

# N.T.T.C.

## BULLETIN

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JOIN THE MOVEMENT OF  
“TEACHERS FOR PROBLEM-ORIENTED-LEARNING”

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# **TEACHERS FOR PROBLEM ORIENTED LEARNING: A MOVEMENT FOR QUALITY IN MEDICAL EDUCATION**

**(Dr. Santosh Kumar, Director-Professor & Head,  
Departments of Urology and Medical Education, JIPMER, Pondicherry)**

## **What is the movement of “Teachers for Problem-Oriented Learning”?**

A movement is a group of people working together to advance a shared cause or a cause of this type.<sup>1</sup> “Teachers for Problem-Oriented Learning” believe in the need of and work for the following paradigm shift in medical education.



Problem-Oriented Learning is the most important dimension for quality in medical education.

## **How to join the movement of “Teachers for Problem-Oriented Learning”?**

We can join the movement of “Teachers for Problem-Oriented-Learning” by taking following two actions.

### **I. Deliver all information (lecture, practical and clinical notes) through information technology (CD or internet) at the beginning of the course.**

1. This is already being practised in the United States and Canada.<sup>2</sup>
2. This will promote self-learning in medical students and fulfil the requirements of Medical Council of India Recommendations which say:
  - A. “There must be enough experiences to be provided for self-learning. The methods and techniques that would ensure this must become a part of teaching-learning process.”<sup>3</sup>
  - B. “Lectures alone are a poor means of transferring / acquiring information.”<sup>4</sup>
  - C. “The undergraduate students coming out of a medical institute should possess the attitude for continued self-learning.”<sup>5</sup>
3. This will enable the medical teachers to use the curricular time for explaining the information and for using problem oriented activities.

## II. Use part of curricular time for problem-oriented activities.

This requires framing of common patient problems (real or simulated) by the joint effort of pre-clinical or para-clinical teachers and clinical teachers of the concerned discipline. This collaboration is essential for the validity and reliability of problems. These patient problems are used by medical students in different disciplines for different purposes in the following manner.

1. Anatomy for identifying and understanding anatomical aspects and abnormalities.
2. Physiology for identifying and understanding physiological aspects and abnormalities.
3. Biochemistry for identifying and understanding biochemical aspects and abnormalities.
4. Pathology for identifying and understanding pathological processes.
5. Microbiology for identifying and understanding microbiological aspects.
6. Pharmacology for identifying and understanding the pharmacological basis of drug treatment.
7. Forensic Medicine & Toxicology for identifying and understanding forensic aspects.
8. Community Medicine for identifying and understanding community aspects.

Problem oriented activities will fulfill the requirements of Medical Council of India Recommendations which say:

- © “Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt be made to de-emphasise compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases.”<sup>6</sup>

### REFERENCES:

1. Concise Oxford English Dictionary, New York; Oxford University Press, 11<sup>th</sup> edition, 2004.
  2. Anderson MB (Editor and Compiler). A Snapshot of Medical Students' Education at the Beginning of the 21<sup>st</sup> Century: Reports from 130 Schools. Academic Medicine. Vol.75, No.9, September Supplement, 2000.
  3. Sixth Point. In: “General Considerations and Teaching Approach,” Chapter I, Regulations on Graduate Medical Education, 1997, Medical Council of India.
  4. Eleventh Point. In: “General Considerations and Teaching Approach,” Chapter I, Regulations on Graduate Medical Education, 1997, Medical Council of India.
  5. Institutional Goal no.(e). In: “Objectives of Medical Graduate Training Programme”, Chapter I, Regulations on Graduate Medical Education, 1997, Medical Council of India.
  6. Fifteenth Point. In: “General Considerations and Teaching Approach,” Chapter I, Regulations on Graduate Medical Education, 1997, Medical Council of India.
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# **PROBLEM SOLVING BY PROJECT WORK: A PRECIOUS STEP FOR QUALITY IN MEDICAL EDUCATION**

**(Dr. Santosh Kumar, Director-Professor & Head,  
Departments of Urology and Medical Education, JIPMER, Pondicherry)**

A problem is an unwelcome or harmful matter needing to be dealt with and overcome.<sup>1</sup> Problem solving is the process of finding solution to a problem. Problem solving process has the following steps.

