the large numbers of students (420 per year). (Keio | Med 59 (4) : 140 -145, December 2010)

Keywords: clinical scenario, learning methods, assessment, student-selected components, virtual campus

Introduction

King's College London School of Medicine is located at three main hospitals: Guy's, King's and St Thomas' and a number of associated district general hospitals in London, Kent and West and East Sussex (**Fig. 1**).

The standard medical degree program (MBBS) is a 5-year program and consists of five phases. There is progression from studying basic medical science to clinical skills and medical practice. In addition, we have a 4 year graduate/professional entry program (GPEP) for a small number of mature students, and a 6-year extended medical degree program (EMDP) for students of high academic ability from poorly performing schools in the London area. The curriculum consists of core material, which is common to all students, and student-selected components (SSCs), which vary in format

The first two phases are mainly taught at Guy's campus. Phases 1 and 2 consist of the first 2 years in the standard program and cover basic medical science with

Presented at the 1648th meeting of The Keio Medical Society in Tokyo, December 11, 2009.

Reprint requests to: Despo Papachristodoulou MSc, PhD, Department of Biochemistry (Henriette Raphael House room 1.13), King's College London, Guy's Campus, London, SE1 1UL, UK, E-mail: despo.papachristodoulou@kcl.ac.uk



Fig. 1 The three main hospitals are shown in white and the associated district hospitals in black



Fig. 2 Numbers of students in the standard 5 year program, the graduate/professional entry program (GPEP) and the extended medical degree program (EMDP). Also shown are the additional 34 graduates from Oxford and Cambridge who enter at phase 3.

some integrated clinical practice. The next two phases consist of years 3 and 4 and they include attachments in clinical areas in the main hospitals and the associated district general hospitals. In phase 5 students act as house officers in their clinical attachments (**Fig. 2**).

We also offer a year of intercalated BSc study, usually between phases 2 and 3, in many areas, including anatomy, neurosciences, imaging, psychology, medical ethics and law, translational medicine and global health. The main body of this lecture program will cover the learning experiences and methods of assessment in the first 2 years or phases of the standard program.

The First Two Phases

Phase 1 starts at the beginning of the academic year in September and lasts 12 weeks. It provides the fundamental basic science needed to prepare the students for phase 2, which contains 36 scenarios of basic medical science integrated into a clinical context.

Outcomes for Phases 1 and 2

On completion of phase 1, students should be able to:

- Act as independent learners
- Understand basic scientific language and the role of science in medicine
- Have basic communication skills
- Perform basic statistical tests on medically relevant data.

On completion of phase 2, students should, in addition to phase 1, be able to:

- Appreciate the integration of science and clinical medicine with epidemiology, public health sciences, medical sociology and psychology in the understanding of illness and health
- Apply ethical principles to medical situations
- Demonstrate a knowledge of basic science in the defined core areas covered
- Show development of appropriate attitudes for the study of medicine
- Perform simple clinical skills including communication skills
- Work constructively with students in related health professions.

Content of Phases 1 and 2

Students receive information on learning and study skills in the first week and course booklets with learning objectives for every session. All the information is also available electronically on the 'virtual campus,' which is our electronic information and communication vehicle for students and staff of the School. The students experience a wide range of learning methods during the program.

Phase 1 provides a platform of knowledge, skills and attitudes that will enable students to progress to the clinical scenario-based part of the course that constitutes the rest of year 1 and all of year 2.

The areas covered in phase 1 are:

- The principles of tissue structure and function
- Cellular and molecular biology
- Metabolism
- Tissue and organ structure and the organisation and function of the cardiovascular, respiratory, gastrointestinal, renal, musculoskeletal, nervous and immune systems
- An introduction to the practice of medicine, including:
- Concepts of health and illness
- The place of medicine in society
- Communication in medicine

Dissection of thorax in phase 1	Clinical problem: Chest pain Professor of Cardiology	-	Histology of blood
Tutorial on CVS < physiology	Lectures: The cardiac cycle 2 Blood cells, haemopoiesis Atherosclerosis Embolism and inforction	→	Problem solving workshop Coarctation
Tutorial on CVS ← pharmacology	Heart disease pharmacology 2		conclution
GP or hospital visit	Clinical problem debrief /summing up Professor of Psychology	N	Problem solving workshop Diseased and healthy heart
	= clinical contact		

Fig. 3 Example of one of the scenarios on the cardiovascular system (CVS). GP; general practice.

- Medical consultation
- The healthcare team
- An introduction to the disciplines shown below:
- Medical ethics
- Medical statistics
- Professional skills.

Some of the topics such as communication skills and ethics are studied with students of other health programs as part of the inter-professional education program (IPE). Students meet patients in the community throughout phase 1.

