



**British Journal of Education, Society &  
Behavioural Science**  
2(4): 419-429, 2012

SCIENCEDOMAIN *international*  
[www.sciencedomain.org](http://www.sciencedomain.org)



---

## **Time to Change the Undergraduate Curriculum at the College of Medicine, Taibah University in Terms of SPICES Model**

**Khalid I. Khoshhal<sup>1</sup> and Shaista Salman Guraya<sup>2\*</sup>**

<sup>1</sup>*Departments of Orthopaedics, College of Medicine, Taibah University, Almadinah  
Almunawwarah, Kingdom of Saudi Arabia.*

<sup>2</sup>*Departments of Radiology, College of Medicine, Taibah University, Almadinah  
Almunawwarah, Kingdom of Saudi Arabia.*

### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author SSG conceived the idea, designed the study protocol, performed statistical analysis and wrote the initial draft. Author KIK collected the data, managed the literature searches and reviewed the manuscript. Both authors read and approved the final manuscript.*

**Policy Paper**

**Received 26<sup>th</sup> September 2012**  
**Accepted 31<sup>st</sup> December 2012**  
**Published 23<sup>rd</sup> January 2013**

---

### **ABSTRACT**

**Aims:** The modern educators have minimized didactic teaching by lectures, as outdated spoon feeding that dampens creative thinking and keeps the student away from reflective practice and lifelong learning. There are diverse ways for delivering medical curriculum ranging from teacher-centered and isolated blocks to the student-centered and integrated curriculum. This study aims to review the existing undergraduate curriculum of the College of Medicine at Taibah University (CMTU) Almadinah Almunawwarah Saudi Arabia (SA) and outlines the guidelines for a change in the existing curriculum in terms of Student-centered, Problem-based, Integrated, Community-oriented, Elective driven and Systematic (SPICES) model.

**Study Design:** Cross sectional study.

**Place and Duration of Study:** CMTU, between September 2010 and August 2011.

**Methodology:** CMTU started with the traditional curriculum and recently, there are well-structured modifications taken as initial steps towards a more integrated and systematic curriculum. The curricula of preclinical and clinical disciplines were analyzed in terms of

---

\*Corresponding author: Email: [drss76@yahoo.com](mailto:drss76@yahoo.com);

SPICES model; course contents, organization of the course, delivery of the course contents, teaching strategies, learning styles of the students, and integration among different courses.

**Results:** The undergraduate medical curriculum of CMTU stands on the right-side, which does not correspond to the desired left-sided paradigm on the SPICES model.

**Conclusion:** The study critically analyzes the existing curriculum for the undergraduate medical students and reflects the need for ratifications, based on modern teaching strategies and community needs.

*Keywords: Medical curriculum; teaching strategies; Taibah University; Saudi Arabia.*

## **1. INTRODUCTION**

The history of medical education in Saudi Arabia (SA) dates back to 1967 when the first College of Medicine, was established in King Saud University. Since then, to meet the demands of community and ever-expanding population, a growth of medical institutions has taken place. In 2005, the National Commission for Academic Assessment and Accreditation (NCAAA), an accrediting body was also established to unify the whole process of higher medical education in order to produce quality graduates.

The current undergraduate medical education in SA is characterized by a dichotomy between basic and clinical sciences. MBBS course starts with a preparatory year followed by pre-clinical and clinical phases each comprising of two and a half year duration. The CMTU in Almadinah Almunawwarah was founded under the umbrella of King Abdulaziz University Jeddah in 2000 and, later on in 2003, was incorporated with the newly established Taibah University. This school began its journey with the traditional medical curriculum which is still being followed with some modifications over the years.

Worldwide, more or less all medical schools are teaching the same content and syllabus and yet the end product varies. The possible explanation is in the difference in design, layout, delivery, timing and application of strategies. The curriculum is considered as a planned educational experience [1]. A curriculum encompasses assessment methods, resources and timetabling in addition to content. The SPICES model Harden et al. [2] can be used in curriculum planning or review, in tackling problems relating to the curriculum and in providing guidance relating to teaching methods and assessment. In this model, six educational strategies have been identified relating to the curriculum in a medical school. Each issue can be represented as a spectrum or continuum: student-centered/teacher-centered, problem-based/information-gathering, integrated/discipline-based, community-based/hospital-based, elective/uniform and systematic/apprenticeship-based.