1. Defining the problem
2. Identifying various options
3. Choosing the best option
4. Implementing the solution

Project work incorporates problem solving process and has the following steps.

1. Title of the project
2. Situation analysis:
3. Definition of the problem
4. Setting objectives and targets
5. Identification of constraints and potential obstacles in implementing the project
6. Designing strategies for implementing the project, overcoming these constraints/obstacles
7. Planning evaluation of the project
8. Actual implementation of the project
9. Actual evaluation of the project
10. Recycling of the project, if necessary.
11. Dissemination of the project outcome.

A problem oriented activity is the most important dimension for quality in medical education and project work is the most important problem oriented activity undertaken by a medical teacher in medical education. It is so because project work is an organised step towards the much needed reform in medical education. There are three stages in project work.

## **1. Planning Stage:**

It is important to understand that project work is an action research in education. Action research consists of diagnosing a problem in a specific context and attempts to solve it in that context. Action research focuses on the change intervention and does not always need a control group. Thus it is less rigorous than biomedical research.

## **2. Execution Stage:**

It needs sustained intrinsic motivation for the completion of the project.

## **3. Publication Stage:**

Publication helps other teachers to benefit from their work. Both favourable as well as unfavourable results need to be published.

All the medical teachers who attend the National Courses of National Teacher Training Centre are to be congratulated for their excellent choice of project topics. It is hoped that the projects will be completed and the project reports will be submitted for publication.

**[REFERENCE: 1. Concise Oxford English Dictionary, 11<sup>th</sup> edition, 2004.]**

## **PROJECT REPORT:**

### **EFFICACY OF GROUP DISCUSSIONS IN IMPROVING LEARNING OUTCOME IN BIOCHEMISTRY.**

**(Dr. KAUSHIK BHOWMICK,  
Lecturer, Department of  
Biochemistry, Sri Devaraj Urs  
Medical College, Kolar.)**

#### **Definition of the problem:**

Lecture, as the most common and dominant teaching method, suffers from several disadvantages. Among others, receptivity and retention after an average lecture session has been documented to be low. Thus other Teaching-Learning methods (T-L methods) used in conjunction with lectures may serve to reinforce and consolidate the learning outcome. Group discussion (GD) offers several advantages over traditional lectures to make it an effective T-L method to supplement lecture sessions. Hence, in the present project, group discussion has been selected as the preferred T-L method to study its efficacy in improving learning outcome (LO) when applied as an adjunct to lectures.

#### **Situation analysis:**

The existing protocol of undergraduate biochemistry theory teaching at our institution includes consecutive lecture classes of duration 60 minutes each for 150 students covering a particular topic or section. After completion of the topic, some 'tutorial classes of duration 90 minutes each are allotted on the same topic with groups of 50 students. At present these sessions lack any predefined lesson plan or specific T-L method to maximize learning outcome, nor

does it have a proper evaluation procedure for testing the efficacy of the whole programme. In the present project, a pre-planned programme with group discussion as the preferred T-L method was implemented during these classes. This was coupled to an evaluation procedure comprising of pre and post tests to study the efficacy of the overall protocol.

#### **Objectives:**

1. To assess the efficacy of group discussion in improving learning outcome.
2. To compare and contrast its effect on various performance-based student cohorts.

