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# N.T.T.C.

## BULLETIN

<b>Theme of this Issue</b> Competence-Based Assessment			
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<p><b>Patrons:</b> K.S.V.K. Subba Rao, Director, JIPMER and Project Director, NTTC, JIPMER</p> <p>K.S. Reddy, Director, Regional Cancer Centre and Dean, JIPMER</p> <p><b>Editor:</b> Santosh Kumar, Project Officer, NTTC &amp; Head, Dept. of Medical Education, JIPMER</p> <p><b>Editorial Board</b> P.H. Ananthanarayanan B. Vishnu Bhat Latha Chaturvedula D. Kadambari B. Gitanjali Debdutta Basu R.P. Swaminathan Z. Zayapragassarazan Sitanshu Sekhar Kar</p> <p><b>Correspondence and Contributions to:</b> The Editor, Bulletin of NTTC, Department of Medical Education, JIPMER, Puducherry-605 006</p> <p><b>Email:</b> nttc.jipmer@gmail.com</p>	1.	<p><b>LEAD ARTICLE</b></p> <p><b>Miller's Pyramid: The Basis for Change from Domain-Based to Competence-Based Assessment</b></p> <p><i>Dr. Santosh Kumar and Mr. Z. Zayapragassarazan</i></p>	2
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## Miller's Pyramid: The Basis for Change from Domain-Based to Competence-Based Assessment

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### Introduction

“To change curricula or instructional methods without changing examinations would achieve nothing!”  
 G.E. Miller<sup>1</sup>

In view of the wide recognition of the influence of assessment on learning, there is a universal trend to change from domain-based assessment to competence-based assessment on the basis of Miller's pyramid.<sup>2</sup> This article describes domain-based assessment, Miller's pyramid and competence-based assessment in an effort to create an awareness for the much needed change.

### Domain-Based Assessment

Beginning in the 1950s, the classification of educational objectives, called taxonomy, was developed by Bloom and others<sup>3,4</sup> and Harrow<sup>5</sup>. In this taxonomy, educational or learning objectives were classified into cognitive, affective and psychomotor domains and each of these domains was further classified into several levels. With the availability of taxonomy of educational objectives, the objectives were divided into three domains. This domain-based classification of educational objectives, led to development and use of assessment tools based on domains. Thus the assessment tools were divided into three domains (Table 1). In India, because of only 20% internal assessment in graduate medical course and zero per cent internal assessment in postgraduate medical courses, mostly cognitive domain-based tools and to a limited extent psychomotor domain-based tools are being used for assessment. Affective domain-based tools are rarely used for assessment.

**Table 1**  
**Domain-Based Classification of Assessment Tools**

Domain	Assessment Tool
1. Cognitive	Essay type questions Short answer questions Modified essay questions Multiple choice questions
2. Psychomotor	Conventional practical & clinical Objective structured clinical/practical examination
3. Affective	Rating scales Questionnaires Diary

### Miller's Pyramid

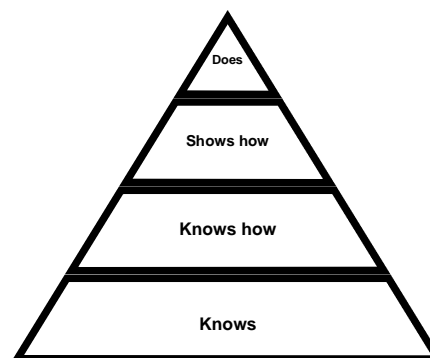


Figure. Miller's pyramid

George E. Miller suggested a framework of assessment for clinical skills, competence and performance in an invited review published in the year 1990.<sup>2</sup> The pictorial representation of this framework is widely known as Miller's pyramid (Figure). Miller's pyramid has four levels as described below.

#### “Knows” Level

At “Knows” level, the knowledge of students is assessed using oral or written assessment tools.

#### “Knows How” Level

At “Knows How” level, the problem solving skills are assessed using written assessment tools.

#### “Shows How” Level

At “Shows How” level, in vitro assessment of professional functions is done under controlled conditions.

#### “Does” Level

At “Does” level, in vivo assessment of professional functions is done in real life settings.