The purpose of this study is to evaluate the existing undergraduate curriculum of CMTU and devise guidelines for adapting modern teaching and learning strategies in terms of the SPICES model. This model may be adapted by other Medical universities of the region if proven successful.

## 2. MATERIALS AND METHODS

The undergraduate medical curriculum of both the pre-clinical and clinical disciplines of the CMTU Almadinah Almunawwarah, SA was reviewed during the year 2010-2011. The course contents, organization of the course, delivery of the course contents, teaching strategies, learning styles of the students, and integration among different courses were analyzed. The information was gathered from the office of Vice Dean of Academic Affairs of the College of Medicine. In case of further inquiries, concerned departments were consulted. These six parameters identified in the SPICES model were extensively reviewed keeping in view the institutional capabilities and scarce available resources. The data was collected on Microsoft Excel 2007 for further analysis.

## 3. RESULTS AND DISCUSSION

Currently, at the College of Medicine 5-year MBBS undergraduate course is conducted with two and a half year delegated for each pre-clinical and clinical section as blocks. The subjects taught in different years are presented in Fig. 1.

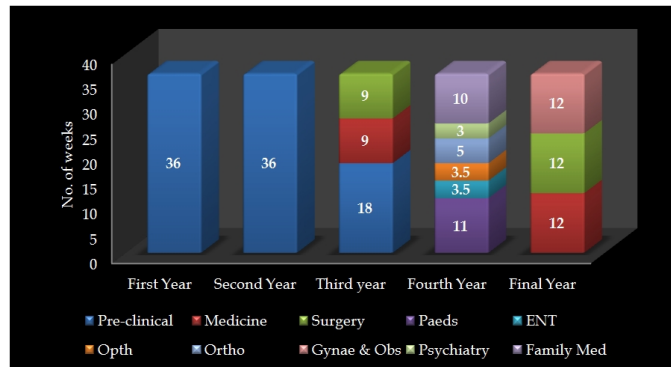


Fig. 1. The yearly breakup of the undergraduate medical curriculum at the College of Medicine Taibah University

In addition to the subjects in Figure 1, certain disciplines are delivered as once-a-week lecture as shown in Fig. 2.

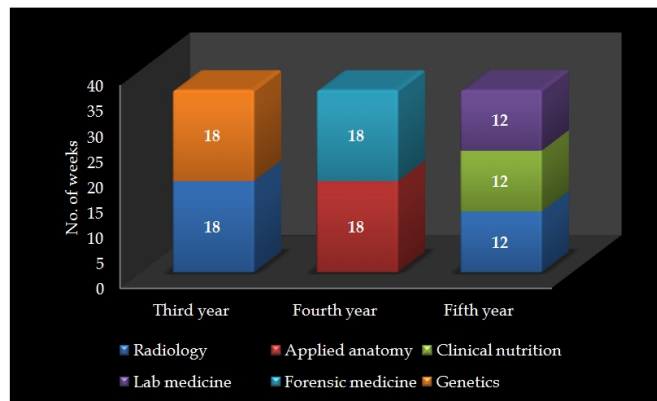
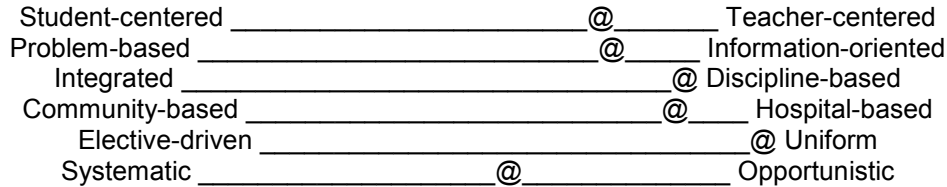


