REVIEW ARTICLE

Tips for Developing an Outcome-based Undergraduate Medical Curriculum

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ABSTRACT

Although the transformation towards adopting an Outcome-based Education (OBE) is gathering momentum globally, several medical schools are finding it hard to implement the change. Based and built on authors' experience and cues from the literature, the *tips* – relating to the process of identification, description and dissemination of learning outcomes (LOs); usage of LOs to ascertain the curricular contents, the teaching/learning and assessment methods; implementing, monitoring and reviewing the curriculum – are the actions that the institutions of higher learning need to perform to transform the existing curriculum or to develop an altogether a new curriculum according to OBE approach. The development of the faculty through dialogues, discussions and training sessions should be an initial and essential step in this process. It is hoped that these *tips* will alley some of the fears and facilitate the adoption of OBE curriculum in new as well as in existing established institutions.

Keywords: Outcome-based Education; Competency-based Medical Education; Tips; Curriculum; Malaysia.

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INTRODUCTION

Spady (1) defined "outcome" as a demonstrable evidence of successful learning. It is a performance that learners should be able to display at the end of a learning period, training or a course. Elaborating further he emphasised that "Outcome-based Education" (OBE) is neither a new method or technique of teaching/learning; nor it is quick recipe for fixing-up the problems that education is facing today. As a matter of fact, it is a novel approach which will revolutionise the way the business is done in the field of education.

OBE brings fundamental changes in the field of education, even influencing the purpose of teaching and the approach to the development and design of curriculum. Logically this approach is most applicable to professional institutions such as medical schools for being responsible of producing physicians with attributes to practice medicine competently, ethically and efficiently.

Every medical school curriculum has outcomes (2) but not every curriculum follows OBE. These are two different things. It is important to distinguish between outcome setting and OBE. In the context of curriculum development, the term "outcome" has broader meaning and is not just equivalent to syllabus or standard approach (1,3).

OBE, emphasises Spady (1), "does not mean curriculum with outcomes sprinkled on (the) top" and differentiates between three types of OBE approaches: a) Traditional OBE sticks to existing curriculum and teaching/learning approaches while mentioning the contents and their application as outcomes, resulting in failure to look at the holistic picture and focusing only on small fragmented segments of instructions; b) Transformational OBE is a forward-looking approach creating a comprehensive new system of teaching/learning and assessment which focuses on functional competencies in a variety of real-life situations; c) Transitional OBE, in terms of its scope and purpose, lies in between traditional and transformational OBE.

In OBE, all the decisions about the curriculum, be it the contents and/or their organisation, the teaching/learning methods, the assessment approaches including

frequency of assessments and the types of examination questions, the educational environment or the teaching timetables are determined by the learning outcomes (LOs) (4).

OBE emphasises relevance in the curriculum and provides a convincing and explicit outline for development of curriculum. It advocates sharing of responsibility for learning between teachers and students and lays down clear guidelines for course evaluation and student assessment (4).

Essential personal attributes of a doctor such as decision making, self-assessment and interpersonal skills which are not given much emphasis in traditional curricula are adequately addressed in OBE – not only as LOs but as components of teaching/learning activities and student assessment (5). However, it should be emphasised that LOs generally identify the core / minimum essential requirements. It does not mean that the teachers and students are restricted by the LOs and cannot go beyond them as OBE is not meant to kill the creativity and imagination of the teachers or students.

Defining learning and training by its outcomes opens up innovative ways of teaching and assessment which cannot be practised in traditional curricula. If learning is focused on outcomes, the other features of OBE fall in place as a logical sequence. This model is capable of solving many of the issues we presently face in the field of education and training (6).

"In OBE," suggests Harden (4), "product defines processes". OBE is a result-oriented approach with outcomes being the most important targets. However, it should not imply that in OBE the process of teaching/ learning is neglected and students are encouraged to achieve the results by whatever means. The teaching/ learning approaches and methodology are equally important (7).

Whereas the traditional curriculum with its knowledge-based objectives emphasises on the instructional process rather than on the quality of the end-product of the programme, in OBE, on the other hand, curriculum processes are not the main focus but only means to achieve the outcomes which oversee all the curricular decisions (4). In this setting, Competency-based Medical Education (CBME) may be regarded as a type of OBE (8). Hence the tips outlined in this article can also be used to develop and implement a competency-based curriculum for undergraduate medical students.