### Competence-Based Assessment

In real life, cognitive, affective and psychomotor domains are used in combination in the form of competence.

The “Knows How”, “Shows How” and “Does” levels of Miller's pyramid include the combined assessment of the three domains or the assessment of competence. Therefore competence-based assessment tools can be classified using the top three levels of Miller's pyramid. The Miller's pyramid levels also facilitate stepwise or sequential assessment of competence.

**Table 2**  
**Classification of Competence-Based Assessment**  
**Tools using Miller's Pyramid**

Miller's Pyramid Level	Assessment Tool
Knows How	Patient management problem Key features problem
Shows How	Objective structured clinical/practical examination Simulators Role plays
Does	Direct observation of procedural skills Mini clinical evaluation exercise Multi source feedback Portfolio

**References**

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**Emotional Intelligence and Medical Professionalism**

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Medical professionalism is how physicians conduct themselves as physicians while serving patients and society in their roles as healer, medical professional

and medical scientist. Medical professionalism is the basis for the trust in the patient-physician relationship.<sup>1</sup>

The selection of students for medical schools is generally done based on their marks in the qualifying examination and/or through a knowledge test. Knowledge of an individual is being considered as the main attribute for selection and training. Further, many have argued that Intelligence Quotient (IQ), or conventional intelligence, is too narrow that some people are academically brilliant yet socially and interpersonally not appropriate.<sup>2</sup> Studies have shown that IQ alone does not contribute to the professional success of medical professionals. Professionals who are trained to be clinically competent, but inadequate social skills for practice have proved to be less successful in their profession.<sup>3</sup> Emotional intelligence (EI) which has already proved to be key attribute for success in the corporate sectors has now gained momentum in the field of education in general and medical education in particular. EI describes the ability, capacity, skill, or self-perceived ability to identify, assess, and manage the emotions of one's self, of others, and of groups.<sup>4</sup>

EI, often measured as an emotional intelligence quotient, or EQ is recognized as an important personal attribute involved in nurturing the patient-physician relationship and is thus increasingly included in the medical education curriculum.<sup>5</sup> Goleman has pointed out, that at a time of heightened competition for patient loyalty, those physicians who are more aware of their patient's emotions are more successful in treating them than their less perceptive colleagues.<sup>6</sup>

<b>EQ</b>	<b>≠</b>	<b>IQ</b>
Emotional Experiential I Feel		Cognitive Academic I Think

Studies involving some 2800 physician "star performers" have shown that 75% of a high achiever's success is a function of emotional intelligence, while 25% of success reflects technical competency.<sup>7</sup> As a result, interpersonal communication skills have been designated as one of the six areas of professional competence for physicians by the Accreditation Council for Graduate Medical Education.<sup>5</sup> The other areas of professional competence are patient care (including clinical reasoning), medical knowledge, practice-based learning and improvement (including information management), professionalism, and systems-based practice (including health economics and teamwork).<sup>2</sup> EI is included as one of the assessment items under affective and moral domains.<sup>7</sup>

EI is a set of 4 distinct yet related abilities<sup>8</sup>:

**Perceiving emotions** — the ability to detect and decipher emotions in faces, pictures, voices, and cultural artifacts- including the ability to identify one's own emotions. Perceiving emotions represents a basic aspect of emotional intelligence, as it makes all other processing of emotional information possible.

**Using emotions** — the ability to harness emotions to facilitate various cognitive activities, such as thinking and problem solving. The emotionally intelligent person can capitalize fully upon his or her changing moods in order to best fit the task at hand.

**Understanding emotions** — the ability to comprehend emotion language and to appreciate complicated relationships among emotions. For example, understanding emotions encompasses the ability to be sensitive to slight variations between emotions, and the ability to recognize and describe how emotions evolve over time.

**Managing emotions** — the ability to regulate emotions in both ourselves and in others. Therefore, the emotionally intelligent person can harness emotions, even negative ones, and manage them to achieve intended goals.

