Designing Of An Integrated Team Based Learning Module To Teach Undergraduate Students- Tuberculosis

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Abstract: Background: Medical curriculum has been revised and proposed to be competency based medical education. The curriculum proposes integrated teaching sessions. An integrated training module where in all the faculty would contribute to active learning and bring about the integration of the knowledge. The module was designed with the aim that students should illustrate the steps in clinical and laboratory diagnosis of pulmonary tuberculosis, and would demonstrate their competency by scoring more than 80% in a post test multiple choice questions based assessment. Materials & Methods: The committee of faculty from microbiology, pathology, pharmacology, respiratory medicine, anatomy, physiology was constituted to design and validate the multiple choice questions, application exercises. The faculty were trained by the expert on team based learning methodology. Team based learning was conducted on a batch of 64 students, whose perception and performance was assessed. The module was redesigned, as per student's feedback recommendations. The module was re-administered on another set of 62 students. The perception and performance of the students was analysed. The faculty feedback was gathered. Results: An integrated module was designed wherein the students were able to illustrate the steps of clinical and laboratory diagnosis of a case of tuberculosis, with 80% accuracy. And 95% students scored ≥80% marks on a multiple choice question test(paired t-test=9.122 p <0.001). Faculty feedback was encouraging to implement the module. Conclusion: Integrated module can be designed on other topics adopting principles of Team based learning [Harakuni S Natl J Integr Res Med, 2020; 11(2):70-73]

Key Words: team based learning. Integrated, Medical education.

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Introduction: Medical council of India(MCI) has recently proposed implementation of new curriculum that is competency based medical education[1]. The curriculum proposes integrated teaching sessions within the subject-wise teaching schedules. The level of integration that can be attained as per Harden's integration ladder is till level 4 i.e., nesting [2]. There is a need for faculty to exchange their ideas about a topic. Co- teaching sessions have been found to be effective involving two faculty from different departments[3].The results vary with the teaching capability of faculty.

We describe the process of designing, implementation and evaluation of a multi instructor led team based integrated teaching session. The module was designed to study the effect and feasibility of such sessions within the traditional curriculum.

Material and Methods: The study was accepted by the institutional ethical committee. The head of the institute allotted an expert from the department of anatomy, physiology, pathology. Pharmacology, respiratory medicine departments.

Faculty Training: All allotted faculty were oriented about the project of integrated team based learning. There was discussion on content of integrated teaching session, mode of teaching. It was decided the topic for the session would be pulmonary tuberculosis. As tuberculosis is an prevalent infection, and would be taught by different departments throughout the medical course, it was chosen as a topic for integration. This would avoid repetitive teaching and also students would have an holistic approach in diagnosis and treatment of the infection.

The faculty were introduced to Team Based Learning (TBL) methodology[4,5]. They were instructed to prepare multiple choice questions pertaining to their speciality on the topic chosen, i.e., pulmonary tuberculosis.

The MCQs were pre-validated by the faculty. The 10 MCQs were chosen based on the blueprint designed by the allotted faculty. Final MCQs were drafted.

Students' Orientation: The students were briefed about the methodology and consent was taken from each one of them. The time for practical session was chosen to conduct ITBL, which is two hours duration. The students attend the practical session in two separate batches, on two different

days, divided as per their roll call. Thus, firstly a batch of 64 students attended integrated TBL methodology. A Google group was created to distribute reading material on pathogenesis and treatment of pulmonary tuberculosis.

The students were instructed to read the material before ITBL session.

ITBL Session: The session was conducted for 2hrs, which was allotted within the routine timetable. No extra time was required. The allotted faculty attended the ITBL sessions.The students were divided randomly into seven groups of nine students each. The sitting arrangement was designed to have a group discussion. Each student in a group could see all the others of the group.

The students were given the formatted MCQs as a hard copy and were asked to solve them individually within 15mins.The tests were collected back and were evaluated. Irrespective of their score, the students were allowed to progress to next level of TBL, i.e., group readiness assurance test. The MCQs for this round were projected through LCD as a PowerPoint presentation. For every MCQ a time of 3mins was given for the group to decide on the correct option. The groups were given placards with options A-D. At the end of 3mins, all the groups were asked to raise the placard of appropriate option simultaneously. An observer would assure that each group raises a placard and records the response.