#### **Methodology**

After completion of each section in a series of theory classes for 150 students, a pre-test on the topic was taken in the last lecture class. This test was of 40 minutes duration and 30 questions in all were asked. Questions were of one word answer type, multiple choices, matching type and true/false type to minimize subjective error in correction. Prevalidation of the questionnaire was done by discussion with the fellow faculty members in the department. Pre-test was followed by sessions of GD on 3 consecutive days of a week including 50 students per day. For each of these GD sessions, the 50 students in each group were further subdivided into 4 subgroups with 12 to 13 students in each subgroup and were assigned to a particular teacher who acted as the subject expert or resource person for the particular GD session. Thus 4 faculty members were required to conduct the discussion for each batch of 50 students. Each GD session lasted approximately 55 to 70 minutes. The number of these sessions allotted for a particular topic was prefixed at a ratio of 1 GD session for every 3 lecture classes such

that the full topic could be covered adequately. After coverage of a complete topic in GD sessions, the students were asked to appear for a post-test comprising of same or similar questions and of same duration as the pre-test. Also, a feedback from the students pertaining to their subjective evaluation of the overall process was collected after the post-test using a preset proforma. Both the pre-test and post-test papers were evaluated. Results of all students with less than 80% attendance separately in lectures and group discussions were summarily excluded from the study. This protocol was repeated for other topics as and when they were completed.

### **Results:**

Altogether, 6 separate sections from biochemistry curriculum were covered under this programme in 32 lecture classes and 12 GD sessions during the course of the study period between October 2005 and December 2005. After excluding the students with less than 80% attendance, performance result of 132 students were included in the present study. For purpose of statistical analysis, these students were classified into 4 groups A, B, C and D based on their performance in pre-test as shown in the Table. The post-test score was compared with the pre-test score for individual students, between each group and also for the entire study cohort. The details of these data as also of all statistical evaluations are presented in the Table and Figure.

The following observations were made from the study:

1. There was a significant difference ( $p < 0.01$ ) in means between pre test ( $46.96 \pm 21.81$ ) and post test ( $53.05 \pm 24.29$ ) scores.

2. There was a significant increase ( $p < 0.01$ ) in means between pre and post test scores of groups B and C.
3. Means between pre and post test scores of groups A and D increased after GD but this increase was not statistically significant ( $p > 0.05$ ).
4. There was a significant positive correlation (Pearson's correlation coefficient = 0.934, ( $p < 0.01$ )) between pre and post test scores in all students.
5. Altogether, 79.54% ( $n = 105$ ) students showed an increase in their post test scores as opposed to 20.45% ( $n = 27$ ) students who had either equal scores or had a decrease in their scores.
6. The percentage of students with  $> 50\%$  marks (cut-off for pass) increased from 50.76% ( $n = 67$ ) to 59.85% ( $n = 79$ ).

### **Discussion:**

In this study, a significant difference in means between pre and post test scores was observed. Thus it may be suggested that, in general, GD exerts a considerable influence on improvement of LO over and above traditional lecture sessions. But when analyzed for variation within separate performance based student cohorts, it was observed that mean post test score increased significantly over pre test score only in groups B and C comprising of students ( $n = 92$ ) with predominantly intermediate performance level who scored 25% to 75% marks in pre test. On the other hand, groups A and D, comprising of students ( $n = 40$ ) who may be otherwise classified as 'High achievers' and 'Low achievers' respectively, failed to show any significant difference in means. From these findings, it

may be inferred that GD was found effective in improving LO in a majority of students who comprise the mid-performance segment of any student cohort and consequently possess the maximum scope for improvement. However, GD fails to significantly influence the LO in 'High achievers' (Group A) presumably due to absence of scope for any further improvement as also in 'Low achievers' (Group D) perhaps highlighting the limited effectiveness of GD in this group of students. The reasons for this may be a relatively poor preparation and inexperience of this group, low learner aptitude perceiving the proceedings as too fast to be effective as also the inherent inability of this group of students to participate actively in group activities, thus underscoring the need for implementing other specialized T-L programmes targeted specifically at this group of students.

The significant positive correlation between pre and post test score through all groups may illustrate that the beneficial effect of GD was proportional to individual performances in all groups and that all students benefited from these sessions at a rate consistent with their individual aptitudes and intelligence levels. Thus altogether, 105 students who formed 79.54% of the study population showed a net increase in their scores as opposed to 27 students comprising 20.45% of the study population who had equal scores in both tests or had a decrease in their performance. Furthermore, the increase in the number of students securing more than 50% marks after GD may suggest that GD, as an adjunct to lecture, elevated the LO of a greater number of students to an acceptable

average, which may be regarded as one of the primary objectives for any T-L programme.