Competence is defined as the ability to apply knowledge and skills (including soft skills). Since competencies are discernible, their acquisition can be assessed and ensured (8).

CBME is, therefore, a subset of OBE which discretely focuses on the well-defined competencies to be achieved by so purposely and meaningfully designing, implementing and evaluating medical education programmes (8).

The purpose of this article is to make suggestions how effectively and systematically an OBE approach can be applied to an existing curriculum or for developing a new curriculum. The following tips, which are based on our own experience of developing a new curriculum at a Faculty of Medicine (FoM) in Malaysia, though presented in a linear fashion should be seen as an iterative one in which each step (tip) should inform and affect other steps.

Tip 1: Process of identification of LOs
For an initiative to develop a new OBE curriculum or to transform the existing curriculum to OBE, identification of the LOs is the first step. The setting out of these LOs may be at the departmental, institutional or national level (4,9).

As LOs influence the design and development of the curriculum, teaching/learning approaches and methods, assessment of students, and documentation of instructions and directions (10), it is of utmost importance that they are identified carefully and stated clearly and unambiguously.

For identification of LOs of a programme, a top-down approach is adopted whereby the desired attributes of a fresh graduate (exit outcomes) – encompassing knowledge, skills and attitudes - are identified first (10) and then outcomes for different phases of the programme (interim or enabling outcomes) are extracted from these exit LOs. This process is repeated for each module within each phase, for each discipline within each module and for each teaching/learning activity within each discipline (4) so that at the end of the process each of the teaching/learning activities will have its own LOs.

The exit LOs are fairly broad whereas the interim/ enabling LOs progressively narrow down and become very specific when it comes down to the individual teaching/learning sessions and activities. For example, the broad exit outcome of a specific curriculum may be to train graduates as competent primary health-care providers who also have the substance to become researchers, teachers, councillors and community leaders (11). Whereas a narrow enabling outcome may be the ability to assess the degree of dehydration in a child with acute gastroenteritis.
Following are some of the examples of exit LOs:

In Tomorrow's Doctors (12), the outcomes are described under three headings:

1. The doctor as a scholar and a scientist - 5 outcomes
2. The doctor as a practitioner - 7 outcomes
3. The doctor as a professional - 4 outcomes

These categories cover the acquisition of the knowledge, skills and behaviour that students must demonstrate by the time they graduate.

The seven domains (of outcomes) identified by Institute for International Medical Education (IIME) (13) relate to:
1. Personal and professional development and ethics
2. Scientific basis of medicine
3. Clinical skills
4. Communication skills
5. Community health and health-providing systems
6. Retrieval and utilisation of the information
7. Higher order thinking skills for decision-making and research

In a three-circle outcome model adopted in the Dundee curriculum (4) the exit LOs are listed under following three headings:
1. Outcomes related to the performance of tasks expected of a doctor – 6 outcomes
2. Outcomes related to the approach adopted by the doctor to the performance of tasks – 4 outcomes
3. Outcomes related to professionalism – 2 outcomes

The twelve enabling LOs identified for Dundee curriculum based on the three-circle model (4) are as follows:
1. Interviewing patients and performing physical examination
2. Communicating with the patients and their relatives, colleagues and other team-members
3. Promoting health and preventing disease
4. Performing clinical procedures
5. Requesting appropriate investigations
6. Diagnosing and treating patients
7. Practising evidence-based medicine
8. Using clinical reasoning to solve problems, critically analysing the formation to make decisions and judgements
9. Using professional approaches to discharge ethical and legal responsibilities
10. Retrieving, manging and appropriately utilising information
11. Displaying a physician's role in the delivery of healthcare
12. Making conscious efforts for personal and professional development including mastery in transferable/soft skills

At FoM the following sequence was adopted for identifying the LOs of the MBBS programme.
Exit LOs
i. General LOs
ii. Specific LOs

Enabling LOs
iii. Phase LOs (General & Specific)
iv. Module LOs (General & Specific)
v. Teaching/learning session LOs (General & Specific)

Tip 2: Criteria for identification of LOs
Identification of LOs should be directed by the vision and mission of the school and all stake holders such as future employers (e.g. Ministry of Health) and community representatives should be included in the process (4).
A medical graduate may be trained to fulfil one or all of the four roles – a physician, a teacher, a researcher and a leader. To identify appropriate LOs we need to know what kind of doctors are needed? What are national priorities and needs? Will doctors be required to provide health care in the community as well as in the hospital? Will they be expected to conduct health promotion activities? Will they be given the job of an administrator or community leader (4)?