Fig. 2. The subjects are delivered as a once-a-week lecture from 3<sup>rd</sup> through 5<sup>th</sup> year

The findings of this study reported a non-uniform, unharmonized, and unstandardized curriculum. According to the SPICES model, currently the spectrum of Taibah University, College of Medicine undergraduate courses almost looks like (Fig. 3);



**Fig. 3. Taibah University standing in terms of SPICES model**

Although there were minor deviations, the educational strategies were reported to be towards more traditional right side; overcrowding of the curriculum, over presentation of some subjects, dissociation between basic and clinical courses, and excessive use of lectures and discipline-based practice. All of the clinical departments are delivering the curriculum with 5-day-a-week clinical sessions and an average of 7-12 lectures per week. Mostly lectures are merely recitation of standard text books thus not fulfilling adequately the function of developing understanding and motivation in students to learn. The two striking observations were the absence of electives and integration of the courses. There are no well-crafted study guides for most of the courses, but the students and staff are provided with course contents and timetables. There is not an agreed yardstick for marking the themes; this is a subjective evaluation based on evaluations of courses' curricula.

Harden and colleagues [2] identified six themes to consider when planning, or developing, a curriculum. They labeled each of these themes as a continuum, with more recent developments located to the left and more traditional strategies to the right. They suggested that by considering where a curriculum should fit in each of the six continua, a curriculum can be reviewed (or planned from scratch) more effectively. These themes, being recognized as the ultimate landmarks, are discussed in relation to the existing curriculum in the CMTU.

### 3.1 Student/Teacher-Centered Approach

In teacher-centered approach, the students remain passive learners. At CMTU, most of the material is imparted through lectures, with no well-structured study guides provided beforehand. Theoretically, there is allocated time for tutorials which is mostly used as lectures but practically many students are not willing to contribute resulting in graduates with poor communication skills. Lectures are considered as a method of transferring the notes of a teacher to the notes of a student without passing through the heads of either. The detailed coverage of facts and findings in the lectures leads to passivity in the students, causing rote memorization of the stuff without stirring the deep connections of brain.

Harden et al. [3] demonstrated in a randomized controlled trial that medical students learn more effectively when they work independently, using learning resources prepared for the purpose, compared with the students who attend lectures. A study guide can be seen as a management tool which allows teacher to exercise their responsibilities while at the same time giving students an important part to play in managing their own learning. Study guides should be provided at the get go of the course which supports the concept of coherent curriculum [4]. If one has no idea of the big picture it may be difficult to finish a jigsaw puzzle

[5]. Study guides provide an overview for the student and show how various parts of educational program fit together. Since information overload is a major challenge, study guides can highlight the required breadth and depth in a given subject. Secondly, specified learning outcomes in the study guides will help the students to specify their pace and directions to attain the knowledge from different sources. Tutorials should be the mainstay of sharing knowledge but at the same time, interactive lectures with student seminars and short group sessions can serve the purpose. Students should decide the pace and speed of their learning, as all brains don't have the same imbibing capacity. Active learning, self assessment and self learning are the intentions [4]. E-learning, integrated labs and clinical exposure enhances the speed of absorption of information by the receiving brains.

At the same time the teachers must be the integral part of information providing system, otherwise the entire student-centered approach will leave the curriculum to the shoulders of the novice, which might derail it.

Aiming to be in the middle of spectrum, learners will be endorsed with the responsibility to develop learning plans, evaluate shortcomings and to determine the learning pace for themselves [6], and the role of teachers will be transformed into a facilitator; a demanding but more rewarding role [7]. Adopting this position will demand student presentation, as well as well structured lectures to provoke thought for better understanding. In short, lectures can bring a subject alive and make it more meaningful. For its implementation, curriculum must be motivating enough to help students in developing their skills towards self learning with clearly delineated learning objectives, containing study guides, curriculum maps, internet resources, time management and protected time allocated in schedule for independent learning.