### **Educational Implications of EI in Medical Education**

It could develop a better understanding of the competency of interpersonal and communications skills of medical students and medical professionals which is more important in relieving anxiety and establishing trusting relationships.<sup>8</sup> EI of individuals can be measured using appropriate tools which help the medical teachers to carry out necessary educational interventions for the desirable development of EI among the medical students during the formative period.<sup>5,8</sup> Doctors with good EQ have proved to have effective communication and interpersonal skills and are less likely to receive patient complaints and more likely to play a major role in reducing medical errors.<sup>9</sup> Educational interventions can be designed to enhance student recognition of patient needs and personal satisfaction.<sup>9</sup> Assessment of EI is now used as part of the selection process for some medical school applicants in an effort to consider an applicant's competence in interpersonal skills.<sup>1,2</sup>

### **Conclusion**

Medical education must change to meet the changing health care needs of the population and the changing demands of patients. It is widely acknowledged that medical schools must strive hard to improve the overall competency of medical students in the interpersonal dimension of practicing medicine. By developing the emotional intelligence, medical students and professionals can become more productive and successful in what they do and help others become more productive and successful too.

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## **Low Achievers – Are They Really Slow Learners?**

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### **Introduction:**

The university result in preclinical examination in our college with an intake of 150 students is between 70 to 88%. There are failures in spite of completion of syllabus and regular teaching schedule. Poor results forced us to make an attempt in knowing the exact cause of poor performance.

Students who had failed in their internal assessment tests conducted as part of their formative assessment attributed various reasons for their poor performance other than coping with academic stress. Medical educators have identified extra curricular causes like language, parental and peer pressure, personal, medical and domestic problems to have a significant impact on learning. So we perceived the necessity to

devise a tool to identify the cause for poor performance and intervene accordingly.

**Objectives:**

1. To design a questionnaire to identify the cause of poor performance in low achievers.
2. To develop a remedial program to help slow learners in improving academic performance

**Methodology:**

All the students scoring below 50 % in theory and practicals of his / her 1<sup>st</sup> Internal Assessment (IA) scores were considered as low achievers. A questionnaire (Table 1) was designed which contained 20 statements regarding curricular (statements 9,10,16,17,18,19,20) and extra curricular ( statements 1,2,3,4,5,6,7,8,11,12,13,14,15) causes and administered to the students. After analyzing the responses, one to one interview was conducted to know the problem in detail.

Intervention planned was having a remedial program consisting of counseling, conducting enrichment classes to assist in learning and having study skill sessions. Periodic assessment was conducted and faculty feedback was obtained.

**Table 1. Questionnaire to identify cause of poor performance**

1.	I have problem in understanding the language	Yes/No
2.	I have no interest in doing Medicine	Yes/No
3.	I have come here as my parents forced me	Yes/No
4.	I am anxious	Yes/ No
5.	I am not accustomed to the food that is provided	Yes/No
6.	I have problems due to my seniors	Yes/No
7.	I am afraid of failing in the exams	Yes/No
8.	I have problems with my classmates/room mates	Yes/No
9.	I don't understand what is taught in class	Yes/No
10.	I am not able to take notes	Yes/No
11.	I don't find the environment conducive to study	Yes/No
12.	I feel sick often	Yes/No
13.	I feel unhappy	Yes/No

14.	I feel threatened	Yes/No
15.	I feel that I don't belong to the group	Yes/No
16.	I am not able to study on my own	Yes/No
17.	I need additional help in learning	Yes/No
18.	I am not confident regarding the subject	Yes/No
19.	I don't understand what is read	Yes/No
20.	I feel frustrated as I can't study	Yes/No

**Results:**

45 low achievers were identified after the 1<sup>st</sup> internal assessment. After analyzing the responses of the questionnaires, poor performance was due to non-curricular causes in 23 students and curricular causes in 22 students.

In addition to identifying the cause, motivating, providing emotional support and non threatening learning ambience, giving confident feedback, encouraging team learning to promote peer acceptance were part of the remedial program planned. All the students were counseled and additional assignments and study skill sessions were conducted.

After 2<sup>nd</sup> Internal assessment, 20 improved and scored more than 50%. The faculty opined that these students submitted their assignments on time and showed interest during the tutorials. For the remaining 24 low achievers, extensive one to one coaching was adopted for those with poor learning techniques and counseling and motivation for the rest. After 3<sup>rd</sup> and final Internal assessment, 13 students remained low achievers with less than 50%. Enrichment and counseling were continued for these students.