Harden (14) has suggested following approaches for need analysis:
1. The wise-men approach
2. Study of errors in practice
3. Critical incident studies
4. Task analysis of established practitioners
5. Analysis of morbidity and mortality statistics
6. Study of star performers
7. Analysis of existing curricula including syllabi and examinations
8. Views of recent graduates

Enabling LOs should fall in line with the LOs of the whole programme (exit LOs). If the exit outcomes state that a graduate would be able to undertake practical procedures or manage patients, the next natural question would be which practical procedures or what kind of patients? The procedures and the medical conditions a graduate would be able to manage at house officer level should be identified by using set criteria e.g. the common medical conditions seen in the community to be served.

Enabling LOs are identified according to the level of the training of students. For each exit outcome there is a corresponding spectrum of enabling outcomes ranging from a novice to mastery level. Miller's pyramid of competence (15) is a very useful tool for identifying outcomes according to the level of the training. An example is given in Table I to illustrate this point.

Tip 3: Description of LOs
Bloom (16) recommends that LOs must be specified using precise descriptors and they must clearly distinguish between the levels of competencies to be achieved by learners.

LO, the way it is stated, guides how that particular outcome/skill/competence should be taught and

assessed. If a LO states that the student will be able to perform a certain skill, the student must be trained and given enough opportunities to practise performing that particular skill and the assessment should be based on the level of performance of the skill – and not based on the description of performing the skill.

A LO should be Specific, Measurable/observable, Achievable, Relevant and Time/context bound (SMART). LOs are best described by using action verbs. Bloom (16) in his Taxonomy of Educational Objectives, using action verbs, has described the various levels of outcomes according to cognitive, psychomotor and affective domains.

Tip 4: Identification of contents of curriculum
Spady (10) recommended that outcomes should be identified first and then the curriculum be developed accordingly rather than having a curriculum first and then identifying the outcomes.

This is a top-down approach. Based on the outcomes (competencies) required of a fresh graduate, the contents are identified and slotted at right level of training / phase of the curriculum. Identification of contents in different

domains for an outcome 'Diagnosis and Management of a Case of Malaria' is illustrated in the Table II.

Tip 5: Teaching / learning methods
LOs guide teachers to (a) select the contents to be taught; (b) design and organise the materials for effective teaching; (c) choose the teaching/learning methods to be applied; and (d) assessment tools to be used (7).

A well described LO will guide how the content should be taught – should it be covered in a large class as didactic session or discussed in a small group session; should it be a theory learning session or a hands-on practical demonstration.

If LO demands that a student would be able to record blood pressure in a child, the teaching must include demonstration of measurement of blood pressure in children. If LO states that student would be able to discuss the pros and cons of a particular intervention, the teaching must include a small group discussion session on the particular intervention. If LO pronounces that student would be able to describe the blood circulation in a normal person, the teaching may be through a Directed Self-Learning session (DSL) or a didactic lecture

Table I : Identification of enabling/interim LOs for an exit LO – "The graduate would be able to perform venepuncture on a patient independently" – and the expected phases of the curriculum for their achievement (Top-down Approach)

Enabling outcomes (knowledge, skills, attitude)	Expected phases of the curriculum for achievement
Able to: • Perform venepuncture on a patient under supervision (several times) • Assist the medical officers in performing venepuncture and collection of specimens • Fill up the investigation request form • Take consent from the patient	Phase III (Traditionally Year 5)
Able to: • Perform venepuncture on a mannequin • Apply aseptic technique • Choose equipment required for performing venepuncture • Assess the patient before performing venepuncture / precautions before performing venepuncture • Explain the indications/reasons/purposes for performing venepuncture	Phase II (Traditionally Years 3 & 4)
Able to: • Identify the veins that can be used for venepuncture • Demonstrate the surface anatomy of blood vessels • Describe the anatomy of cardiovascular system (structures and circulation)	Phase I (Traditionally Years 1 & 2)

Table II : Identification of LOs for an outcome – "At graduation a student will be able to diagnose and manage a case of Malaria."

