

Recent Trends In Teaching and Learning In Physiology Education Early Clinical Exposure And Integration

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Abstract: Teaching and learning of Physiology has been challenging both for the teachers and the learners. Different educational strategies are being used for teaching and learning of Physiology. The purpose of this paper is to discuss the need for and the process of implementation of Early clinical exposure and Integrated teaching- learning, two of the curricular reforms proposed by the Medical Council of India, in the Physiology curriculum for the first year medical students. Early Clinical Exposure (ECE) is a teaching learning methodology, which fosters exposure of the medical students to the patients as early as the first year of medical college. In a medical college, ECE can be introduced to the first year medical students, thus providing relevance and context to Physiology teaching and learning in the Class room, Hospital and Community settings. An integrated approach to teaching medical subjects is an effective educational strategy. Yet, this has not become popular in medical colleges in India. Some of the ways Integrated Teaching and Learning can be developed include Problem based learning, Case Based Learning, Self Learning Modules, Integrated Lectures and Early Clinical Exposure. The key feature that is critical is that the focus is not on the teachers but on the students, thereby ensuring their Integrated Learning of the subject matter. Wide spread faculty development programs are essential for successful implementation of ECE and Integration modules. A scientifically rigorous educational research is crucial to provide evidence for the efficacy of these strategies in the Indian setting and for quality assurance.

Keywords: Teaching, Learning, Early Clinical exposure

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Introduction: Teaching and learning of Physiology has been challenging both for the teachers and the learners. It is not only difficult to retain learners' interest and motivation but also to enable them to cope with the rapid increase in the knowledge and scope of Physiology^{1,2,3}. In recent years there has been an increasing use of different educational strategies for teaching and learning of Physiology to address the above issues such as incorporating multiple learning styles in instructional design⁴, combination of didactic lectures and case oriented problem solving tutorials⁵, integrated learning program⁶, problem based learning⁷ and early clinical exposure¹.

The Medical Council of India (MCI) in the Vision 2015 document has recommended curricular reforms for undergraduate and postgraduate medical students⁸. Some of the recommendations for the undergraduate medical students include a foundation course at the beginning of 1st year, an integrated curriculum, early clinical exposure, student doctor method of clinical training, electives, skill development training and secondary hospital exposure⁸.

Early clinical exposure and Integrated teaching-learning are two of the curricular reforms

recommended by the MCI to be introduced in the first year of undergraduate medical studies⁸. The purpose of this paper is to discuss the need for and the process of implementation of Early clinical exposure and Integrated teaching-learning in the Physiology curriculum for the first year medical students.

Early Clinical Exposure

What is Early Clinical Exposure?: Early Clinical exposure (ECE) is a teaching learning methodology, which fosters exposure of the medical students to the patients as early as the first year of medical college⁹. The goals of ECE are to provide social relevance and context to basic science teaching and learning, enhance medical knowledge, learn few basic clinical skills and acquire a wide range of attitudes⁹.

The need for Early Clinical Exposure: For generations, medical students have spent the preclinical years in classrooms and laboratories, memorizing body parts and dissecting specimens, eagerly anticipating the clinical years when they would see and learn from patients. This divide between preclinical and clinical years has been the norm since a century ago providing a theoretical basis for clinical medicine¹⁰. Traditionally the foundation years of medical students have made them thorough in

biomedical sciences but have hardly provided them with any clinical experience¹¹.

Lack of early clinical experience has shown to demotivate students and make them prone to negative emotions when they finally enter the clinical environment¹¹. On the other hand early clinical exposure “helps medical students socialize to their chosen profession. It helps them acquire a wide range of subject matter and makes their learning more real and relevant. It has potential benefits for other stakeholders, notably teachers and patients. It can influence career choices¹⁰.”

Some of the advantages of early clinical exposure identified in the literature are that ECE forms a crucial part of initiation into medicine, smoothens the transition from layperson to student physician, provides an opportunity to bring social relevance and contextualize basic science learning, provides teaching and learning of basic clinical skills, enhances student motivation and encourages the students to learn professional behaviour¹². Students perception of advantages of ECE were that it provided important validation of the student’s decision to go to medical school, it was a lifeline that helped the student stay focused on their studies and provided opportunity to establish a link between the basic sciences concepts and actual patient cases^{12, 13}. Faculty perception of advantages of ECE were that it provided a more integrated approach to teaching basic sciences and clinical medicine, increased excitement for learning by students, provided better comprehension of basic science knowledge^{12, 13}.