**Conclusion:**

Non-curricular causes like lack of motivation, language and food preferences appear to have a significant impact on the academic performance of students. A well designed questionnaire will serve as an important tool in identifying the cause of poor performance and then intervene accordingly.

The questionnaire that was developed for this NTTC project has now become the mainstay of remedial and mentorship program to help the poor performers in our department.

Remedial program for slow learners include identification of cause, counseling by faculty, enrichment classes, assignments, small group discussions and constant feedback.

Orientation programs for fresh entrants with sessions on study skills, mind mapping, making notes and time management and coping stress (delivered by a

psychiatrist) are also being conducted to facilitate learning at the beginning of the course.

#### **Future directions:**

The questionnaire will be revised to include responses on a 5 point Likert scale to test validity and internal consistency. To extend the remedial program to para clinical and clinical phases.

#### **Reference:**

Ananthkrishnan N. Helping problem learners – A suggested approach. Bull NTTTC. 2000; 7(2): 3-6.

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### **The Seekers and the Sought: a novel Teaching-Learning concept**

**Dr. V.V.Unnikrishnan,**  
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It is a commonplace experience during ones studentship in a medical school, that one hears the existence of a great teacher somewhere in the institution, but won't be able to experience him because the teacher is in a different unit, or is in a situation normally inaccessible if one is in a different semester [eg. in Anatomy or Anaesthesiology dept]. Their 'great' classes were lost horizons for the rest of us.

Even though we all tend to accept the situation as such, the fact remains that such a teacher is rightfully a 'property' of all the students at that point of time. How to make a good teacher accessible to a cross section of students in a medical school? This was the question which led us to formulate this unconventional TL concept.

The prime question was about how to find out the 'Good Teachers' in the Undergraduate student's point of view. This was a delicate area, because a number of egos might get rubbed in the wrong way at every stage of the process.

We solved this by asking Thrissur Medical College Alumni Association to conduct an informal, quadri-centric survey. The Debate and Quiz Club of the Students Union, 'Prateeksha', the Charity wing of Medical Students, different Tutorial Groups, and an informal group consisting of students with good academic track records, were asked to simply rank the 'Good Teachers' in different departments. They were permitted to use 'sms' as a method of participating in the survey. Anonymity was ensured at every stage.

The data was analyzed, and the teachers were divided into four groups, according to whether their names appeared in one, two, three or all lists. The teachers whose names appeared in the 3 and 4 groups were [ie, those whose names were present in 3 out of 4 lists and all the 4 lists] were approached by the Alumni

Association members and requested to present a session on a topic of their choice before a cross section of students, in the Alumni Association Auditorium on any Tuesday or Thursday after class hours. Duration and choice of TL Method were left to the teacher. However the Teacher was encouraged to stick on to the theme of the program, "Simplify It!".

Students were informed of the sessions one day before each session through the SMS Communication Network, an initiative by the TMC Students Union 2011. PGs and other faculty members were also informed through sms networks from the Dean's office. Attendance was not compulsory, but they were encouraged to come to the venue by about 4.30pm, sufficiently relaxed.

The program, christened as 'TMCAA-DQ Mastermind Program' commenced on 7<sup>th</sup> April 2011. The response was enthusiastic and highly encouraging. A cross section of students of different semesters varying from 35 to 200 attended each session. Obviously, some sessions were 'crowd pullers'. Many PG students and other faculty members also came over to attend sessions. After 12 sessions, feedback was taken from the teachers and students on what they felt about the concept.

#### **What the Students liked about the concept**

1. Teachers were chosen by the students; hence the sessions were eagerly awaited for.
2. No compulsions.
3. Felt relaxed [especially the timings, and absence of compulsions on attendance]
4. Topics were relevant.
5. Liked the teachers & their ways of teaching
6. Came across different personalities and styles among the faculty
7. Felt informal.

#### **What the Teachers liked about the concept**

1. Felt wanted
2. Felt recognized
3. Could get an audience who came specifically to hear them
4. Could select their own 'favourite' topics.
5. Could select their own T-L method
6. Flexibility of timings.
7. Overall freedom.

