

**Report of the Board of General Assembly – International Union of Physiological Sciences on ‘Hands On’ Workshop on Medical Teaching Methodologies: IUPS Initiative drafted and submitted by Jayasree Sengupta, Susan Barman and Debabrata Ghosh**

The ICMR Tri-Series Workshop on Workshop Series on Physiology Education Techniques 2018: IUPS Initiative held in three academic institutions – All India Institute of Medical Sciences Jodhpur (Rajasthan), North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences Shillong (Meghalaya), and Government Medical College Kozhikode (Kerala) in India in 2018 concluded on November 17, 2018. A follow-up Brainstorming Meeting was held at AIIMS, New Delhi on January 20, 2019 attended by members of the Core Committee and by six delegates who had participated in the Workshops held in 2018. The Report of the Brainstorming Meeting is available in the IUPS website <http://www.iups.org/reports/other-reports/>.

As a follow-up activity in teaching-learning exercises in a medical school, Dr. Rubi Dey, faculty member of the Department of Physiology, Sikkim Manipal Institute of Medical Sciences (SMIMS), Sikkim Manipal University (SMU) organized hosting a ‘Hands On’ Workshop on Medical Teaching Methodologies in Gangtok, Sikkim during 5th to 7th November 2019. Dr. Dey had been a delegate at the NIGRIHMS Workshop held in Shillong, Meghalaya during 10th to 12th November 2018 and a participant of the Brainstorming Meeting in AIIMS, New Delhi.

Dr. R. Dey as the Organizing Secretary welcomed the Dean, SMIMS, the Vice Chancellor SMU, all Resource Faculty members, the Chairperson, Dr. D. Ghosh, Dr. J. Sengupta and the faculty members of SMIMS to its inauguration on Nov. 5, 2019. The Inaugural Address was delivered by Brig. (Dr.) V.K. Mehta, Dean, Sikkim Manipal Institute of Medical Sciences (SMIMS). The Keynote Lecture was next delivered by Lt. Gen. (Dr. M.D. Venkatesh, Vice Chancellor, Sikkim Manipal University (SMU). Dr. D. Ghosh in his capacity as the Chairperson of the Workshop and Dr. J. Sengupta as the Chairperson of the BGA-IUPS addressed the gathering, followed by the traditional Lighting of the Lamp to conclude the Inaugural event.

The Hands On’ Workshop on Medical Teaching Methodologies: IUPS Initiative held at the SMIMS-SMU during November 5 to 7, 2019 was chaired by D. Ghosh, Professor of Physiology at the All India Institute of Medical Sciences, New Delhi. The members of the Resource Faculty included, Dr. Susan Barman (Michigan State University, USA), Dr. Dinu Chandran (AIIMS-Delhi) and Dr. Manpreet Kaur (Vardhaman Mahavir Medical College-Safdurjung Hospital, New Delhi) for Case Based Learning (CBL); Dr. R. Sharma (Vardhaman Mahavir Medical College-Safdurjung Hospital, New Delhi) and Dr. Bharti Bhandari Rathore (Government Institute of Medical Sciences, Greater Noida, U.P.) for Problem Based Learning (PBL); Dr. Manasi Bhattacharjee (Vardhaman Mahavir Medical College-Safdurjung Hospital, New Delhi) and Dr. Suriya Prakash (AIIMS-Delhi) for Flipped Classroom (FCR). Delegates in three groups participated in each session after completing a short Pre-Session Questionnaire based on the Workshop preparatory material sent in advance of the Workshop and at the end of each session they completed Post-Session Questionnaire and Session Assessment Questionnaire, and finally delegates submitted to resource faculty a General Feedback for all three sessions.

Fifty four (54) faculty members of SMIMS-SMU were the delegates: Anatomy (2), Anaesthesia (1), Biochemistry (4), Biotechnology (1), Community Medicine (3), Dermatology (2), Dental Surgery (1), ENT (1), FSM (1), Microbiology (2), Medicine (2) Ob-Gyn (1), Ophthalmology (1), Pathology (2), Physiology (10), Pharmacology (2), Paediatrics (1), Psychiatry (1), Radiology (1), General

Surgery (2), Medical Education Unit (8), Sikkim Manipal College of Nursing (3), Sikkim Manipal College of Physiotherapy (2).

In November 2018, Dr. Robert Carroll, Chair of the IUPS Education Committee in his valedictory lecture delivered at the conclusion of the ICMR Tri-series Workshop at Kozhikode Government Medical College opined that the delegates of the ICMR workshop series would be the true agents who through dissemination and by forming a learning community in medical schools and in region-specific manner would allow Physiology to lead in curricular reform that was then slated for its initiation in medical schools in India in 2019. Indeed, a year later in November 2019 we find this key issue being addressed at the 'Hands On' Workshop on Medical Teaching Methodologies: IUPS Initiative. Resource Faculty members in this Workshop are using CBL, PBL and FCR as their tools have catapulted physiology 'Centre Stage' in developing interactive teaching-learning modules through small group sessions to a heterogeneous group of SMIMS faculty members ranging from pre-para-clinical departments of the medical school, nursing, dental and physiotherapy.