### **Limitations:**

The present study, though adequately illustrating the efficacy of GD after a session of lectures, was confounded by the fact that GD served as a revision session for the students enabling them to internalize in a better way the basic concepts already learnt in lectures.

Thus the difference in pre and post test performance may, at least in part, reflect the advantages gained from revision rather than due to any particular T-L method. The study period was also relatively short. We intend to further improvise upon the method to overcome these limitations as we continue the programme for the next few months.

### **Conclusions:**

GD was found to be an effective T-L method when used as an adjunct to lecture classes. A majority of the students showed significant improvement in performance after attending GD sessions. However, the improvement varied between different student cohorts based on the performance in pre test scores. The majority of the students comprising the intermediate performance segment showed the maximum improvement. Low achievers failed to show significant improvement underscoring a need for implementation of other specialized T-L programmes targeted specifically at this group.

(Please see the Table and the Figure on the next page)

**TABLE**

**Mean and Standard deviation of marks obtained in pre-test and post-test among different performance-based student cohorts**

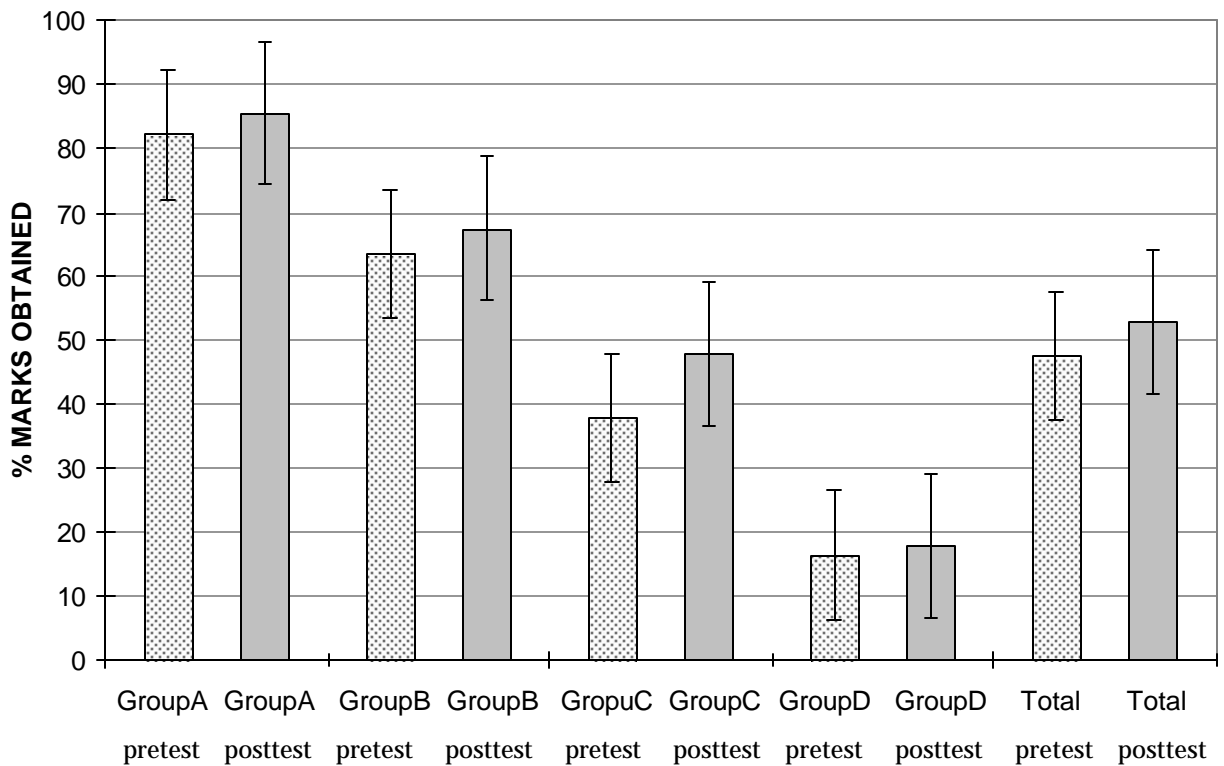
Grouping			Pre-test Score		Post-test Score					
Groups*	% Marks* **	n	Mean	SD	Mean	SD	t	df	P value	significance
A	75 – 100	12	81.67	5.47	84.08	8.75	1.192	11	0.258	Not significant
B	50 – 74	55	61.18	7.38	68.73	11.15	6.388	54	0.001	Significant
C	25 – 49	37	38.27	7.93	46.86	12.74	5.486	36	0.001	Significant
D	0 – 24	28	15.64	5.91	17.11	6.81	1.393	27	0.175	Not significant
Total	0 – 100	132	46.96	21.81	53.05	24.29	8.040	131	0.001	significant