### **3.2 Problem/Information-Oriented Approach**

At CMTU, learning is mostly acquired through an information-oriented system, which is more close to rote memorization. Clinical subjects are taught as a block system, but at the end of the day students are unable to place these blocks in their appropriate places. This compartmentalization of knowledge is the least desirable objective in modern medical education.

Problem-based learning (PBL) is student-centered approach to active learning, originated from McMaster University [8]. PBL is science-in-action approach where the fundamental issue is the intelligent use of a problem to drive the learning activities on a need-to-know basis. PBL will offer a safe and supportive environment for discussing and sharing existing knowledge while generating ideas and testing possibilities [9].

PBL should be introduced in the early years of the undergraduate medical curricula to encourage active learning and concurrent practice in skill labs and clinical experience in hospitals, so that the students can acquire knowledge and skills in parallel. An effective PBL small group teaching is cohesive, motivated, and mutually supportive collection of learners where knowledge is freely shared and all are actively engaged in learning. A classical sequence of events in small group teaching comprises forming, norming, storming, reforming, and disbanding. Students learn to co-operate rather than just to compete [9]. Roles are shared and all participate in discussions on their turn. Although not following the recommended guidelines, some of our departments have adopted small group teaching. At CMTU, the major obstacle is the non-existence of a university hospital, which reduces the

control on clinical sessions on real patients. Another limitation is the deficient number of qualified and trained staff, which is a point to ponder by the university administration.

Broad goals of PBL include the encouragement of self-directed learning, scientific and clinical reasoning, attainment of communication skills and teamwork. This can be achieved by coaching role of the teacher and formative assessment. Implementation of PBL needs tutor training to equip teachers for their new roles [10]. In case the tutor is placed in a driving role, s/he has to discreetly counteract with tact, skill, and substantial grace. His chief role is to listen and encourage ideas and opinions. A PBL tutor is a facilitator rather than a source of information and requires training and ongoing support.

Now that the medical educators have started to feel a little uncomfortable about PBL, the evidence for and against PBL are equivocal [11]. It has been reported that students on PBL courses are uncertain about their level of knowledge and suffer feelings of inadequacy [12]. To overcome this discomfort, sometimes task-based learning [13] comes into action, but the "backward" reasoning approach is another big issue in PBL, which should be reserved for expert clinicians only. Similarly to overcome such short comings of PBL model, educators at the University of Calgary Faculty of medicine created a Clinical Presentation Curriculum. This approach is quite different from the hypothesis-to-data-generation which is peculiar to PBL [14]. In the given circumstances at CMTU, small group teaching facilitated by the tutors in a problem-based setting would be a major drift towards the left-hand side of the SPICES paradigm.

### **3.3 Discipline-Based/Integrated Approach**

CMTU follows a didactic discipline-based curriculum where the pre-clinical disciplines are taught during the first two-and-a-half years and by the time the student enters into the clinical side, much of the prior knowledge has evaporated. Departmentalization of the curriculum is another stigma which is a great obstacle to integrated curriculum.

Integration is the organization of teaching matter to interrelate or unify subjects frequently taught in separate academic courses or departments [1]. It is also referred to as interdisciplinary, thematic or synergistic teaching.

The objective of education is to improve the quality of meanings we construct [15]. A recent study has, however, reported that effective competence-based-learning is not achieved by offering students separate building blocks because this does not facilitate the transfer of what students have learned [16]. Information in isolation is inert and unhelpful [14]. When students learn complex tasks in an integrated manner, it will be easier for them to transfer what they have learned to the reality of day-to-day work settings [17]. Vertical integration is an inter play of disciplines traditionally taught in different phases of curriculum, classical example being the Spiral Curriculum taught at the University of Dundee. Similar curricula bring about more relevance and excitement in learning.

Horizontal integration is a link between parallel disciplines such as anatomy, physiology and biochemistry or medicine, surgery and therapeutics which are traditionally taught in same phase of the curriculum. Vertical integration is a spiral curriculum which can be scientifically applied in the present settings of CMTU.

