



Perspective

Operations perspective to competency-based medical education: Experiences of IUPS-ICMR Physiology Education Workshop series (2018-2019) conducted in India

The Medical Council of India (MCI; now National Medical Commission, NMC) introduced landmark changes in the medical education landscape of the country in November 2018 by establishing competency-based curriculum as the training method for Indian medical graduates¹. This was a much-needed reform to transform the structure and process-oriented undergraduate medical training into a competency and outcome based curriculum. It is however, anticipated that implementation of this curriculum shall face various practical challenges that may adversely affect the proposed dividends of this theoretically sound curricular framework². A team of physiology educators consisting of faculty members from India, Finland, Malaysia and the United States of America conducted a series of physiology education workshops on active learning techniques at four apex centres of medical education in different parts of India in 2018 and 2019. The details of the workshops are presented elsewhere³. This physiology education workshop series was a joint initiative of the Indian Council of Medical Research (ICMR) and the International Union of Physiological Sciences (IUPS). The workshops provided the organizers and the resource faculty with the unique opportunity to interact and obtain feedback from the participating faculty members who represented institutions across the country with considerable diversity in academic norms, pedagogic practices, access to infrastructure and availability of resources.

The guiding principle of the competency-based curriculum of NMC is to make it 'more learner-centric, patient-centric, gender-sensitive, outcome-oriented and environment appropriate'¹. The new curriculum thus envisions an academic environment that nurtures the growth of undergraduate medical students into competent physicians who are equipped with adaptive skills to respond responsibly and appropriately to the current and future healthcare needs of the society.

Learner-centric approaches in pedagogical processes form the cornerstone of this curricular framework. In general, there exists marked inter-learner variability in the time taken to develop broad competencies, which may be further mapped to subject-specific sub-competencies¹. This time-independent student-specific approach to learning demands self-directed and reflective learning as the core learner attribute for the successful development of competencies⁴. Self-directed learning is best nurtured in an active learning environment that enables adult learners to engage in the learning process by problem solving and by participating in higher order cognitive tasks, applying the gathered knowledge to real-life case scenarios rather than mere acquisition of information and facts⁵. Active learning sessions in small groups using problem-based learning (PBL), case-based learning (CBL) and flipped classroom (FCR) models augment peer-assisted learning. These practices also generate opportunities for individual learners to identify their specific learning needs through self-reflection and analysis of prior understanding. Thus, a self-directed approach towards knowledge acquisition and application in an active learning environment best nurtures the development of competencies through explorative, experiential and iterative learning⁶. This paradigm was the basis of the IUPS-ICMR workshop series. The important perspectives in terms of anticipated challenges and possible solutions for the implementation of competency-based curriculum for Indian medical graduates are summarized in the Table.

Anticipated challenges

Dearth of adequately skilled educators: A significant challenge to the successful implementation of a competency-based curriculum for medical students in India is the lack of awareness and adequate expertise regarding active learning strategies among the faculty

Table. Anticipated challenges and possible solution for the implementation of competency-based curriculum for Indian medical graduate

Challenges	Possible solution
Dearth of adequately skilled educators	Statutory bodies and stakeholders at the national level shall organize hands-on workshop series involving national and international experts in active learning methodologies to train the trainers and medical educators using IUPS-ICMR workshops conducted during 2018-2019 as a working model ^{3,7} .
Limitation of resource materials for active learning	Create working groups at the national and regional levels for developing validated repositories of openly accessible learning resources ⁷ . Promote collaborative efforts among teams of faculty members from preclinical, paraclinical and clinical disciplines at the institutional level to create learning resources from real clinical cases to facilitate deeper experiential learning among medical students ⁷ .
Challenges in implementing formative workplace-based assessments	Revision of minimum requirements as directed by statutory bodies to attain optimal faculty-to-student ratio conducive for effective workplace-based assessment ⁸⁻¹⁰ . Training of faculty assessors on workplace-based assessment at the institutional and regional levels ^{9,10} . Development of assessment strategy that includes workplace assessment methodology as well as the usable and valid tools for assessment ¹¹⁻¹³ .
Variegated student's perspectives	
Residual impact of passive learning-oriented training for competitive examinations	Inculcate skills of self-directed and reflective learning to facilitate smooth transition into the active learning environment of medicals colleges through specific modules in the foundation course ^{5,14} .
Language barrier	Mixed and flexible use of both vernacular language and English for instruction during the first year of undergraduate training ⁷ .