Knowledge	Skills	Attitude
• Malarial parasite (life cycle, types and transmission) • Symptoms and signs of malaria • Laboratory investigations to be carried out in a patient suspected to have malaria • Drugs used for treatment of malaria (pharmacokinetics, modes of delivery, doses, adverse effects, precautions) • Resistance to drugs used for treatment of malaria • Non-pharmacological management of a patient with malaria • Complications of malaria • Prevention of malaria in individuals and the community	• Ability to take relevant history in a patient suspected to have malaria • Ability to demonstrate the physical signs in a patient with malaria • Ability to prepare slides for visualising malaria parasite in the blood of the patient (thick and thin film) • Ability to identify different types of malarial parasites on the blood film	• Communication skills • History taking • Explaining to the patient about the illness • Taking consent for collection of specimens for investigations • Informing the patient about the diagnosis • Explaining the treatment and compliance • Informing about the adverse effects of the drugs to be used • Explaining about the prevention – personal, at home and in community

in a large class. Mannequins and patients may be used to demonstrate abnormal heart and breath sounds if LOs require students to acquire these skills.

In contrast to duration-based traditional courses (5) OBE is competency based – as soon as students fulfil the requirement they move on to next level (an example of the criteria for "moving forward" is given in Table III). Therefore, apart from timetabled activities, the teaching schedules have to be flexible and individualised.

Table III : Criteria for 'moving forward' from CVS to next module in Phase I

Knowledge (Pass the individu-alised e-examination)	Skills (Must demonstrate to the satisfaction of the examiner)	Attitude (Must demonstrate to the satisfaction of the examiner)
• Adequate knowledge of anatomy, physi-ology, biochemistry, pathology, microbi-ology, pharmacology and community medicine in relation to following themes: 1. Ischaemic heart disease 2. Atherosclerosis 3. Valvular heat disease 4. Heart failure 5. Hypertension 6. Cardiomyopathies • Adequate knowledge in relation to longi-tudinal module i.e. Personal & Profes-sional development and Ethics	Able to: • Get relevant history from the patient • Demonstrate the surface anatomy of CVS • Perform physical examination of CVS – picking up obvious physical signs such as cyanosis, clubbing, oedema, hypo/hyper-tension, tachy/bra-dycardia, displaced apex beat, recogni-tion of 'not normal' heart sounds • Record ECG and 1. calculate the heart rate 2. calculate duration of waves and ampli-tudes 3. interpret above findings	• Communication skills – able to communi-cate with the patient with respect and politeness • Phrases the questions in such a way that are easy for patient to understand • Gets permission for performing physical examination • Able to answer the questions according to his/her level of training

Table IV : Matrix to show the links between LO, Contents, Teaching/learning methods (TLM) and Assessment methods

LO	Contents	TLM	Assessment
By the end of the module, the students will be able to mark the surface anatomy of lungs and its lobes	Knowledge - Boundaries of lungs in relation to the thoracic cage - Location of fissures of the lungs in relation to the thoracic cage - No. of Lobes of the right and left lungs Skill Identification of the surface markers related to the boundaries and lobes of the lungs (vertebrae and ribs) Attitude Explaining to the patient about the importance of the relevant physical examina-tion and obtaining his/her consent	Demonstration of the surface markings of both the lungs on the volunteers, mannequins or patients	OSCE (real or simulated patient)

Applications of modern technology using online teaching/learning methods such as chat groups, webinars, lecture videos and WhatsApp groups provide the robust format for this purpose.

Tip 6: Assessment of students
In OBE, assessment of students poses number of challenges. There are new outcomes which are not routinely assessed in traditional system and cannot be assessed with the existing tools of assessment. Therefore, apart from usual methods, individual examinations need to be blueprinted (17) based on the outcomes and course content. Assessment methods should be matched against the LOs of each phase and must support student learning. The components of the longitudinal tracks are to be assessed in each phase.

Assessments need to be spiral with increasing complexity and progressive in nature whereby the later years assessments should also include the components of earlier phases. Apart from the written examinations, assessments must include work-based multi-station setups (11).