\* Sub grouping based on pre-test score

\*\* denotes the % marks obtained in pre-test

**FIGURE**

Bar graph showing Mean and Standard deviation of marks obtained in pre-test and post-test among different performance-based student cohorts



\*Note: Individual groups are defined as per Table

# **EDUCATIONAL PROJECTS INITIATED DURING 52<sup>nd</sup> NATIONAL COURSE**

The 52<sup>nd</sup> National Course was held at JIPMER, Pondicherry from 20<sup>th</sup> Feb – 1<sup>st</sup> March 2006. The following projects were presented by the participants and approved. We wish them speedy execution of the projects and look forward to receiving the final report.

## **1. Group tutorial as revision exercise.**

Dr. Kalyan Goswami,

Sr. Lecturer in Biochemistry, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha – 442102

## **2. MCQ banking in Physiology.**

Dr. Ashwani Dhawan,

Sr. Lecturer in Physiology, Mahatma Gandhi Institute Of Medical Sciences, Sevagram, Wardha - 442102

## **3. Structured undergraduate dissection hall teaching using modified dissection manual.**

Lt. Col. Sushil Kumar,

Assoc. Prof. in Anatomy, Armed Forces Medical College, Pune – 411040

## **4. Short problem oriented teaching / learning ward round on management issues related to diarrhoea and RTI for MBBS students**

Surg Cdr. K.M. Adhikari,

Assoc. Prof. in Paediatrics, Armed Forces Medical college, Pune – 411040

## **5. Evaluation of alternative teaching-learning methods for undergraduates in Ophthalmology.**

Dr. (Maj) Kavita Bhatnagar,

Sr. Lecturer in Ophthalmology, Bharati Vidhyapeeth Deemed University Medical College, Pune – 43

## **6. Planning and implementation of OSPE (Objective Structured Practical Examination) in Microbiology.**

Dr. A.G. Prathab,

Asst. Professor in Microbiology, M.S. Ramaiah Medical College, MSR Nagar, Bangalore – 54

## **7. Project evaluation of impact of integrated teaching on students and faculty.**

Dr. G. Suman,

Lecturer in Com. Medicine, M.S. Ramaiah Medical College, MSR Nagar, Bangalore – 54

## **8. Use of pre-test and post-test in routine theory classes for the II MBBS students in Pathology.**

Dr. B.S. Ajaz Ahamed,

Asst. Prof. in Pathology, Al Ameen Medical College, Bijapur

**9. Use of tutorials for improving the learning outcome of MBBS students.**

Dr. Y. Karuna Sree,  
Asst. Prof. in Biochemistry, Kurnool Medical College, Kurnool

**10. Improving learning outcome of low achievers.**

Dr. A. Padma Vijaya Sree,  
Asst. Prof. in Biochemistry, Kurnool Medical College, Kurnool

**11. To improve academic performance of students with low achieving.**

Dr. D.S. Krishna Swaroop,  
Asst. Prof. in Pathology, Narayana Medical College, Nellore – AP

**12. Symposium as a method of teaching-learning activities for MBBS students.**

Dr. B. Veeresalingam,  
Professor of Surgery & Medical Superintendent, Narayana Medical College, Nellore – AP.