IUPS, International Union of Physiological Sciences; ICMR, Indian Council of Medical Research

members. Medical education in most of the academic centres in India continues to be instructor driven with didactic lectures as the most frequently used instructional tool. Sensitization of faculty members to rediscover their academic roles as facilitators of a learner-centric instructional approach is indispensable for the appropriate implementation of active learning techniques¹⁴. With this background, the IUPS-ICMR workshop series were conducted to create awareness and hands-on experience about the potentiality and practices of CBL, PBL and FCR models among faculty members in basic sciences and human and veterinary medicine. The feedback data obtained from the participants showed that 50-65 per cent of the young teacher participants (depending on the centre) were not familiar with these active learning techniques⁷. This is overtly indicative of a significant hiatus in the awareness and preparedness among faculty members in getting themselves pedagogically equipped to deliver a competency-based curriculum. It was generally felt by the facilitators, participants and observers that statutory bodies and stakeholders at the national level might organize hands-on workshop series involving

national and international experts in active learning methodologies to train the trainers from NMC regional centres for medical education using IUPS-ICMR workshops as a working model^{3,7}. Without engagement in such ongoing conversations and 'co-reflection', teachers may be trapped in a state of stagnant self-appraisal with reduced motivation to change, and with a fear of doing things differently^{15,16}. On the other hand, pedagogical training leads to professionalism enabling academics to make appropriate improvements as a response to criticism. By training, academics improve on pedagogical thinking and understanding basic theoretical concepts of teaching and learning that enable analysis of feedback from various sources. Sense of influence leads to commitment, willingness and increasing emotional ability. Pedagogically trained academics own a sufficient repertoire of teaching methods and are able to choose the appropriate method for the situation^{17,18}.

Limitation of resource materials: Almost all participants and observers of the workshops expressed their concerns about limited availability of suitable clinical cases and problems as a major

roadblock to conducting active learning sessions using PBLs and CBLs. A major limitation was a serious dearth of skilled personnel or groups trained as content designers and content providers⁷. It was commonly felt that serious efforts were necessary to create working groups at the national and regional levels for developing validated repositories of openly accessible learning resources. These resources must include case scenarios and problems relevant to the Indian context and be used liberally in active learning sessions. There was an added emphasis on horizontal and vertical integration across disciplines in the new curriculum. This demands the facilitation of collaborative efforts among teams of faculty members from pre-clinical, para-clinical and clinical disciplines at the institutional level to create learning resources from real clinical cases to facilitate deeper experiential learning among medical students⁷.

Assessment in competency-based curriculum in medical education: The issue of how to conduct assessments in competency-based medical education (CBME) repeatedly surfaced in the workshops. Although CBME in principle is time independent and outcome oriented⁴, the course structure of undergraduate medical training in India continues to follow time-restricted framework¹, posing itself as one of the most fundamental challenges that could only be circumvented by major administrative reforms. The assessment setting is further complicated by the incongruence of it being discipline based, whereas the course content is expected to be delivered with considerable horizontal and vertical integration across various pre-, para – and clinical disciplines¹. A major emphasis on regular formative assessments is needed to keep real-time tracking of the development of competencies among learners; this is *sine qua non* so that corrective measures can be forwarded to the individual students who need additional support¹¹. This demands instructors and faculty members invest a considerable amount of effective time for directly observing, assessing and grading the knowledge, attitudes and skills of students with reference to the performance benchmarks for each sub-competency. Furthermore, rigorous and structured post-assessment feedback to individual learners clearly outlining the deficits in their performance is crucial to redressing their learning behaviour as required towards a timely attainment of competencies. Ensuring the validity and reliability of formative workplace-based assessments and the quality of instructor feedback demands a highly favourable assessor-to-learner ratio that goes well

beyond the currently prescribed minimum requirements for medical colleges in addition to appropriate training of all assessors on workplace-based assessments^{1,8-10}. Efforts are also required for the development of befitting assessment strategy that includes workplace assessment methodology as well as the usable and valid tools for assessment¹¹⁻¹³.

Variiegated students' perspectives: The students admitted to medical colleges in India are fresh pass outs from the academic environment of schools and coaching centres for entrance examinations where they are trained mostly to be competitive rather than collaborative and competent. This involves instructional processes oriented towards passive learning that hinders their smooth academic transition into the active learning environment of medical colleges. This is further complicated by the difficulties posed by the language barrier for many students who undertake schooling in vernacular languages while English is generally used as the medium of instruction in medical colleges in India. Subsequent to the culmination of the IUPS-ICMR workshop series conducted in 2018, the present group of facilitators conducted a brainstorming meeting in which a case study on the mixed use of vernacular language and English was reported as a potential solution to overcome such hindrance caused from the language barrier for achieving better student engagement during CBL sessions⁷. It is recommended that the foundation course module in the new curriculum be specifically oriented to prepare medical students for an effective transition to the active learning environment best suited for nurturing them into competent physicians. Proactive measures to make every student understand the significance of being an independent, self-directed learner are critical to ensure his or her effective participation in active learning sessions.