Phase 2 runs for a year and a half and allows the promotion of understanding of normal structure and function and their interrelationships. It also continues to extend training in professionalism (communication skills, attitudes and behaviours) as well as teaching basic clinical skills. It consists of 36 clinical scenarios that employ a variety of learning styles, including:

- Lectures
- · Small group teaching
- Workshops
- Student-led learning
- Student presentations
- Clinical attachments in hospital and community settings.

The Clinical Scenarios

Each clinical problem is introduced by a clinician and is used as a focus for learning the background basic medical, behavioural and epidemiological science needed to understand the clinical situation. Each scenario is completed in approximately 1 week and ends with a summing up session reviewing the important learning issues in the context of the clinical setting. The scenarios cover the following areas:

- · Cardiovascular and respiratory systems
- · Gastrointestinal and renal systems
- Metabolism and nutrition
- Musculoskeletal system
- Endocrinology
- · Fertility and reproduction
- Head and neck anatomy
- Neuroscience
- Genetics
- Infections.

Scenario titles often include a patient name and condition, which may seem a frivolous approach, but our students tell us that it helps them to remember the topics. Below are a few examples of the scenario titles and the area to which they belong:

- Sanjay's malaise: is it influenza? (respiratory)
- Wilma's woeful wrist (musculoskeletal)
- Diana's diarrhoea (gastrointestinal)
- Sheila's sore shoulder (musculoskeletal)
- Donna has diabetes (endocrinology).

Figure 3 shows an example of a typical scenario taking place in 1 week.

Learning Methods in Years 1 and 2

• We give about eight 1-hour lectures per week to the whole year of about 420 students and provide them with paper handouts and PowerPoint presentations

on the virtual campus in advance.

- We hold 1-hour tutorial classes for 12-14 students on average 1-3 times a week.
- We hold laboratory practical classes in physiology, biochemistry and histology for 50-60 students at a time.
- We carry out dissection of cadavers and prosection in supervised groups of about 10 students. The dissecting room is open for private study and there is an additional voluntary weekly session with academic staff.
- We hold problem-solving workshops with groups of 30-60 students.
- We teach communication skills with simulated patients in small groups of 2-12 students.
- We also have an online tutorial facility through the virtual campus. Students can ask questions on academic matters which are answered by the appropriate member of staff. They can also comment on any part of the course.
- We organise primary care and hospital visits for the students so that they see selected patients at general practice (GP) and in the patients' homes and they also visit patients in hospital.

In year 1 we organise four GP sessions where the themes are 'why do people go to the doctor?' and 'what happens during the consultation?' Students attend in pairs. The theme of the hospital visits is the process of admission and discharge. Students again attend in pairs and they also attend three seminars in groups of 12. There is a clinical symposium and students are asked to make presentations about their community and hospital medicine experiences

- In year 2 there are two themes: eliciting a medical history and access to healthcare. For each theme we hold a symposium and workshops and visit a general practice and a hospital.
- We encourage self-directed learning, particularly in the clinical skills centre where students can improve their practical skills.
- We organise a system of peer-led problem-based learning, whereby year-4 student volunteers facilitate problem-based learning sessions for year-2 student volunteers.
- Year-2 students can attend post-mortem examinations in the hospitals in groups of five students
- We have a great variety of student-selected components (SSCs) in the course.

In year 1, students learn together in groups of six with a supervisor. In this way we introduce supported selflearning linked to developing oral presentation and poster skills and report writing. In year 2, students undertake two SSCs, one per term. One day per week is set aside for these SSCs and no core teaching is scheduled. A wide choice of scientific, medical and humanities projects are included as well as learning a foreign language.

 Table 1
 Scenario-based curriculum: student evaluation from end-of-year questionnaires

Presenting the basic science material in scenario format made it interesting				
Strongly agree	59%			
• Agree	39%			
• Neutral	1%			
• Disagree	0%			
 Strongly disagree 	1%			

 Table 2
 Student evaluation

Presenting the basic science material in scenario format helped learning				
Strongly agree	53%			
• Agree	43%			
• Neutral	2%			
Disagree	1%			
Strongly disagree	1%			

Students can also devise their own project if they find a willing supervisor.

Evaluation of the Course

We evaluate the course using a number of methods, including student staff lunch meetings and by carrying out a number of questionnaires at the end of each academic year. **Tables 1** and **2** show some results from the questionnaire for the academic year 2008–2009:

Assessment

Student assessment includes the end-of-year examinations and in-course assessment (ICA) during the year. The MBBS Part 1 examination consists of two main components that are weighted as follows:

End-of-year examinations 80%

In-course assessment 20%

The end-of-year examination consists of three units and the in-course assessment component consists of eight elements (**Table 3**).