Based on the level of training, the standards need to be defined precisely for each outcome. Miller's pyramid and Bloom's taxonomy can be used for this purpose. For example, the levels of expertise required of students, in relation to performing Lumbar Puncture (LP) can be made explicit as follows (4):
Level 1. Awareness of LP
Level 2. A full theoretical understanding of LP
Level 3. Observation of LP procedure
Level 4. Assisting during LP procedure
Level 5. Performing LP under supervision
Level 6. Performing LP independently

Being a competency-based, the assessment, like teaching/learning sessions, has to be both individualised and in groups. There has to be more reliance on continuous assessment rather than end-of-the-module or annual assessment. Use of portfolios; assignments; online examinations (e-examinations) consisting of randomly selected MCQs (18) e.g. TCExam, structured essay questions, patient management problems; MiniCx; video recordings; role plays; simulated patients etc. allow faculty to make competency-based decisions. The Entrustable Professional Activity (EPA) concept allows faculty to make competency-based decisions on the level of supervision required by the students (19). An example given in Table III illustrates the assessment process and the criteria used. The competencies frameworks (CanMed) provide descriptions to guide learners, their supervisors and institutions for teaching and assessment (19).

Patients' feedback provides valuable information to assess ethical aspects and professionalism among students. At FoM the patients are requested to answer

following question about the students who have examined them.

1.   Did the student greet you?
2.   Did he/she address you respectfully/politely?
3.   Were his/her questions clear to you?
4.   Did he/she ask for permission before examining you?
5.   Did he/she give clear instructions before performing physical examination?
6.   Was he/she gentle in examination?
7.   Did he/she cause excessive / unnecessary pain?
8.   Would you like to be examined by him/her again?
9.   Do you think he/she will make a good doctor?

The answers to above questions help the examiners to grade the student in the area of professionalism and ethics.

Tip 7: Developing curricular maps and outcome frameworks

It is imperative that the contribution of each curricular component in achieving the desired LOs be made clearly known and documented. This will allow the learning to be focussed and relevance be clearly seen by all the stake holders including students, teachers and educators (20).

Developing a matrix and outcome frameworks to show the links between LOs, curricular contents, teaching/learning methods and assessment (constructive alignment) gives a clear and quick overview of the outcome-based curriculum.

Curriculum mapping – which involves indexing of the curricular components (contents), clearly demonstrating their place in the overall curriculum (e.g. timetable) and linking them with desired LOs – makes the whole process transparent and accountable and helps in the implementation of the curriculum, ensures quality control and maintenance, and points out deficiencies, duplications and redundancies in the curriculum. It can be presented in the form of tables or matrices (21,9).

A number of online software applications are available for mapping the curriculum and organising the outcome frameworks. An example of such a matrix is given in Table IV.

Tip 8: Dissemination of LOs

A foremost requirement of OBE is that the LOs should be explicitly communicated to all stake holders of the programme including the students, the teachers, future employers and public at large.

All stake holders should be informed about the expected levels of competencies and skills of the fresh graduates specifically the communication and personal transferable skills; competencies in managing emergency, acute and chronic medical conditions; ability to work in the community and the hospitals; leadership skills; health promotions skills; competency to undertake research; and adherence to ethical principles of medical practice etc (4).

The LOs can be disseminated through multiple means and methods such as curriculum maps, course information summaries, student guides, course books etc. For example, a clinical attachment in obstetrics and gynaecology, apart from addressing the LOs directly related to the discipline, may also cover the other outcomes such as professionalism and ethics in medical practice, role as a team-member in providing health-care in the community and promoting, screening and preventive measures, communication and leadership skills etc. (4).

In FoM the LOs of the MBBS programme, of the respective modules and of all the teaching/learning sessions of that particular module are included in all the student guidebooks. LOs of the MBBS programme are also displayed at prominent places in the Faulty. LOs of a particular teaching/learning session are displayed on the screen before the session begins. Students in their written feedback are requested to comment whether the LOs were adequately addressed or otherwise during the teaching/learning sessions.

Tip 9: Longitudinal tracks

The purpose of integrating the parallel/vertical or longitudinal tracks with the biomedical and clinical sciences is to address and achieve the LOs essential to medical profession such as ethical values, communication skills, leadership skills, research and evidence-based medicine. These modules spiral up throughout the course with increasing complexity.

Four longitudinal tracks namely health ethics, law and professionalism; medicine and society; information literacy, critical thinking, evidence-based medicine, research methodology; and patient-based programme were included in a new curriculum that was implemented at the Yong Loo Lin School of Medicine of Singapore (11).

In FoM, the Personal and Professional Development and Ethics (PPD&E) module, covering all the areas mentioned above, runs parallel and vertically throughout the course. The students are assessed on these attributes at various intervals and junctures. A final assessment is carried out in the final phase of the curriculum. The students must pass in this assessment to qualify for sitting in the exit examination.