#### **What the Organizers felt about the Program**

The concept of 'Evening Classes' by teachers is nothing new. From the point of view of organizers, the most important features, which we felt made the difference, are:

1. Informal, relaxed settings
2. Total lack of compulsions on teachers and students
3. Flexibility in timings
4. Flexibility in choice of topics
5. Creates intimacy among Teachers and students, and among students themselves.

6. Virtually a 'Zero-expenditure' program.
7. A fertile area for involvement of Alumni Associations in academic programs.
8. sms may be utilized as a tool for educational surveys and feedback
9. Extra-curricular themes could be incorporated.

#### Adverse comments from different quarters

1. Too informal
2. The number of participants in a session could not be predicted, and often sessions were crowded.
3. More interactions should be encouraged
4. Faculty members felt that they were arbitrarily divided into 'Good' or otherwise, by questionable methods.
5. Their research initiatives were not duly recognized.

#### Rejoinder

All the adverse comments are valid. However, as teachers we ought to accept that the undergraduate students' perception of goodness of a teacher is not necessarily that of senior members of the fraternity. Ultimately the goodness of a cake is decided by the eaters, and not the cooks! As a student moves up the

hierarchy, they tend to recognize the importance of other faculties, and assign the value due to them.

#### Future plans

We are periodically taking feedbacks from the faculty and students on choice of faculty, topics and on how to improve the program. It is being monitored by the Medical Education Unit of the institution as a novel TL Intervention. A proposal to conduct a get-together of the faculty and honouring them is also on the anvil.

Sustainability of such a program needs the active, creative and consistent inputs from the faculty and the students. Hence we are now thinking on the ways we can achieve this, by forming a core team, which will be self-renewable in character.

*[The author, an alumnus of the 42<sup>nd</sup> batch of NTTC, continues to derive inspiration from the time utilized at NTTC, Puduchery.]*

#### Educational Projects Initiated during 63<sup>rd</sup> National Course

The 63<sup>rd</sup> National Course was held at JIPMER from 5<sup>th</sup> September to 15<sup>th</sup> September 2011. The following project proposals presented by the participants were approved. We wish them speedy execution of the project proposals and look forward to receiving the final reports.

Sl. No.	Submitted by	College	Title
1.	Dr. Sanjay Jayantilal Mehta, Professor of Microbiology	C.U. Shah Medical College, Gujrat	Evaluation of 'Inquiry Based Learning (IBL)' as a teaching-learning tool in the subject of Microbiology.
2.	Dr. Dandekar Kundankumar Narayan, Associate Professor of General Surgery	Rural Medical College, Maharashtra	Item analysis of MCQs used in internal assessment III year MBBS students in the department of Surgery
3.	Dr. K. Amrutha, Assistant Professor of Physiology	Mamata Medical College, Andhra Pradesh	Use of Group Discussion with Problem Solving Exercises (PSE) in Physiology as a Learning Method
4.	Dr. B. Lakshmi Prasanna, Assistant Professor of Forensic Medicine	Kamineni Institute of Medical Sciences, Andhra Pradesh	To assess the awareness of non scholastic abilities among the final year MBBS part 1 students
5.	Dr. Nalini. G.K, Associate Professor of Pharmacology	Hassan Institute of Medical Sciences, Karnataka	Assessment of Prescription Writing Skill Among Final Year MBBS Students
6.	Dr. Girish. M. Desai, Associate Professor of Biochemistry	M.R. Medical College, Karnataka	Evaluation of Question Papers in Biochemistry subject of Rajiv Gandhi University of Health Sciences, Bangalore