Students must pass all three written examinations, but one further attempt is allowed if a student fails any of the papers. Each paper consists of two types of questions: single best answer questions and extended matching questions. All written papers are computer marked.

In year 2, MBBS Part 2 is an examination consisting of two main components that are weighted as follows:

- End-of-year examinations 82%
- In-course assessment (ICA) 18%

The end-of-year examination component consists of four units and the ICA component consists of eight elements (**Table 4**).

Components of the MBBS part 1 examination	% of final mark
End-of-year examination (Duration)	Total 80
2. Scenarios 1-7 (2 hours)	23
3. Scenarios 8-13 (2 hours)	23
In-course assessment 1. Mid-sessional written examination	Total 20 8
2. Clinical Presentation	2
3. Timed Problems (best 2 out of 3) 4. Histology sessions	2 2
5. IPE assessment	6

Table 3 MBBS Part 1 examination

Scenarios 1–7 cover the cardiovascular and respiratory systems. Scenarios 8–13 cover gastrointestinal and renal scenarios and nutrition and metabolism.

Table 4MBBS Part 2 examination

Components of the MBBS part 2 examination	% of final mark
End-of-year examination (Duration)	Total 82
1. Scenarios 14-23 (3 hours)	28
2. Scenarios 24-32 (3 hours)	28
3. Scenarios 33-36 (1.5 hours)	14
4. OSCE	12
In-course assessment	Total 18
1. Clinical epidemiology and statistics critical appraisal	3
2. Mid-sessional examination	3
3. Neuropsychology assessment report	2.5
4. Neuroscience timed essay	3
5. Three neuroscience practicals (hearing, vision and CAL)	1
6. Endocrinology problem	1
7. Ethics short answer questions	3
8. Histology practicals	1.5

Scenarios 14–23 cover the musculoskeletal system and endocrinology. Scenarios 24–32 cover head and neck anatomy and neuroscience and scenarios 33–36 cover genetics and infections.

Students must pass all three written papers and the OSCE in order to progress to year 3. One further attempt is possible if a student fails one or more examinations. The OSCE (objective structured clinical examination) examines skills, knowledge and understanding in clinical situations and is a minimum competence examination. In year 2, we have 20 stations, 16 of which are active and 4 of which are rest stations. Each station lasts 6 or 12 minutes. Each OSCE has a mixture of history taking, practical skills and communication skills including sensory awareness and living anatomy.

Student-Selected Components (SSCs)

In year 1, groups of six students work together on a project selected by them from an extensive list. At the end of the collaboration, the students do a poster presentation as a group which accounts for 50% of their mark and write a report which accounts for the other 50% of

the mark. The report mark is an individual mark for each student.

In year 2, the assessment depends on the type of SSC. It could be a library project marked by two examiners independently, a written examination, e.g., for a language or a taught course, and/or an oral examination, e.g., as part of a language exam, library project or taught course. The SSC marks do not form part of the final examination mark but a student needs to pass two out of three in order to progress to year 3.

Strengths and Weaknesses of the Course

The best feature of the course in years 1 and 2 is the scenario format of phase 2. This is a consistent feature of the results from all questionnaires carried out since we started this way of teaching and learning. Since we started teaching in this way, we have not had any of the usual questions that medical students asked previously, i.e.,

'what does *this* have to do with medicine?' The relevance of basic science to medicine is made immediately obvious in the scenarios.

Another strength of the course is the gradual integration of clinical material into basic science. The virtual campus is one of our strong points and a feature that has received praise from the General Medical Council. Students also tell us during admission interviews that one of our attractive features compared to other medical schools is the breadth of our SSCs. Our OSCE also consistently receives praise from external examiners for its organisation and the way it is conducted.

Our weaknesses are few, but we have some difficulties such as organising such a large body of students for teaching; the process necessitates multiple rotations and sessions to cover the material. The large number of students in years 1 and 2 and the fact that we have to accommodate the standard 5 year-program students with the extended 6 year-program students and the accelerated 4 year-program students mean that running this course is very complex and challenging.

A weakness of the scenario format is that it makes the timetable rather inflexible; for example, if a lecturer is unavailable on a particular day, then that session is difficult to reschedule within the week of the scenario.

In summary, this article gives an overview of the teaching, learning and assessment methods in the first 2 years of the medical course at King's College London School of Medicine. We have not adopted an ultra-modern method of education, but I think we have struck a good balance by putting traditional methods of teaching and learning in a clinical context aided by e-learning, without compromising the value of basic science. We have found that this approach works well, judging by evaluations of the course by our students and also by staff members and external examiners.