

## INNOVATIVE IDEA

Volume 8 Issue 4 2016

DOI: 10.5959/eimj.v8i4.450

### ARTICLE INFO

Submitted: 01-08-2016

Accepted: 06-12-2016

Online: 30-12-2016

# Biphasic Integration of Ophthalmology for Undergraduate Medical Students at Al-Baha Faculty of Medicine

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To cite this article: Al-Ghamdi AHS, Elfakey WEM. 2016. Biphasic integration of ophthalmology for undergraduate medical students at Al-Baha Faculty of Medicine. *Education in Medicine Journal*. 8(4):69–77. DOI: 10.5959/eimj.v8i4.450

To link to this article: <http://dx.doi.org/10.5959/eimj.v8i4.450>

## ABSTRACT

It is a challenge to find a good time to teach a growing discipline like ophthalmology in a fully integrated system-based curriculum. We solved this problem in Faculty of Medicine, Albaha University (FMBU). We planned to teach ophthalmology in two phases. In Phase 1, we integrated related basic and clinical ophthalmologic objectives and contents in the related basic and clinical modules. In Phase 2, we teach the main ophthalmology objectives and modules in well-structured two-week module. In this article many questions related to the themes, objectives, contents, methods of instruction and assessment methods are discussed. Students are helped with module study guide that contain all module details. Feedback is obtained from both faculty and students for reasons of evaluation and future reforms. Evaluation had pointed to some weak components like module structure according to the desired outcome from the view of the academic staff. Assessment methods were the least satisfying to the students. The most important point in evaluation of this module is the results of the progress test. This showed dramatic improvement as compared with other KSA medical schools who participated in progress test after implementation.

**Keywords:** *Ophthalmology, Integrated curriculum, Ophthalmology module, Evaluation, Assessment*

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## INTRODUCTION

It is no longer valid to say that ophthalmology is a minor specialty or to marginalise it for undergraduate medical students. Teaching ophthalmology for medical students is a cornerstone to improving eye health care globally (1). Applying competency-based approach in teaching ophthalmology to undergraduate medical students will directly proportionate

to the improvement in patients care and decrease morbidities related to ophthalmic diseases in both developed and developing countries.

One of the main goals of the ophthalmology course is to teach and train students knowledge and skills to acquire the competencies pertaining to ophthalmology that are required to be practiced in the

community and at all levels of health care system.

Despite of the breakthroughs in ophthalmology worldwide, but recent surveys showed ophthalmology may increasingly be a small, or even absent, in components of undergraduate medical curricula. This occurs at the time of the establishing the international ophthalmology curriculum guidelines (2).

Practice makes it perfect, it is an old say applied in all medical disciplines when teaching and training medical students. Ophthalmology teaching needs a degree of motor skill proficiency emphasise significantly more practice and rehearsal (3).

For this reason in planning of our ophthalmology module attention is paid to the practical and clinical exposure for medical students' more than theoretical teaching.

Faculty of Medicine AlBaha University (FMBU) is newly established medical school, first batch admitted in 2008. The faculty implementing a fully integrated body systems-based curriculum, through all phases of the six years of its educational program. The innovative program of FMBU is composed of 10 system-based basic sciences modules studied in the three years of the basic sciences phase and other mirror image system-based modules studied in the three years of the clinical phase (4).

The ophthalmology module is one of the unique modules that are not supported by any of the basic module under the same title, but ophthalmology basic concepts are distributed in related basic modules. In this paper we described how we plan, design, integrate and implement the ophthalmology module in two phases. In the first phase we select ophthalmology contents and inject them in the related basic or clinical system-based modules. In the second phase we teach ophthalmology in one block of two weeks where we include the core topics of ophthalmology.