7.	Dr. N. M. Sebastian, Assistant Professor of Community Medicine	MES Medical College, Kerala	A Review study on the quality of theory examination question papers of Community Medicine MES Medical College, Calicut University for 2009, 2010 and 2011
8.	Dr. G. Jeyachandran, Associate Professor of Biochemistry	Dr. SMCSI Medical College, Kerala	Identification of risk factors in poor performers of 1 <sup>st</sup> MBBS
9.	Dr. Binu Abraham, Assistant Professor of Pediatrics	Dr. SMCSI Medical College, Kerala	An evaluation of the different learning materials used by the final year MBBS students in relation to the academic performance in Pediatrics
10.	Dr. Alfred Job Daniel, Professor of Orthopaedics	Christian Medical College, Tamil Nadu	A survey of MBBS graduates about the effectiveness of training in managing common Orthopaedic problems
11.	Dr. Kamanashis Dutta, Assistant Professor of Pharmacology	Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, Tamil Nadu	Objective Structured Practical Examination (OSPE) as a method of formative evaluation in Pharmacology & students feedback on it.
12.	Dr. S.S.S.N. Rajasekhar, Assistant Professor of Anatomy	Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, Tamil Nadu	Students' perception towards anatomy
13.	Dr. J. Jayalakshmi, Professor of Microbiology	PSG Institute of Medical Sciences & Research, Tamil Nadu	Student's perception of Viva voce in the formative assessments In microbiology department
14.	Dr. Lathadevi. G.V, Associate Professor of Physiology	PSG Institute of Medical Sciences & Research, Tamil Nadu	Evaluation of stress levels with reference to language and medium of school education in 1 <sup>st</sup> MBBS Students.
15.	Dr. T. Chitra, Assistant Professor of Obstetrics & Gynaecology	Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry	To identify the cause for low academic achievement among final year MBBS students in the obstetrics and gynaecology and to take remedial measures at SLIMS, Pondicherry
16.	Dr. Pradeep Kumar N.S, Prof. of Pathology	Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry	Effective utilization of pathology museum in teaching learning process
17.	Dr. Basanta Kumar Behera, Associate Professor of Community Medicine	Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry	Facilitating and Hindering factors regarding learning outcome among 1 <sup>st</sup> year M.B.B.S students
18.	Dr. K. Bhuvaneshwari, Asst. Professor of Medicine	Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry	The effectiveness of Peer delivered lectures among undergraduate final year students
19.	Dr. Nataraj .A.R, Asst. Prof. of Orthopaedics	JIPMER, Puducherry	Comparison of lecture versus small group discussion as a teaching method in orthopaedic undergraduate teaching in JIPMER
20.	Dr. Rashmoni Jana, Asst. Prof. of Anatomy	JIPMER, Puducherry	MCQs for Assessing Learning Outcome of Embryology Lecture Classes
21.	Dr. Ravi Philip Rajkumar , Asst. Prof. of Psychiatry	JIPMER, Puducherry	The Impact of Undergraduate Psychiatry Training on Attitudes Towards Mental Illness

22.	Dr. Reena Gulati, Asst. Prof. of Pediatrics	JIPMER, Puducherry	Formulation of OSCE stations for formative evaluation of final year MBBS students in Pediatrics
23.	Dr. Pratul Sinha, Asst. Prof. of Transfusion Medicine	JIPMER, Puducherry	Impact of weekly quiz based self learning program on transfusion practices at JIPMER
24.	Dr. Vinod K.V. Asst. Prof. of General Medicine	JIPMER, Puducherry	An evaluation of objective structured clinical evaluation [OSCE] along with simulation as a teaching tool to improve the performance of emergency procedures by interns in JIPMER
25.	Dr. Kubera. N.S, Asst. Prof. of Obst. & Gyn.	JIPMER, Puducherry	Students (Interns) Perspective About Summative Evaluation in Obst. & Gyn.

## **ANNOUNCEMENTS**

### **JIPMER NTTC Alumni Association**

All medical teachers and allied health professional teachers who have attended the National Course on Educational Science for Teachers of Health Professionals of National Teacher Training Centre, JIPMER, Puducherry are requested to send the following information to **nttc.jipmer@gmail.com** to enable us to send the Bulletin of NTTC and facilitate communication.

1. Name, designation and full postal address
2. E-mail address

Secretary  
JIPMER NTTC Alumni Association

### **Medical Education – Principles and Practice**

Medical Education – Principles and Practice – a reference book published by JIPMER NTTC Alumni Association and popular among the Medical Teachers is available for sale. Interested medical teachers and institutions may send a crossed DD for Rs.325/- (including postal charges) in favour of Alumni Association of NTTC, JIPMER, payable at SBI, Puducherry, towards the cost of a single book to Secretary, JIPMER NTTC Alumni Association, C/o. Dept. of Medical Education, JIPMER, Puducherry-605 006.

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