A few medical colleges in India have been using ECE in various ways to teach Physiology^{1,7}. Evaluation of these programs has shown that medical students appreciate them and it has enhanced their learning. However, the long-term impact of these programs is yet to be evaluated.

Process of implementation of Early Clinical Exposure: In a medical college, ECE can be introduced to the first year medical students, thus providing relevance and context to Physiology teaching and learning in all or any of the

following three settings: Class room setting, Hospital Setting and Community setting.

1. Class room setting: In a typical Physiology classroom, ECE can be used as an educational strategy either by bringing patients to the classroom or through case discussions. For example a class on Physiology of Thyroid hormones could be taken as follows:

a) A patient with hyperthyroidism can be brought into the Physiology classroom after appropriate consent has been taken. The clinician could ask the patient to describe the symptoms; the clinician could demonstrate the signs and have a discussion on physiology of the thyroid gland in the context of the patient’s condition with the first year medical students. However, the learning objectives need to be stated explicitly and made clear to the clinician so that the discussion remains on track.

b) Alternatively if the clinician is not available, the Physiology teacher can himself/ herself take the class as described above. It is important though, that the Physiology teacher should have discussed the clinical signs and symptoms with the clinician prior to the class.

c) If a patient cannot be brought to the class room a paper based case on hyperthyroidism can be used as a trigger for discussion. However, this is an alternative only because of feasibility issues and does not comply with the definition of early clinical exposure which states that “it is an authentic human contact in a social or clinical context that enhances learning of health, illness or disease, and the role of the health professional”¹¹. The design of the case will be crucial to the success of the ECE. Case construction guidelines elaborated by University of New Mexico can be accessed at: http://som.unm.edu/ume/ted/pdf/ed_dev_toolsconstructing.pdf

http://som.unm.edu/ume/ted/pdf/ed_dev_toolsconstructing_wkbk.pdf

Instead of a paper based case, video recordings, pictures/case scenarios on power point, animations etc. can be used as triggers for discussion.

d) All the above (a-c) can be done in multiple small groups of students instead of a single large class if enough space, time and faculty members are available.

2. Hospital Setting: Students in small groups are taken to the hospital either to the wards or outpatient block. The physiological concepts are discussed by the clinician in the context of the patients seen. The learning objectives need to be stated clearly. In addition observation guides¹⁴ are to be developed by the Physiology and clinical faculty so that the student knows who to observe, what to observe and what to report back. Observation guides help to structure observations made by the students in a clinical setting, an active purposeful task that stimulates deep learning¹⁴.

For example ECE in endocrine Physiology was implemented in Christian Medical College Vellore as follows: traditional didactic lectures in endocrine physiology were followed by case based lectures by clinician. In addition the students had hospital visits to see patients with endocrine disorders along with the clinician and had discussions on endocrine physiology in the context of the patients seen¹.

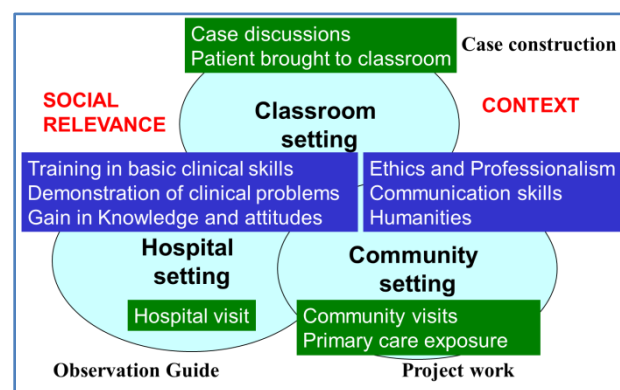
3. Community Setting: The focus of community based early clinical exposure should be on providing the context for basic science learning; integration of basic sciences, clinical dimensions and societal perspectives; seeing primary care providers at work and student involvement through activities.

For example the first year medical students of Christian Medical College, Vellore spend a week in small groups, during their December holidays in one of the secondary/ mission hospitals of their choice in rural areas. They had a structured program where they learned basic science concepts through the clinical Material available there. One of the projects was screening for hypothyroidism in the village served by that particular mission hospital. The students picked up cases which were treated and had a discussion on the basic science concepts. This helped to bring in the socio-clinical relevance and

context to the students' learning of Physiology of thyroid gland.

What are crucial to the success of the ECE program would be explicitly stated specific learning objectives, development of appropriate cases for classroom setting, observation guides for hospital setting and designing relevant and feasible projects for community setting. Figure 1 summarizes the different settings where ECE can be used.