## METHODOLOGY

To develop the ophthalmology module, a module committee headed by ophthalmologist was assembled from different subspecialties including; internist, pediatrician, ENT surgeon, medical educationist, community physician, anatomist biochemist and physiologist. The main task of the committee is to formulate the Intended Learning Outcomes (ILOs) of the Ophthalmology Module, synchronise these ILOs with the outcomes of the Undergraduates Integrated Curriculum of AlBaha University Faculty of Medicine (ABUFM), determining the module contents, delivery methods, and biphasic integration of these contents vertically in related modules and horizontally in determined block for the 5<sup>th</sup> year.

To achieve these goals the committee applies the approach that described by Kern et al. which is six-steps for curriculum development (5).

The steps followed are:

1. Problem identification
2. Educational needs assessment
3. Setting goals and objectives
4. Identification of educational strategies
5. Implementation
6. Evaluation and feedback

These steps applied by the committee and resulted in preparation of study guide and module description which followed by implementation.

## RESULTS AND DISCUSSION

In applying these steps the committee divided the module contents in two categories: First, related topics are taught in relative systems for instances ophthalmic manifestations of childhood diseases are taught in Child Health Module. Second, the core ophthalmologic objectives are planned

to be taught in two weeks for 5<sup>th</sup> medical year (Semester 9).

### Problem Identification and General Needs Assessment

The International Council of Ophthalmology (ICO) determined the need to expand ophthalmic medical student's education due to the increasing age of the world population, high prevalence of common problems such as eye injury and red eye, and importance of vision in the information age. The ICO Medical Student Education seeks to include appropriate ophthalmic education for all medical students as part of the complete physician education and to offer assistance and resources in regions where it is not yet included (6).

Despite of the fact that ophthalmology comes in the 5<sup>th</sup> order of the specialty preference for medical students in Saudi Arabia, revision of the Medical Curricula reveals deficiencies in teaching ophthalmology for undergraduates (7).

The Module Committee revised all these facts and plans to design an innovative model for teaching ophthalmology in FMBU.

### Needs Assessment for Target Learners

Revising the medical curricula nationally and internationally helped the committee to determine the trends in teaching ophthalmology and the educational needs. The stakeholder's wishes and the ABUFM graduates choices were put in consideration to identify the exact needs. These data collected through focus groups discussion and graduates interviews.

### Goal and Objectives

The learning objectives were formulated by the committee in relevance to Blooms domains cognitive, psychomotor and affective learning domains. These objectives categorised to be distributed in other

modules as described above in addition 2-week-ophthalmology module that taught in Semester 9, early in the 5<sup>th</sup> year. The objectives that related to the basic ophthalmology are injected in the relative modules in the first three years and some of the objectives that related to the clinical ophthalmology are injected in the last three years.

The contents of the module are determined and distributed according to the methods of teaching and assessment as shown in Table 1.

### Educational Strategies

In this step the committee followed Kern et al. (5) approach as the goals and objectives are determined, the educational strategies should be developed by identifying the contents which are the specific materials that to be included and the methods which are the ways in which contents are presented.

The contents chosen according to the assessed needs. The biphasic approach in distributing these contents is based on the following:

1. The foundation of ophthalmology and relevant topics are integrated in the first three years. These topics that related to physics, biology, chemistry, anatomy, physiology, terminology and ethics were integrated in the module of the natural sciences, as well as the basic sciences system-based module following Harden's ladder of integration (8). For instances the basis of optics and light refraction are taught the physics part of the natural science module with light touching the clinical implementation of this topic in diagnosis and treatment of ophthalmic problems.
2. The clinical ophthalmology contents as well divided in to topics that integrated in the clinical sciences system-based modules and the two-week ophthalmic module. The system-based clinical modules are taught in the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> years. Modules like cardiology and