It appears that a successful implementation of the well-articulated competency-based curriculum for Indian undergraduate medical students requires concerted and coordinated efforts by stakeholders for the formation of networks involving institutional, regional, national and international working groups at the hub for promoting and supervising training of medical faculty members and creating repositories of active learning resources. The IUPS-ICMR workshop series exemplified that institutes of national importance that cater to medical education are strategically placed to promote CBME in the country in an independent manner by facilitating networking

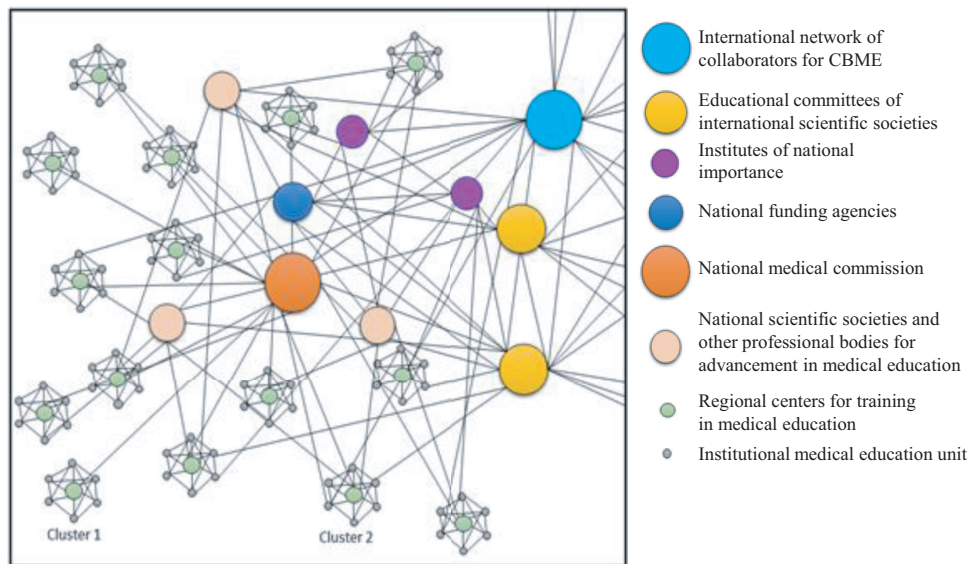


Figure. A proposed distributed network model for promoting collaborations at various levels involving regional, national and international players (shown as colour coded nodes and hubs) in different capacities for successful implementation of a competency-based medical curriculum. Clusters of medical institutions affiliated to respective regional centres for training in medical education under the National Medical Commission differ in their inherent connectivity (cluster 1 vs. cluster 2 as represented in the figure) with national and international scientific societies and other agencies, thereby creating opportunities for training in CBME for the faculty members in respective institutions. A distributed network model is a potential solution to address these heterogeneities and disparities innate to the Indian medical education arena. CBME, Competency-based medical education.

with international agencies. The proposed distributed network for facilitating collaborative efforts towards implementation of CBME needs to be supported by proactive changes in the existing regulatory norms and policies regarding the minimum requirements concerning instructor/faculty workforce that conforms to the true spirit and philosophy of a competency-based curriculum. The establishment and maintenance of such operational networks requires only a modest funding support, which different governmental and non-governmental agencies may easily provide. In Figure, a model has been proposed for promoting collaborations at various levels involving regional, national and international players to address the challenges in making CBME fructify in Indian medical education.

Acknowledgment: The authors thank the Director General of the ICMR, and Dr. N.C. Jain, Division of Human Resource Planning and Development, ICMR for facilitating conduct of the tri-series 'Physiology Education Workshops' in 2018.

Financial support & sponsorship: This study was financially supported by the Indian Council of Medical Research; International Union of Physiological Sciences (IUPS) – Education committee; Dr Ramdas Pai and Shrimati Vasanthi Pai Endowment Fund of the Sikkim Manipal University (SMU), Sikkim.

Conflicts of Interest: None.

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Received March 12, 2021

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