### **Case Based Learning**

Case based learning (CBL) sessions in the workshop allowed delegates to get a real time exposure to the tool as if they were students. This approach was primarily devised to make them experience the salient differences of CBL from a problem-based learning (PBL) session. It was generally perceived that most delegates assumed CBL essentially follows the PBL methodology with a clinical case as the core 'problem' presented to learners. Participants in general were unaware of the requirement of learners being provided with preparatory material in advance of the lesson and the need to conduct individual- and team-based readiness assurance tests (iRAT/tRAT) before proceeding with the case session. The Case presentation allowed the participants to learn some fundamental information about how a patient may present to their health care provider with a concern about their blood pressure. Throughout the case discussion, participants were challenged to work in small groups to answer questions about things such as proper methods to measure blood pressure and factors that impact blood pressure. Follow up activity tools included completing a Concept Map linking most factors involved in the control of heart rate, stroke volume, or total peripheral resistance. Another follow-up activity was a Hypothetical Drug activity in which participants needed to predict how a hypothetical drug would reduce blood pressure. These activities were enthusiastically received by the delegates as novel tools appropriate for active and self-directed learning. The active discussion amongst the delegate groups especially in the concept map activity indicated their high level of involvement and engagement in the session. The major concerns raised with reference to feasibility were mostly related to development of content including follow-up activity tools for CBL sessions. It was generally agreed that content development could be taken up at the institutional medical education units comprised of an interdisciplinary team that could be used for integrated learning sessions across the course. Another common query amongst the group was whether the curriculum offers sufficient scope to include CBL sessions as an active learning methodology for students. As a part of the interactive session held at the end of each days' session, delegates were made aware of the dedicated time slots and sessions provided by Medical Council of India (MCI) for the use of newer teaching methodologies directed towards active, integrated and deep learning experience for all students. Overall, the session was widely appreciated, and most delegates looked forward to incorporating CBL as an active teaching-learning methodology.

## **Problem Based Learning**

Each session of Problem Based Learning (PBL) began with a brief introduction and delegates in pairs briefly discussed the main pedagogical principles of PBL and/or their previous experiences of this teaching-learning methodology. The key points voiced by each pair were noted on a flipchart that was then referred to during final discussions at the end of the session. The enhancement in clarity was appreciated by all when it was revisited at the end of the session. Several delegates had prior exposure to this technique, although not as per the classical definition of PBL. A brief audio-visual presentation summarized the basic principles of PBL, the standard format and methods, requirements, as well as an introduction to the practical exercise. Delegates in small groups next explored the classical seven steps of the PBL format. It was interesting to observe the group dynamics at play as they volunteered enthusiastically for the various roles and also vied to perform better than the other groups! Common challenges included slight confusion regarding the exact steps and writing quickly on the board during the brainstorming. There was a common tendency to prepare vague, subjective learning objectives and often repetition of the content. A brief presentation by all groups summarized the steps followed by a short discussion about group dynamics, roles and the process. The challenges outlined were discussed and the importance of creating precise and appropriate learning objectives emphasized. The difficulties faced while performing each role (Chair, Scribe, Tutor) were listed by delegates followed by an encapsulation of their functions by the faculty. Four case scenarios that were distributed were discussed by all groups to jointly confer regarding the merits of each case and its determinants; the opinions expressed by each group were noted on flipcharts. An interactive discussion was then held on how best to support students' self-directedness and activity during the self-study phase, including supporting lectures and laboratory visits. The importance of reflection as a culmination of the process was also stressed upon, both for tutors and students. The significance of constructive and precise feedback in encouraging and motivating students was highly appreciated as delegates shared incidents of managing students - either introvert, dominating, or habitual latecomers. The session ended with animated discussion about advantages and drawbacks of PBL with most delegates expressing enthusiasm in adopting this technique. Several delegates listed challenges likely to be faced in introducing PBL in their own setup and how it may be adapted to their particular institutional and departmental needs.