PBL and clinical presentation-based models are very useful way to integrate learning [18]. The vertical integration between basic sciences and clinical medicine in a PBL setting has

been found to stimulate deep rather than superficial learning, and thereby evokes better understanding of important biomedical principles [19]. To gain maximum benefits, we should aim for both horizontal and vertical integration. But a number of factors need to be considered, such as aims of curriculum, organizational structure and resources, assessment methods need to be considered before deciding the level of integration [13].

The success of an integrated curriculum depends on the implementation of an integrated assessment. Integrated assessment will reflect integrated curriculum. The examination questions should include modified essay questions, problem-based questions, best answer questions, objective structured clinical examination, and objective structured practical examinations reflecting an integrated curriculum [20]. Integrated assessment does not mean an assessment with five questions from each discipline put together in one paper. To exemplify, cardiovascular system is taken from first year and all possible aspects like anatomy, physiology, pathological variants, presentations of the disease process, and the range of management strategies are taught in reference to the context. The real essence of integration needs cohesive teamwork among the different disciplines and trained faculty. Integration of a curriculum might overshadow the true discipline sense and teachers might not feel comfortable with this approach. The current principles of medical education in terms of the SPICES model demand the application of integrated curriculum at CMTU with an intention to improve students' knowledge and critical thinking.

### **3.4 Community/Hospital-Based Approach**

At our institution, most of the curriculum is developed by hospital/university-based staff, so the community-based education is mostly neglected. Common community-based health problems are only seen by the general practitioners at basic health care centers. Students are passive learners that, as soon as they have learnt the specific functioning of one team, they move to another discipline with new supervisors, hence the time spent in wards as "study" rather than as "work".

Community-Based Medical Education (CBME) is now an increasingly popular tool in medical educator's toolbox, meant to work in peripheral and small health-care centers. The community involves a potential broadening of perspective [21]. Students should spend at least 50% of their time in community visiting GPs', community health care centers, patients' homes, schools and community fairs etc. Worley et al. [22] narrated that rurally based students encountered double the number of common medical conditions and assisted in, or performed, six times as many procedures as city-based students. This practice also ensures integration of a range of disciplines without much effort.

CBME is also useful in providing a long-term work force redistribution strategy. CBME is a mean of achieving local relevance in teaching and learning activities so that education is intimately engaged with the community, which becomes the learning environment [23,24]. Rural location is an ideal setting for practical community based learning where one can develop knowledge, skills and attitude that are useful in any medical practice setting. Almadinah Almunawwarah, is located at a lucrative religious hub for the Muslim World, a novel segment of CBME can be dedicated to the pilgrims for Hajj and Umra during the Ramadan and Hajj occasions.

In CBME, students come across with broader illness spectrum ranging from different levels of severity and complexity while in tertiary health settings highly filtered case-mix, all of high severity and complexity are being catered. Other benefits include gaining insight into the

social context of health, real life mutual learning experience, broadening students' understanding of health professional roles in the community, interaction with professionals from other disciplines, 'student-client' communication and community-based research projects [25]. General practitioners, family physicians, consultants, and other health care professionals in the rural setting can best serve the purpose of medical teachers since most of them are potential teachers with broad clinical skills, managing a wide variety of patient-care challenges. General Practitioners may also need to be trained for their future role. But teaching in the community may require additional time and person-commitment because of the low student-teacher ratio and costing of supporting the students at a distance, such as accommodation, travel for students and academic staff, and information and communication technology. For this, we can start instilling this component gradually till we attain the desired levels.

### **3.5 Elective/Uniform Approach**

At our institution, no concept of electives has been cultivated at the undergraduate level. This is addressed only during internship.

It is no longer possible for students to study in-depth all topics in a curriculum and elective syllabus can provide them with the opportunities to explore their areas of interest and develop skills in critical appraisal and self assessment.