Students at FoM are expected to complete two research projects during their training period. First one to be completed by the end of Year-two which is carried out individually by all students and mainly relates to literature review on a topic chosen by the student

him/herself. Adequate training for this exercise is provided through modules on epidemiology, research methods and biostatistics, introduction to ethics and community and health. Second project is mainly based on the questionnaires or epidemiological studies and is conducted by students in teams of 5 to 6 individuals and should be completed by the end of Year-four.

Two elective postings of 4-weeks each are organised at the end of Years three and four. The choice of the topic for first elective is open and students can select either a medical or non-medical area. However, they must be monitored by an internal and an external supervisor. For the second elective, students are encouraged to choose topics/areas related to practice of medicine.

Tip 10: Implementing curriculum
Implementation of OBE programme has implications for students, teachers, assessment and evaluation committees, course and module coordinators, curriculum committees, faculty, administrators and other stake holders (4).

To succeed in transforming the existing curriculum to OBE and its effective implementation requires readjustments in medical school's infrastructure and the structure of different committees. The committees will be required not only to identify the exit outcomes of the curriculum but also the interim outcomes for different levels of implementation of the course such as phase or year outcomes, module outcomes and even the individual teaching/learning sessions' outcomes. New and innovative teaching/learning and assessment methods will be needed to ensure that students achieve the desired standards in all the outcomes. Novel assessment techniques would be required to assess the outcomes related to ethics, attitude, communication skills and professionalism. Expertise in medical education, advanced and adequate planning, financial resources, perseverance and persistence in approaches and positive responses to feedback both from students and staff are all important requirements and attributes for achieving the successful implementation of OBE and for the sustenance of the new curriculum design with its integrated layout (11).

The Royal College of Canada, 11 years after implementing CanMEDS, has made following recommendations for successful implementation of OBE in medical schools.
(a)   As OBE is a paradigm shift for 21st century medical education, the change managers must demonstrate necessary patience and perseverance required for a change of such a magnitude to be successful.
(b)   The change to OBE should be managed by effective, systematic and logical approach so that it is acceptable for all the stake holders including teachers and students.
(c)   Development of the faculty is absolutely critical

especially for educational leaders, researchers and more so for teachers who would be at the front-line of the change to overcome the resistance.
(d)   Additional resources should be readily available for the development and implementation of the curriculum and for rapid dissemination of the information to all the stake holders (22).

The internal or external assessors may use the stated outcomes as criteria/yardsticks for the purpose of assessing the success or otherwise of the actual implementation of an educational programme (4).

Tip 11: Monitoring of curriculum and its implementation
The curriculum committee, with the help of relevant experienced staff members, plays a major role in the identification of LOs, curricular contents, teaching/learning methods and assessment strategies. It also monitors the implementation process and quality assurance. Any change in the curriculum or its implementation must be approved by this committee.

The members of the curriculum committee should include senior academicians, Heads of the Departments and Medical Educationist. It should be chaired by the Dean or Deputy Dean who can make quick decisions. The curriculum committee should meet regularly and frequently.

The academic staff members are encouraged to provide feedback, point out any problems and present any new ideas to the curriculum committee for deliberation before making any change.

The FoM took almost two years to develop its outcome-based curriculum i.e. LOs, contents, teaching/learning and assessment methods. However, the curriculum is still time-based/duration-bound. It has been made absolutely clear that as LOs represent the core/minimum essential standards, they must not be disregarded. However, there is no restriction on teachers or students to go beyond the specified LOs (additional knowledge or skills).

Tip 12: Pledge to review and amend
For successful implementation of OBE curriculum, the leaders of the change must be open and ready to make appropriate amendments to address any insufficiencies identified in the content of the curriculum or its implementation. Efforts to improve the curriculum and its implementation ought to be a continuous process. Blueprinting of the curriculum, by identifying poorly written and disjointed LOs, provides sound evidence for the need of curriculum review (23).

The Faculty must develop a strategy and a standard operating procedure (SOP) for review of the curriculum if any shortcomings are pointed out in its design or implementation. The review may be based on the staff and students' feedback, levels of students' performance

in regular assessment exercises, external examiners' reports, observations of the supervisors, employers' comments and the demands of the society at large. The curriculum committee should hold the responsibility for reviewing the curriculum and implementation of amendments if any. It is imperative to record the basis of any change/s for future reference.