## **Flipped Classroom**

Each session Flipped Classroom (FCR) began with an interactive lecture to give delegates a basic idea about FCR in order to facilitate active involvement and understanding of the hands-on sessions that were to follow. In this initial part of FCR session, the participants were very collaborative and were keen to clarify their doubts. The subsequent activity was aimed to provide the participants an experience of how an actual FCR session runs. For this, a 6-min video was provided for viewing. This was a simulation of the Out-of-Class or Pre-Class Time of FCR. The video had been provided as preparatory material a day prior to the commencement of the workshop and mandatory for a successful FCR. Since many of the delegates had not checked it *a priori* they immediately realized that student's participation is mandatory for a successful FCR. Many delegates considered this aspect may be challenging and expressed their apprehension that a large percentage of students may fail to go through the learning material provided by the facilitator. The video was followed by a Google Form as an In-Class FCR activity of responding to questions based on the video. The next part of the FCR consisted of 'Hands On' experience of preparing Videos for FCR class and preparing the Google Forms to assist in Pre-class and In-class

teaching-learning. The participants were elated to learn how to make video from a Power-point presentation and many of them regretted the fact that they had been under utilizing the power point application. The making of Google Form was taken up with the same zest. Many of the faculty members admitted that they were not tech-savvy and realized that the preceding activities were technology dependent. The resource faculty reiterated the fact that video making and in class assessment using Google Form were not mandatory for FCR. Nevertheless, the participants were keen to take this up as a challenge. In the 'Hands-on' activity that followed Google Form and video making, delegates had to chalk out a general plan for an FCR session using Gagne's 9-events of instruction. In the final interactive session, the foreseeable challenges like student motivation to go through pre-class material and increased load on teachers for the creation of FCR assignment were discussed, however, most delegates agreed that such caveats might be tackled with regular application of FCR.

### **Plenary Lecture**

A plenary lecture entitled, **Active Learning Methodologies in Medical Education: A More Prepared Health Care Provider** was delivered by Professor Susan M. Barman in the Workshop. It was widely acclaimed and appreciated by the Vice Chancellor, the Dean, and the faculty and students of SMIMS-SMU. Professor Barman opined that "students take ownership in their medical education experience by being an active adult learner and a decision maker...Active learning as part of a team stimulates learners to solve more difficult tasks than when only working independently...Active learning encourages learners to apply new knowledge, create new ways to understand, and to use critical reflection. Clinical experiences, appropriate to the stage of education, can be integrated with foundational biomedical science...Key elements of effective active learning modalities include having real-world relevance, being competency based, involving peer collaborations and including frequent feedback to measure progress through more formative and lesser summative assessments than in a traditional medical curriculum." Broadly speaking, active learning modalities that include PBL, FCR, and CBL are essentially Team Based Learning (TBL). Some simple active learning modalities (e.g., use of Think-Pair-Share or brief case studies) can be easily incorporated into lectures and engages students in the learning process. Professor Barman concluded that by transforming from passive to active learning, we may be able to groom a more prepared health care provider to meet the current demands of personalized, patient-centered health care system.

### **Student's Activity: Stakeholder's Assessment of Medical Education**

The stakeholders comprised the medical student fraternity, 25 participating students who had volunteered to be associated with a Medical Education Symposium presented during the Workshop a truly unique interactive academic session. This included 15 students from the 1<sup>st</sup> Semester, 6 students from the 3<sup>rd</sup> Semester, and 4 students from the 7<sup>th</sup> Semester who discussed briefly their perspectives on five topics: **We and Medical Ethics, Teaching-Learning Methods in Medical Education, Impact of Internet on Medical Education, Medical Students and Research, and Importance of Knowledge of Physiology in Medicine**. Each student eloquently presented their views and also actively interacted with the audience on such diverse topics viewed from the portholes of medical education and careers in medicine. The students expressed the ancient Hippocratic dictum that the physician's duty and ethics is centered on treating the patient – not the disease - to prevent suffering and to preserve life. Competency based medical education (CBME) was discussed on how it might affect teaching-learning, the role of research-based learning methods, the need to have both a teacher-centric combined with student-centric teaching modules, the positive impact of introducing CBL, PBL, and FCR in teaching methodologies

for the creation of competent Indian medical graduates, the need for teachers to be trained in such practices and finally why medical students should opt for in-depth understanding of physiology towards sustaining a lifetime career and practice of medicine. This interesting session concluded with Professor Susan Barman congratulating each participant and felicitating them with gifts of *Ganong's Review of Medical Physiology* and *Harrison's Principles of Internal Medicine* that were kindly donated by the publisher, McGraw-Hill.