**Table 1:** Themes, objectives, instruction methods and assessment methods

Theme	Objective/topic	Method of instruction	Assessment
Basic Ophthalmology	Embryology of the eye and orbit	Lectures	MCQs
	Anatomy of the eye and orbit	Skill laboratory training	Short essays
	Physiology of vision		
Clinical skills	Microbiology of the eye and orbit		
	Ocular history	Skill laboratory training	OSCE
	Eye examination	Hospital-based clinical teaching	Viva
Lids and orbits	Ocular radiology		
	Eyelids and lacrimal system	Lectures	MCQs
	Tumors of the eye and orbits	Skill laboratory training	OSCE
Anterior and posterior segment pathology	Ocular trauma	Hospital-based clinical teaching	
	Dry eye syndrome	Lectures	MCQs
	Non-infectious corneal disorders	Skill laboratory training	OSCE
			Hospital-based clinical teaching
	Non-allergic conjunctival disorders		Viva
	Microbial keratitis		
	Cataract		
	Allergic eye diseases		
	Common eye surgeries		
	Non-traumatic ocular emergency		
Glaucoma overview			
Miscellaneous	Overview of retinal disorders		
	Acute vision loss	Lectures	MCQs
	Chronic vision loss	Hospital-based clinical teaching	OSCE
	Refractive surgery		Short essays
	Strabismus and amblyopia		
	Ocular anesthesia		
	Eye and systemic diseases		
Refractive errors			

Note: Multiple Choice Questions (MCQs); Objective Structured Practical Exam (OSPE); Objective Structured Clinical Exam (OSCE);

cardiovascular surgery, neurology and neurosurgery and other modules include related ophthalmic topics. The remaining pure ophthalmic topics are taught in the two-week ophthalmic module in the 5<sup>th</sup> year. The methods that selected by the module committee are include a wide variety of opportunities. We maintained congruence between objectives, methods of delivery and assessment.

- a. Methods for meeting cognitive objectives were lectures, audiovisual materials, programmed learning, students directed learning and learning projects.
- b. Methods for achieving affective objectives are determined to have attitudinal changes and require exposure to knowledge, experience, and as well to help students to identify desired and undesired attitude in practice. These included students' prepared seminars, tutorials, small groups' discussions and problem solving sessions.
- c. Methods for achieving psychomotor objectives are allocated by the committee according to available workplace and technology-based facilities and included supervised hospital-based clinical teaching, skill laboratory-based teaching in simulations by artificial models, role-plays, and audio-visual reviews of skills. In this module other aspects of ABUFM curriculum strategies were not ignored and partially implemented. Community-based strategies are planned to be implemented as the students are asked to organise a community-based activities where they meet people in supermarkets to deliver simple messages to promote eye health and distribute handouts which prepared by

students under supervision of the ophthalmologist. The students are asked to write a report on their community-based activities. Students' centered-learning is applied asking the students to choose topics for self-directed learning and discussed the weight of this in the final assessment marks.

### Implementation of the Module

Implementation of the module faced obstacles related to human resources, time allocated to the module and issues related to the clinical teaching. The committee solved all these issues and put plans raised to the curriculum committee for future improvement in implementation issues. In relation of fill gaps of specialised ophthalmology teachers, part of the hospital-based clinical teaching is carried by specialist from the Ministry of Health on part-time basis. Time issues are as well solved by distributing some of the contents to the related system-based modules.

As the university hospital is not built yet, an agreement between the university and the health authorities is signed and accordingly the three hospitals in the region were utilised for the clinical teaching. These hospitals contain well-established, well-equipped ophthalmology departments with in-patients, out-patients and referred ophthalmic clinics. The same strategy is applied for all other clinical modules waiting for the university hospital to be fully constructed.

The committee did not face any other problems related to the implementation as the ophthalmology teaching is less disturbing if compared to modules.

### Evaluation and Feedback

Students' assessment is conducted in the two phases of implementation through formative and summative assessment.

Table 2 showed the assessment of the two-week ophthalmology module.

In Phase 1 the assessment take place in relative modules depends on the assessment strategies of that module where different types of assessment are applied. The committee had its input in the assessment of the ophthalmology competencies in these modules and was satisfied.