A faculty representative from the foresaid departments attended the ITBL session.
Any discrepancy in the answers would be discussed by the faculty contributing to the explanation on a MCQ.

Application exercise, was a case, was projected and the groups are asked to work on the investigation and treatment aspects for 10 min. The groups presented their work, and there was a session on discussion by the faculty and the groups, to clarify the doubts. Faculty gave an expert opinion on case work-up. Students' feedback was collected through a validated questionnaire. Pre and post test were conducted to evaluate the effectiveness of the session, before and after the TBL session.

Based on the evaluation of students' feedback, a meeting of the involved faculty was called to rectify the deficits. The faculty exchanged ideas to make students' interaction more effective. MCQs were modified and were validated. The positive aspects of the process were retained.

Another batch of 62 students was taken to carryout second pilot study. The students were briefed on the process of ITBL. Same faculty attended the session. The process of individual readiness assurance test, group readiness assurance test, application exercise was conducted allowing the faculty to interact.

Pre and post test were conducted. Students' feedback was collected. Faculty also were asked to give their feedback on the process of organising ITBL session, through a questionnaire.
Statistical Analysis: Pre test and post test scores were compared by paired t test. Student evaluation of educational quality, faculty feedback on pre-validated questioner was analyzed by percentage of positive response.

Result:

Pilot study 1: 64 students participated: Mean of Pre test score and post test scores are 7.5± 1.45 and 8.6 ±0.93 respectively. Post test the performance of students improved,[t=5.23, Df=63, p<0.001].

Feedback: 60% students felt the lessons learnt were valuable, >55% students opined TBL was challenging, interactive. About 40% students opined the faculty needs to be more organized. Thus a meeting was called for and the entire faculty was sensitized to the process, the questions of TBL session were evaluated and modified. Then again the TBL was engaged with another batch.

Pilot study 2: 62 students participated: Mean of Pre test score and post test scores are 7.9± 1.28 and 9.3± 0.92 respectively. Performance of students improved, t=9.12, Df=61,p<0.001

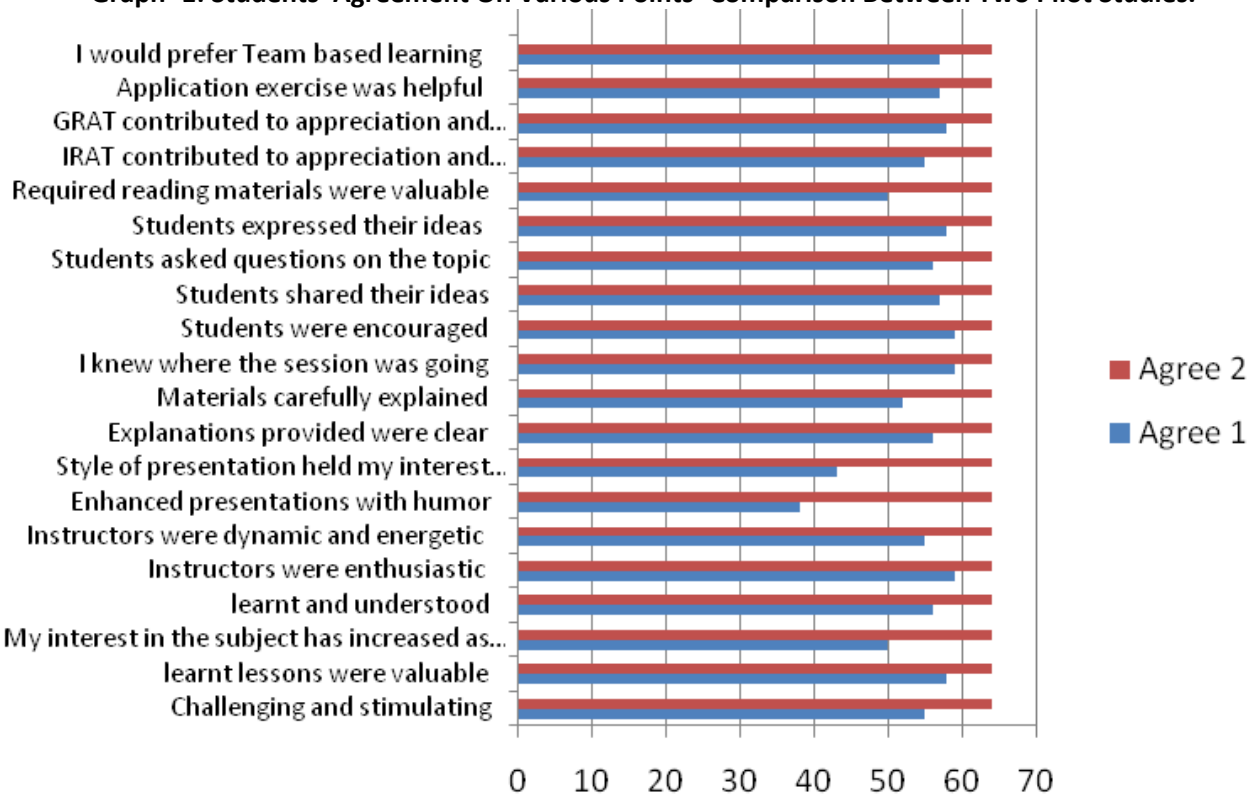
Table:1 Student Performance: Pilot Study I(N=64)