Fig 1: shows the different settings where Early Clinical Exposure can be introduced as an educational strategy



The design of the ECE module should also include appropriate student assessment methods aligned to the learning objectives and a plan for evaluation of the ECE program.

Integrated Teaching and Learning

What is Integrated teaching and learning?: Integrated teaching inter-relates or unifies subjects frequently taught in separate academic courses or departments¹⁵. Integrated learning refers to when knowledge and skills from across the disciplines are called upon to address patient cases, problems and issues, to create learning experiences for students. Thus an “integrated medical curriculum helps graduates to put together the learned facts so as to get the whole picture and adopt a holistic approach while treating a patient or planning a health care strategy (e.g. planning the preventive measures of an impending outbreak of an infectious disease)”¹⁶.

The need for Integrated teaching and learning: An integrated approach to teaching medical

subjects is an effective educational strategy¹⁷⁻¹⁹. The General Medical Council of UK has advocated introduction of Integrated Teaching and Learning in the medical course²⁰. The Medical Council of India has recommended introducing horizontal and vertical integration for teaching undergraduate medical students as early as 1997²¹ and then in the recent Vision 2015 document⁸. Yet, this has not become popular in medical colleges in India.

Problem-based learning (PBL) has been acknowledged as a method that enhances integration of learning, self-directed learning and provides relevance and context to the subject. It is also used to prepare students for their professional life as physicians²². The use of PBL has been reported in several medical colleges²²⁻²⁴. However, the Integrated Teaching and Learning does not necessarily have to be through PBL. Many effective integrated learning programs are not problem based. Some of the other ways Integrated Teaching and Learning can be developed include Case Based Learning, Self Learning Modules, Integrated Lectures and Early Clinical Exposure^{16,25}. The key feature that is critical is that the focus is not on the teachers but on the students, thereby ensuring their Integrated Learning of the subject matter.

The educational experience through an integrated approach to teaching and learning is consistent with adult learning principles, encourages the use of active learning approaches such as problem solving, improves retrieval of information, improves lifelong learning and enables better clinical reasoning process. Other advantages of using Integration as a Teaching Learning tool is that it leads to greater learner satisfaction, improved learner performance, more efficient use of time as it removes unnecessary repetitions and redundancy.

Some of the challenges of Integrated Teaching and Learning are that it is time consuming. It involves extensive planning, proper organization and appropriate student assessment for it to be effective.

Implementation of Integrated teaching and learning: The SPICES model of educational strategies describes Integration as a continuum

with complete integration on one end and traditional teaching on the other¹⁵. Whenever there is a discussion on integration there are some teachers who are for it and some who are not. In his paper titled "The integration ladder: A tool for curriculum planning and evaluation", Harden proposes that the question to be asked is not whether one is for or against integration but where in the continuum we are¹⁸.

While planning the integrated curriculum it is important to decide on the scope and level of integration. It is more feasible to start with a small module and then extend it into other areas in the curriculum. Many educationists feel that there is a need for both subject based and integrated experiences in the curriculum.

It is crucial to communicate the need for integrated teaching and learning to the students and the faculty and train the faculty to develop integrated module/curriculum. Another important factor to plan and implement is an integrated assessment¹⁶. Without appropriate assessment it will be of no value to the student. Thus it is essential to frame the learning objectives at the start and devise assessment methods aligned to the objectives.

Hybrid curriculum where an integrated learning module is implemented within the framework of a traditional discipline based curriculum have been developed and implemented by medical colleges in India^{7,20}. Sri Ramachandra Medical College and Research Institute, Chennai, India has tried to shift from traditional discipline based to integrated curriculum in the recent years. However, evaluation of their integrated curriculum after their first group of students have completed is awaited.

In Christian Medical College, Vellore an integrated learning programme (ILP) to teach the gastrointestinal system (GIT) in the first year of the medical course was introduced in 2003 and has been incorporated in the curriculum since then⁷. This is an example of a hybrid curriculum where an integrated learning module was implemented within the framework of a traditional discipline based curriculum. When

designing the integrated teaching and learning module the following steps were taken:

Formation of a core group: this was a mix of faculty from Anatomy, Physiology, Biochemistry, Medicine, Surgery, Medical Education, Vice Principal of the undergraduate curriculum, who helped in the implementation of the program

Developing the goal of the Integrated teaching and learning program: The aim of the program was to introduce horizontal and vertical integration in gastrointestinal system for the first year medical students. The specific learning objectives were framed aligned to the goal.