The assessment of the students in the ophthalmology module divided in formative and summative assessment.

1. Formative assessment: comprise of 60% of the total mark through student portfolio which consist of clinical logbook, community-based activity report, problem solving skills, task-based learning, self-directed learning and quizzes.
2. Summative assessment: conducted at the end of the two weeks and comprise of 40% of the total mark and include written and objective structured clinical exam.
  - a. The module evaluation conducted after the implementation using students' and faculty self-administered anonymous questionnaire. The results as shown in Table 3 were good and encouraging. Most of the module items scored well despite the presence of some weak points which will be a target for improvement next time. The results showed that faculty staffs are not well satisfied with module structure in relation to

the planned outcome. Students were less satisfied with methods of assessment.

The results of the progress test were good tools to evaluate the outcome of this module. FMBU participated in the progress test with other 25 medical schools in Saudi Arabia for three consecutive years. Figure 1 showed the results of the ophthalmology questions in the progress test before implementation of the module as compared with other schools in Saudi Arabia, and Figure 2 showed the same results after implementation. There is a dramatic improve in the results of the ophthalmology at FMBU. This is an excellent tool for assessment and evaluation of the module.

## CONCLUSION

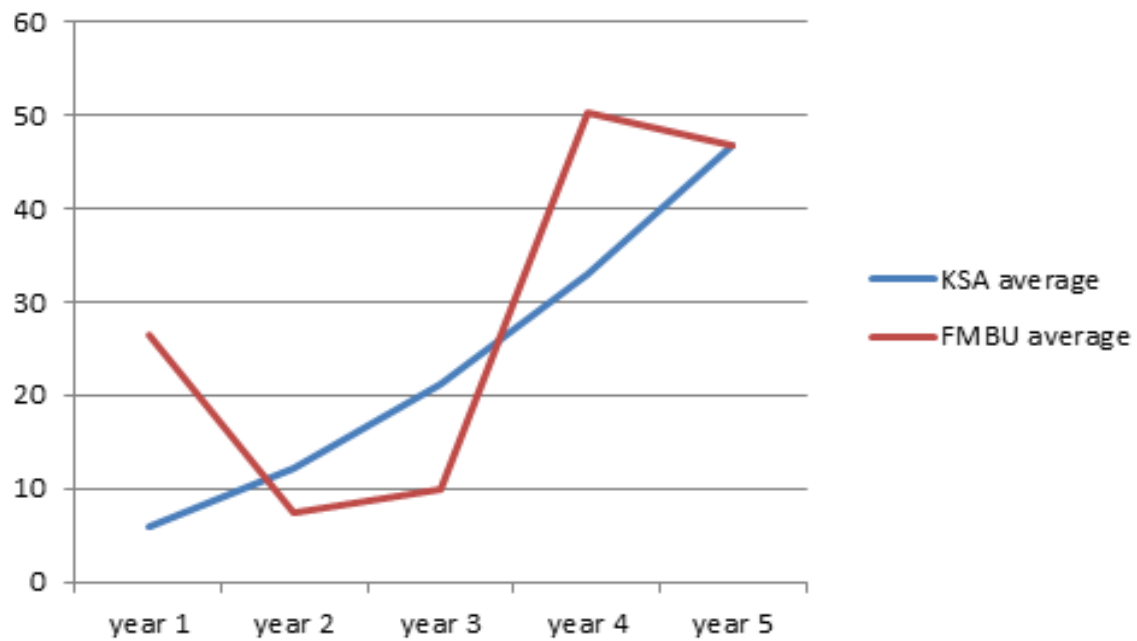
Biphasic integration of ophthalmology for undergraduate medical students' at ABFUM is innovative and can be taken as a model for integrating different specialties. Curricula planner may face obstacles related to time; human resources and clinical teaching facilities, therefore studying our experience will propose a solution for these issues. Ophthalmology nowadays cannot be classified as minor specialty; in Phase 1 we have opportunity to include all ophthalmologic contents in the relative system-based modules, where the remaining main ophthalmologic objectives were delivered in the ophthalmology module in Phase 2. On the other hand obtaining feedback from both students and faculty members help us to keep the strength points and to plan to reform the weak ones.