By taking few steps towards the left on SPICES continuum we can handle a little bit of enormously expanding medical knowledge. The concept of a core curriculum will ensure the acquisition of uniform baseline knowledge by all students. Providing them with the opportunity to choose electives will facilitate their career choice, will bring about an attitude change thus making curriculum flexible enough to be relevant to students aspiration [1]. Using a core curriculum, time can be freed for students to study extra topics or subjects of their own choosing, referred to as student selected components. CMTU can offer a list of electives for the students to choose from; for example ambulatory care medicine, acute medicine, and metabolic surgery, bioethics, and management and leadership. Before embarking upon this strategy, a few problems need to be addressed such as recruiting additional staff so as not to burden the already overloaded faculty, managing the core curriculum and designing an assessment layout for electives. This exercise also needs collaboration of Taibah University among established universities, and as an initial step.

### **3.6 Systematic/Oppportunistic Approach**

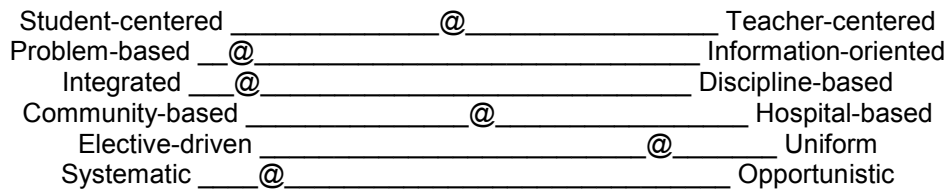
An opportunistic approach prevails at CMTU where only few hard working and consistent students will get hold of uncommon and complex cases. Keeping in view, there is a great mismatch between what is expected of the young doctor and the competencies gained from the training program.

In outcome-based education, student learning focuses on predefined learning objectives. Curriculum mapping is a comprehensive approach to designing and delivering medical curriculums which includes the expected learning outcomes, the curriculum content or required areas of expertise, assessment procedures, learning opportunities, learning resources, a timetable, the staff involved, and measures for future curriculum development [26]. To fulfill defined learning outcomes, a systematic approach is needed so that all students will have a comparable learning experience. This can be done by provision of study



guides and core curriculum to the demonstrators and keeping a check on the topics covered in each clinical session. Well equipped and modern skills lab teaching is a way of providing systematic and uniform teaching in controlled environments. Blended learning in the form of face-to-face learning and e-learning will serve the purpose of permanency and a very precise way to monitor the systematic and uniform way of learning and facilitation of learning.

At CMTU, based on the advantages discussed advantages of SPICES model, the future vision of the continuum of the SPICES model for teaching strategies of the undergraduate medical education is proposed as (Fig. 4);



**Fig. 4. Vision of Undergraduate Medical Curriculum by Taibah University**

Not all studies require a large sample size, or a tightly-controlled comparison, or any comparison group at all. But decisions regarding these issues should arise after careful deliberation and thoughtful consideration of how the decision will impact study interpretations [27].

#### **4. CONCLUSION**

Rigorous and regular application of concepts within the SPICES model is recommended in achieving the required standards and this is likely to lead to better student outcomes and satisfaction. We don't recommend taking a sudden u-turn and introducing all new strategies, but by adding a little more spice every year will make it palatable to the community and medical profession. Little changes introduced gradually are more long lasting as compared to the drastic and the sudden ones. More evidence based research is needed to validate finding of our study.

#### **ACKNOWLEDGEMENTS**

The authors appreciate Prof. Salman Yousuf Guraya FRCS for his invaluable expertise in proofreading and improving the manuscript.

#### **COMPETING INTERESTS**

The authors declared that no competing interests exist.

#### **REFERENCES**

1. Kern D, Thomas P, Howard D, Bass E. Curriculum Development for Medical Education. Baltimore: The John Hopkins University Press; 1988.