Choosing appropriate teaching – learning methods and assessment methods aligned to the goal: This program incorporated elements of problem based learning, early clinical exposure, lectures and small group laboratory work as the teaching learning methods. Student assessment was formative (for problem based learning sessions) and summative (using problem-based learning and knowledge tests).

Developing the resources: Developing Problem Based Learning cases with facilitator guides and References, planning out the hospital visits and developing appropriate learning objectives for the same.

Faculty training program: A training program for faculty facilitators was conducted giving them an overview of the Integrated program, Problem based learning and construction of concept maps. This was done through interactive lectures, demonstration by role play of faculty facilitating students going through a mock PBL case and hands on experience of facilitating students going through a mock PBL case over two sessions as well as being co facilitator with an experienced facilitator for the first PBL case of the ILP program.

Student orientation program: An orientation program for students was conducted where they were given an overview of the Integrated learning program, Problem based learning and construction of concept maps. This comprised of interactive lectures, demonstration by faculty role play of a PBL session, students going through

a mock PBL case over two sessions with faculty facilitators. Program Evaluation was through feedback from faculty and students. The evaluation findings were used to modify the integrated program.

The steps have been summarized as a check list in Table 1

Table 1: Checklist for developing and implementing an Integrated teaching learning module

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| <p>Step 1. Core group formation – faculty from basic and clinical sciences, medical education unit and administration</p> <p>Step 2. Develop the Goal of the integrated program</p> <p>Step 3. Frame the Specific learning objectives aligned to the goal</p> <p>Step 4. Choose appropriate teaching learning methods and assessment aligned to the Specific learning objectives</p> <p>Step 5. Develop resources</p> <p>Step 6. Conduct Faculty training program</p> <p>Step 7. Conduct student orientation program</p> <p>Step 8. Evaluate the program</p> <p>Step 9. Use evaluation findings to modify/improve the program.</p> |
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The Way Forward: Even though the need for ECE¹⁰⁻¹³ and Integrated teaching and learning¹⁷⁻¹⁹ has been well recognized globally and the Medical Council of India recommends its use for first year medical students⁸, yet it is challenging to implement it in one's own medical college.

One of the major challenges is the need for faculty to be trained to design and implement ECE and Integration modules. Efforts have been made to initiate faculty development programs in India including preconference workshops in ECE and Integration conducted at the National Conference of Health Professions Education (NCHPE) 2011 at Christian Medical College, Vellore. A preconference workshop on ECE was also conducted at the South East Asia's Regional Association of the World Federation for Medical Education (SEARAME)-NCHPE 2012 International Conference on Health Professions Education at PSG Coimbatore.

Medical Council of India has also initiated the Curriculum Implementation Support Program

(CISP) to train faculty in the new curricular reforms proposed in the new graduate medical regulation. The national core team has developed CISP and conducted two workshops to train the faculty from medical education units of those medical colleges recognized as Regional Centres for national faculty development by the Medical Council of India. Currently both the recommendations for curricular reforms and the concurrent faculty development program i.e. CISP is being reviewed and processed at the Medical Council of India and awaiting final approval for implementation. However, the three days basic course in Medical Education Technology, an initiative of MCI, has a session on the proposed curricular reforms including ECE and Integrated teaching-learning to sensitize the faculty to it.

Some of the universities such as the Tamil Nadu Dr MGR Medical University has already initiated orientation programs for the medical faculty to the curricular reforms proposed by the MCI in the Vision 2015 document including ECE and Integration. Many medical colleges conduct thematic workshops on ECE and Integration for their own faculty.

These efforts are commendable but need to be expanded to train faculty at all the medical colleges in India. In addition this has to be extensively supported by sample modules, and other resources as well as continuous on-going support, not only to enable medical colleges to implement ECE and Integration but also for quality assurance. Once this has been achieved, scientifically rigorous educational research has to be conducted with a larger sample size to provide evidence for the efficacy of these programs in the Indian context.

Conclusion: MCI in its vision 2015 document has recommended curricular reforms for undergraduate medical education which includes Early clinical exposure and Integrated teaching and learning. ECE and Integrated teaching and learning are becoming more and more popular in undergraduate medical curriculum. There are multiple ways of using ECE and Integration as educational strategies but it has to be adapted to the needs of the students

and the medical college. These strategies are useful and feasible within the framework of a traditional curriculum. However, extensive faculty development programs with on-going support are crucial to successful implementation. A scientifically rigorous educational research is critical to provide evidence for the efficacy of these strategies in the Indian setting and for quality assurance.

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