**Table 2:** Assessment methods and marks distribution in ophthalmology module

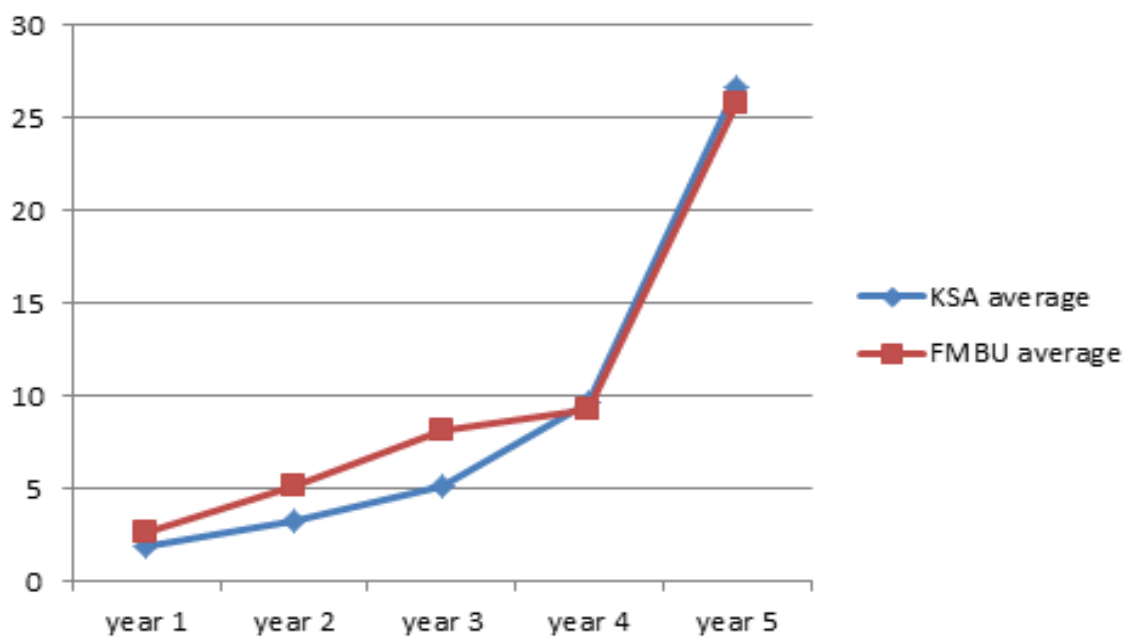
Assessment method	Marks %
Problem solving skills	10
Structured viva	15
Quizzes	15
Seminars	10
Task-based learning	5
Student-directed learning	5
Final written exam	15
Objective structured clinical exam (OSCE)	25
Total	100

**Table 3:** Ophthalmology course evaluation results, academic staff and students’ opinions obtained by a self-administered questionnaire of 5-points Likert scale

Academic staff and students opinions on ...	Average academic staff satisfaction (out of 5)	Average students level of satisfaction (out of 5)
Module ILOS	4.3	4.5
The syllabus states course objectives and required skills	4.7	4.8
The module theoretical concepts with real world application	3.1	3.9
The subject matter	3.8	4.1
The module was well structured to reach module outcomes	2.9	3.5
Good balance between lectures, practical and clinical	4.8	3.9
The learning and teaching methods encourage active participation	4.6	4.6
The methods of assessment were reasonable	3.7	2.8
Your opinion on the students study guide	4	4.7
Opinion on the module as whole	4.5	4.2



**Figure 1:** Results of ophthalmology in the progress test at FMBU before implementation.



**Figure 2:** Results of ophthalmology in the progress test at FMBU after implementation.



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