2. Harden R, Sowden S, Dunn W. Some educational strategies in curriculum development: the SPICES model. ASME Medical Education Booklet No. 18. Med Educ. 1984;18:284-297.
3. Harden R, Stevenson M, Lever R, Dunn W, Holroyd C, Wilson G. Experiment involving substitution of tape/slide programmes for lectures. Lancet. 1969;1:933-935.
4. Beane J. Toward a coherent curriculum. Yearbook of the association for Supervision and Curriculum Development. 1994; 170-7. ASCD, Alexandria, VA.
5. Harden R, Davis M, Crosby J. The new Dundee curriculum: a whole that is greater than the sum of the parts. Med Educ. 1997;31:64-271.
6. Challis, M. AMEE Medical Education Guide no. 18. Personal learning plans. Med Teach. 2000;22(3):225-236.
7. Harden R, Crosby J. AMEE Education Guide no. 20. The good teacher is more than a lecturer-the twelve roles of the teacher. Med Teach. 2000;22(4):334-347.
8. Norman G, Schmidt H. Effectiveness of problem-based learning curricula: theory, practice and paper darts. Med Educ. 2001;34:721-728.
9. Visschers-Pleijers A, Dolmans D, Grave W, Wolffhagen I, Jacobs J, Van Der Vleuten C. Student perceptions about the characteristics of an effective discussion during the reporting phase in problem-based learning. Med Educ. 2006;40:924-931.
10. Farmer E. Faculty development in problem-based learning. Eurp J of Dent Educ. 2004;8:58-65.
11. Newman M. A pilot systematic review and meta-analysis on the effectiveness of Problem Based Learning. Available: <http://www.mdx.ac.uk/www/hebes/teaching/Research/PEPBL/>. 2003.
12. Prince KJAH, van Mameren H, Hylkema N, Drukker J, Scherpbier AJJA, van der Vleuten CPM. Does problem-based learning lead to deficiencies in basic science knowledge? An empirical case on anatomy. Med Educ. 2003;37:15-21
13. Harden RM, Crosby JR, Davis MH, Howie PW, Struthers AD. Task-based learning: the answer to integration and problem-based learning in the clinical years. Med Educ. 2000;34:391-7.
14. Mandin H, Jones A, Woloschuk W, Harysam P. Helping students learn to think like experts when solving clinical problems. Acad Med. 1997;72:173-179
15. Newman F, Marks H, Gamoran A. Authentic pedagogy and student performance. Am J Educ. 1996;104:280-312.
16. Janssen-Noordman A, Merrinboer J, van der Vleuten C, Scherpbier A. Design of integrated practice for professional learning competencies. Med Teach. 2006;28(5):447-452.
17. Regher G, Norman G. Issues in cognitive psychology; implications for professional education. Acad Med. 1996;71(9):988-1001.
18. Barrows H. How to design a problem based curriculum for the preclinical years. New York: Springer; 1985.
19. Dahle L, Brynhildsen J, Berbohm Fallsberg M, Rundquist I, Hammar M. Pros and cons of vertical integration between clinical medicine and basic science within a problem-based undergraduate medical curriculum. Examples and experiences from Linkoping, Sweden. Med Teach. 2002;24:280-285.
20. Malik A, Malik R. Twelve tips for developing an integrated curriculum. Med Teach. 2011;33(1):99-104.
21. Boaden N, Blich J. Community-based medical education: towards a shared agenda for learning. Oxford University Press, New York; 1999.
22. Worley P, Prideaux D, Strasser R, Newble D, Jones A. The parallel rural community curriculum: an integrated clinical curriculum based in rural general practice. Med Educ. 2000;34:558-565.

23. WHO. Community-based education of health personnel: Report of a WHO study group. Technical Report Series. Geneva: World Health Organization; 1987.
24. Magzoub M, Schmidt H. A taxonomy of community-based medical education. *Acad Med.* 2000;75:699-707.
25. Mudarikwa R, McDonnell J, Whyte S, Villaneuva E, Hill R, Hart W and Nestel D. Community-based practice program in a rural medical school: Benefits and challenges. *Med Teach.* 2010;32(12):990-996.
26. Connell H. Spicing up medical education. *Student BMJ.* 2009;17:b2390.
27. David C. If you teach them, they will learn: why medical education needs comparative effectiveness research. *Adv in Health Sci Ed.* 2012;17:305-310.

---

© 2012 Khoshhal and Guraya; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<http://www.sciencedomain.org/review-history.php?iid=158&id=21&aid=859>