**13. Effectiveness of tutorials to improve the learning outcome of II MBBS students in Microbiology.**

Dr. P. Srinivasulu Reddy,  
Assoc. Prof. in Microbiology, Narayana Medical College, Nellore – AP

**14. Formative assessment of revised National Tuberculosis Control Programme implemented by medical students in Community Medicine.**

Dr. G. Premchand,  
Asst. Prof. in Community Medicine, Govt. Medical College, Anantapur, A.P.

**15. Teaching epidemiology by problem solving exercises.**

Dr. Aswathy, S,  
Assoc. Prof. in Community Medicine, Amrita Institute Of Medical Sciences, Ernakulam – 682026.

**16. Imparting communication skills to medical students through community interaction.**

Dr. Thomas Mathew,  
Prof. & Head, Dept. of Community Medicine, T.D. Medical College, Alappuzha – 688 005  
(Kerala)

**17. An assessment of problem solving exercises as a T.L. method in the Department of Pathology, PSG Institute of Medical Sciences, Coimbatore.**

Dr. S. Shanthakumari,  
Assoc. Prof. of Pathology, PSG Institute Of Medical Sciences & Research, Peelamedu, Coimbatore

**18. Evaluation of current methods of lecture delivery by the faculty in the department.**

Dr. T. Sathish Kumar,  
Asst. Professor, Dept. of General Surgery & GI Surgery, PSG Institute Of Medical Sciences & Research, Peelamedu, Coimbatore.

**19. Improving the learning abilities of low achievers and slow learners in the Department of Microbiology.**

Dr. K. Prabhakar,  
Professor of Microbiology, Rajah Muthiah Medical College, Annamalai University, Chidambaram

**20. Training of undergraduates in cardio pulmonary resuscitation.**

Dr. C.S. Balachandran,  
Reader-Pediatrics, Rajah Muthiah Medical College, Annamalai University, Chidambaram

**21. Computer assisted learning (CAL) module in haematology for independent learning y III year MBBS students.**

Dr. D. Jeevan,  
Assoc. Prof of Pathology, Mahatma Gandhi Medical College & Research Institute, Pondicherry-607 402

**22. Methods to improve bed side clinical teaching.**

Dr. T. Tirou Aroul,  
Assoc. Prof. of Surgery Mahatma Gandhi Medical College & Research Institute, Pondicherry-607 402

**23. Helping the slow learners to improve in the Department of Clinical Microbiology.**

Dr. Shashikala,  
Assoc. Prof. of Microbiology, Pondicherry Institute of Medical Sciences, Kalapet, Pondicherry

**24. Evaluation of dissection skill of I MBBS students as a part of internal assessment.**

Dr. N. Muthukumaravel,  
Asst. Professor of Anatomy, Pondicherry Institute of Medical Sciences, Kalapet, Pondicherry

**25. Creating and issuing electronic knowledge bank of Otolaryngology for undergraduate students before the start of 6<sup>th</sup> semester to promote self-learning.**

Dr. Somanath B. Megalamani,  
Asst. Professor of ENT, JIPMER, Pondicherry-6

**26. Item analysis to create MCQ bank in Pathology.**

Dr. Manish Bundeale,  
Asst. Prof. of Pathology, JIPMER, Pondicherry-6

**27. Assessment of awareness of medical undergraduates on common dental emergencies.**

Dr. S. Balanand,  
Dept. of Dentistry JIPMER, Pondicherry-6

**28. Use of portfolio based assessment during community based field postings.**

Dr. Swaroop Kumar Sahu,  
Senior Resident in P & SM, JIPMER, Pondicherry-6

**BOOK POST – PRINTED MATTER**

**TO**

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