Pre	Post	Increase	T	Df	P
7.5±1.45	8.6±0.93	0.99±1.51	5.228	63	<.001

Table2 : Student Performance: Pilot Study II (N=62)

Pre	Post	Increase	T	Df	P
7.9±1.28	9.3±0.92	1.33±1.14	9.122	61	<.001

Graph- 1: Students' Agreement On Various Points- Comparison Between Two Pilot Studies.



Faculty Feedback: All the six faculty involved in ITBL liked the interdepartmental discussion and coordination offered to each other. They all did agree that ITBL improved the understanding and application of basic science knowledge, help the students to perform better in the clinical practice. They opined ITBL to be an interesting experience. Totally disagreed that ITBL preparation is time consuming.

Discussion: The study was designed following the twelve tips recommended by Malik (2011), for integrated curriculum [6].

Faculty were identified from the basic science department and from chest physician department. A letter through head of department asking for allotment of a staff for integrated teaching was sent to concerned departments. This made the involvement more authentic. The staffs were relived from other duties as they were asked to design the MCQs and attend meetings. This reduces the chances of staff reverting back from the assignment. The MCQs designed were validated by all the staff involved in ITBL; this increased the coordination between the staff. These are few positive points to reduce faculty coherence, which is a problem raised in some studies[3,7].The feedback of the faculty was also encouraging where in all the involved faculty found the process to be enjoyable and not time consuming. As the faculty were well versed with all the MCQs, cases presented in TBL, they could coordinate and contribute in ITBL sessions. They had to attend only two hour session along with other faculty on one day. And all of them got scope to interact with the students following every MCQ. Thus faculty enjoyed the session and found it less stressful as is reported in few of the studies[7,8].

Scope of Integration: Tuberculosis is a prevalent infection in India. It can mimic any other disease. Thus it is included in the syllabus of all the subjects. The departments teach the topic at various phases of undergraduate course. Tuberculosis was thus aptly decided by the faculty to take as a topic of integration. The topic was further restricted to pulmonary Tuberculosis for discussion in ITBL of 2hours.

It is advisable to have subject-wise teaching and few sessions of integrated session in a curriculum[6]. ITBL allows such change in the present discipline based curriculum. The study can be further broadened by involving other departments like community medicine/Public health department. The sessions involve faculty from various departments thus would be difficult to be practiced in an institute with minimum faculty intake. Faculty training is most important

to bring about effective discussion in sessions and should form the integral part of ITBL sessions.

Conclusion: Integrated team based learning module can facilitate integration of knowledge in the minds of students with no demarcation of subjects in MCQ discussions. The sessions are enjoyed by students and the faculty with a good learning experience.

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