In FoM the review of the curriculum is carried out at three levels: at the end of each module based on the students' and staff feedback (urgent adjustments/changes required in the module) ; annually based on the feedback of the coordinators and external examiners (major changes); a major review after every five years based on the feedback of the employers and supervisors' comments during internship of fresh graduates.

DISCUSSION

The term OBE has been interpreted differently by different people (24). However, the basic concept of the shift from a "process-driven" to "product-driven" approach is agreed by all (25).

OBE brings conceptual transformations in the field of education, even influencing the aims and objectives of teaching/learning activities and the approaches to the development and implementation of the curriculum. Understandably this approach is most relevant to the professional institutions such as medical schools; being responsible for producing health care providers with attributes to practice medicine proficiently, ethically and competently.

It is critical that the exit and enabling outcomes should be identified first and then curriculum be developed accordingly, rather than having a curriculum first and then searching for the outcomes (10). Developing curriculum maps and outcome frameworks are the most useful and practical way to focus on and address the desired and most relevant LOs (20).

LOs once identified determine all the characteristic features and qualities of a curriculum, be it the contents, their organisation and delivery; the teaching/learning approaches; the assessment methods including frequency of examinations and the types of questions to be used; the educational environment and the implementation of teaching timetables (4). It holds both teachers and students equally responsible for the learning process to take place successfully.

As opposed to traditional curriculum, OBE gives high importance to the professional attributes of a practising physicians such as analytical, decision making, self-evaluation, communication and interpersonal skills and demands the inclusion of these attributes both

in the training schedules as well as in the assessment components (5). It is the longitudinal tracks / vertically running modules in OBE guided curriculum that specifically address the professional and personal attributes such as ethical values, leadership skills, research and evidence-based medicine especially required for physicians to practice medicine ethically, efficiently and effectively.

However, it should be understood that LOs mainly highlight the minimum essential requirements and are not meant to dampen the lateral thinking, creativity and imagination of the teachers and/or students (7).

We found the involvement of all the stake holders and top-down or backward approach (26) as most logical way of identifying the exit LOs. Using action verbs to describe the LOs guided us to (a) recognise the content, (b) design and organise the materials for effective teaching, (c) choose most appropriate method of delivery of the content and (d) use the most logical methods of assessment (7). We realised that the existing tools of assessment are unable to assess the new outcomes included in OBE and novel assessment methods – such as involving patients in the assessment of students or 360 degrees assessment approach – are required (17).

Implementation of OBE programme has implications for all stake holders including students and teachers (4). The curriculum committee plays a major role in the formulation, implementation and reviewing of the curriculum. Any change in the curriculum or its implementation must be approved by this committee which has students' representatives as its members.

For the successful implementation and incessant improvement of the OBE guided curriculum, the flag holders of the change must be receptive and ever ready to make apt amendments to address any inadequacies identified in the content or implementation of the curriculum. It should be understood that curriculum is a dynamic entity and needs to be upgraded constantly and continuously to keep it relevant and "age appropriate".

CONCLUSION

The main difference between traditional curriculum and OBE approach is the change in the focus. The traditional curriculum is knowledge-based and emphasises on the instructional process whereas OBE is mainly concerned with the output and the process is determined by the well-defined outcomes using constructive alignment. In this respect Competency-based Medical Education can be regarded as a subcategory of OBE.

This article has made practical suggestions to develop a brand-new OBE guided curriculum or a Competency-based Curriculum for undergraduate medical students.

The same steps (tips) can also help to transform the existing traditional curriculum to an Outcome-based Curriculum.

Although the level of endorsement of and conversion to OBE/CBME concept is increasing globally, several institutions of higher learning are finding it hard to implement the change. The difficulty and hesitance in accepting this change is understandable as OBE transforms the whole concept of doing business in education.

The term OBE has been interpreted differently by different people. A number of frameworks for articulating and reporting LOs have been outlined. It is conceivable that there will be no agreement on a uniform or standard framework. However, the frameworks which address the essential competencies expected of a doctor, provide an all-inclusive and cohesive view of medical practice and are instinctive and easy to use will be accepted by most of the institutions.

It is conceivable that the well-established institutions, with previously well-accepted and deep-rooted curricula, will find it particularly hard to implement this change. To win over the trust and support of the faculty, there would be a need to conduct dialogues, discussions and training workshops before the proposed change is presented for implementation. It is hoped that these tips will alley some of the fears and facilitate the adoption of OBE/CBME in new institutions and transformation in the existing institutions.

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