### **Plenary Discussion on Competency Based Medical Education**

The panel discussion on Competency Based Medical Education (CBME) was chaired by Professor D. Ghosh and the panelists were: Professor Forhad A. Zaman and Dr. Ashim Mishra (Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal, University, Gangtok), Professor R. Sharma, Professor M. Bhattacharjee and Dr. M. Kaur (Vardhaman Mahavir Medical College-Safdurjung Hospital, New Delhi) and Dr. S. Prakash (All India Institute of Medical Sciences-Delhi). The discussion was initiated by Dr. Zaman who introduced to the audience the historical perspective of how the formal teaching of medicine began in 1835 in Kolkata through the establishment of the Calcutta Medical College, the oldest medical college in Asia. The Medical Council of India (MCI) was established in 1933 and through a series of reforms that began in 1946 based on recommendations from the Bhole Committee for major changes in medical education with three months training in PSM to produce social physician. A series of reforms followed that has now culminated in the introduction of Competency Based Undergraduate Curriculum for Indian Medical Graduates by the MCI. William C. McGaghie and his colleagues were the first to propose in 1978, "The intended outcome [of CBME] is a health-professional who can practice medicine at a defined level of proficiency, in accord with local conditions, to meet local needs." The subject-oriented and integrated curriculum has been defined by its organization around functions required for the practice of medicine in a specified setting, and the conviction that all medical students can master the basic performance objectives, and finally, the justification that learning and learning processes can then be empirically tested. Dr. Mishra defined that the practice of CBME requires four major approaches: behavioural and managerial, systems approach and finally a humanistic approach to successfully create a student-centric adaptation of the MCI guidelines in CBME.

CBME as discussed by Dr. R. Sharma was viewed as an opportunity to train physicians of first contact, who could provide primary health care efficiently. These courses center on: (a) Foundation Course aimed at inducting students coming from diverse backgrounds to basic medical and social skills; (b) Early clinical exposure from first year with integrated teaching across horizontal and vertical specialties to enhance student engagement; (c) Skill development and learning of soft skills using the longitudinal AETCOM (Attitude, Ethics and Communication Module) running throughout the academic curriculum; (d) Self-directed and reflective learning by student to inculcate values of being a lifelong learner; (e) Formative assessment modalities as a tool for deep learning and instant feedback; and (f) Mandatory elective postings in pre-clinical and clinical departments aimed to unlock the research potential of future medicos. Dr. Bhattacharjee next highlighted some of the grey areas that lie in implementation of CBME in medical colleges in India. She advised to begin CBME through small scale activities that pose low risk for both instructors and students. Various modalities may then allow for converting a large class into an active learning space where different techniques may be used to handle small group teachings. The framework for integration provided by Ronald Harden in 2000 comprises a ladder that has amongst its steps: Isolation, Awareness, Harmonization, Nesting, Temporal co-ordination, Sharing,

Correlation, Complementary and Multi-disciplinary was discussed with a suggestion to maintain mid-levels of integration in the present scenario. The challenges in imparting and assessing soft skills that include attitude, ethics and communication to medical professionals were addressed. Dr. Bhattacharjee concluded by mentioning that while challenges may be many, but these can be overcome by commitment, dedication and most importantly with a will to change for the benefit of medical education.

Dr. S. Prakash next drew the attention of a need to search for novel digital platforms in the implementation of CBME in medical schools in India. The need for matching the teaching method with the learners' preference was emphasized. Creating or procuring appropriate audio and video content and posting the same on the website was suggested to cater for visual and auditory learners. Designing novel activities for class time that would involve learners to read or write such as hypothetical drug activity, concept map activity was suggested for addressing the need of learners who prefer reading/writing/practical exercises with augmented reality being proposed for kinaesthetic/tactile learners. In conclusion, the accrued benefits of using augmented reality for practical exercise with inherent capability of interaction with peers and instructors unlike that in virtual reality exercise being fully immersive, and their relative potential in reducing the diagnosis and interpretation errors were discussed. Dr. M. Kaur discussed various strategies being employed in the prescribed CBME curriculum. She started with her own experience of conducting a Case Based Learning module for a strength of 180 students and how they came back asking for inclusion of more such interactive learning sessions rather than regular one-way didactic lectures. Dr. Kaur considered that once the inertia to undertake a change is taken care of – the major challenge that most faculty face is valid content/ resources creation for which institutional medical educational units could collaborate at local levels and also national networking may be implemented.

The SMIMS Workshop Report has been prepared taking inputs received from the Resource Faculty members and Panelists, Dr. R. Sharma, Dr. M. Bhattacharjee, Dr. B. Rathore, Dr. D. Chandran, Dr. M. Kaur, Dr. S. Prakash, Dr. F. Zaman and Dr. A. Mishra. We are grateful to the Vice Chancellor, SMU, the Dean, SMIMS, the Organizing Secretary of the Workshop and her colleagues in the Department of Physiology, SMIMS-SMU and all students of SMIMS for providing us an excellent opportunity to integrate physiology through teaching-learning tools with teachers of medicine, dental surgery, nursing and physiotherapy, student interactions via conduct of a medical symposium and dialogues undertaken in a panel discussion on competency based medical education.