FAIMER®
Foundation for Advancement of International Medical Education and Research

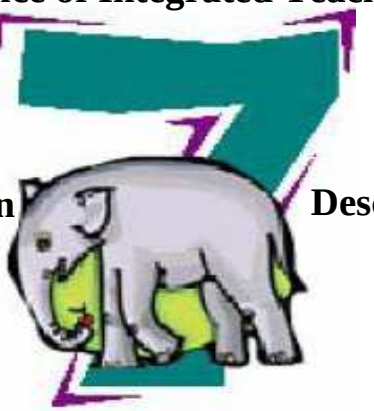
Integrated Teaching / Learning

ML Web Assignment

PSG-FAIMER Regional Institute

January 2010

Absence of Integrated Teaching is

Like the seven blind men  **Describing an elephant**

(Ears) (Trunk) (Legs) (Tail)

Dr. Chitra Nagaraj

PSG-FRI Fellow (2008)

FOREWORD

Ability to be a learner all through one's life is very important. This ability keeps a person curious and also leaves a zeal and zest for life which is conducive for the maintenance of good health as one ages.

I consider myself to be blessed to be chosen as a FAIMER fellow. This opportunity has introduced me to the *'LEARNING CHAKRA'* which will remain as a life long learning activity, giving me immense benefits.

The past two years have been one of intense learning which I have thoroughly enjoyed.

I put forward before you, our ML Web topic on 'Integrated Teaching /Learning – January 2010'

In this endeavour, I had the full support of 2009 fellows – Kalpana, Seema and Satish and 2008 fellow Ashwini, from the faculty side we had Vimal , Jyoti and Marina. I thank all of them and the rest of FAIMERLY for making this a unique learning and enjoyable journey and experience.

Chitra Nagaraj
PSG-FRI Fellow (2008)
PSG Institute of Medical Sciences & Research,
Coimbatore
Tamil Nadu
India

Dedications

The following have played an important role in my life and I dedicate this report to them

1. **My late *father* for being a *visionary* towards *women's empowerment* at a time when it was not fashionable to do so.**
2. **My *mother* who is the *pillar* of the family.**
3. **My *husband* for his *silent support***
4. **My *son* for being the *challenge* for completing the course**
5. ***FAIMER* for taking up and being the *catalyst for the cause of medical education***
6. **My Institution *Kempegowda Institute of Medical Sciences, Bangalore,* for their *encouragement and support* towards all activities.**

Thank you one and all

Chitra Nagaraj

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Introduction to ML Web Learning

The Foundation for Advancement of Medical Education and Research (FAIMER) has taken the initiative for working towards improving the standards of medical education all over the world. They have initiated faculty development fellowship programmes which are expected to bring about a change in the teaching and learning processes for better results. Their unique system of the fellowship with three contact sessions and two online sessions for a period of two years is well adapted for today's world of technology. Apart from doing a Curriculum Innovation Project the fellows are expected to actively take part in the Web Seminars, seven seminars for each year. A batch of 4 to 5 fellows from the senior and junior batch would lead the seminar and the rest are expected to participate actively. In the comfort of ones home/workplace one is able to acquire large amounts of knowledge in respect of the latest developments in medical education.

Methodology for the ML Web Learning

Five moderators, three of them from the PSG-Faimer Research Institute (PSG-FRI) '09 batch pioneered as discussion leaders and two from the '08 batch as co-facilitators with faculty mentors for guidance. We initiated an online discussion on Integrated Teaching/ Learning through the PSG-FRI listserv. In all, thirty two current fellows and PSG-FRI alumnis were to participate to explore a new methodology of learning in a unique non-threatening cyberspace environment.

The group would initiate the topic and put up relevant articles giving enough time and scope for generating a vibrant discussion. It was also planned to take feedback in the form of surveys in two stages, one to know the level of knowledge of the group in respect of 'Integrated Teaching / Learning' and the second to know how much 'Integrated Teaching / Learning' is currently in practice and also the feasibility of implementing this methodology in the various medical schools.

The topic for ***January 2010 ML Web learning was Integrated Teaching / Learning*** and the topic was discussed as per the format given below:

Sl No	**Time January 2010**	**Topic / Activity**	**Moderators (Dr.)**
1	First week	1. First Survey about awareness on Integrated Teaching / Learning among participants 2. Basics of Integrated Teaching / Learning	1. Ashwini & Seema 2. Sathish Nayak
2	Second week	Student and Faculty Perception of Integrated Teaching / Learning	Kalpana
3	Third week	Scope Of Integrated Teaching In The Existing Scenario	Seema S Raja
4	Fourth week	Second Survey about feasibility of implementing Integrated Teaching / Learning and Discussion on the results of the survey	Chitra Nagaraj Ashwini Appaji

Integrated Teaching / Learning

Introduction

Let us begin with a true story – 'Why did Mrs X die'[1] is a film based on a true life event produced by the World Health Organization on maternal mortality. Mrs X died during labour in a small hospital, the cause of death was said to be a straight forward clinical diagnosis of antepartum haemorrhage due to placenta praevia and the file was closed. But later when the case was re- opened and discussed it was found it was not a straight forward medical cause but a combination of factors, which lead to the death of Mrs X.

It was found that Mrs X came from a poor socio economic strata of society, she had many children and this was an unwanted pregnancy, she did not have access to family planning services, she did not have access to accessible and affordable health care, the bouts of bleeding which took place in the antenatal period were ignored, she had problem reaching the hospital in time due to lack of transport, the performance of a caesarean section was delayed, she did not receive enough blood transfusion, she was not identified as a high risk pregnancy, she was anaemic and undernourished. The film goes on to say that if interventions were done at the appropriate times, her death could have been averted. This story highlights the importance of 'Integrated Learning'

With Integrated Learning' one would focus on the broad and whole picture, rather than look at just one part of the whole.

I would also like to place as food for thought the musings of Ravi Shankar, our senior fellow: "*Basically all knowledge is interconnected. We as human beings are an integral part of the Universe or Cosmos a fact which had been intuited by our rishis centuries ago. All of us are composed on neutrons, protons and electrons and other basic building blocks of matter. The matter in our bodies follows the same laws of quantum mechanics as matter elsewhere in the Universe. Also most of the heavy metals (in this case I mean elements beyond Helium) have been formed in stars because of nuclear reactions and have been spewed out into interstellar space during the death of stars. We are all children of the stars in a very real term. That now puts a totally new perspective on integration. Those interested in knowing more about this are requested to refer to the award winning television series and book titled 'Cosmos' by the noted astronomer, Carl Sagan. In physics also scientists started by studying localized phenomena and studying pieces of the Universe. Eventually in Physics various general laws were discovered like the law of Universal gravitation and the theory of General relativity. Many particular and specific phenomena could be explained using these general laws. At present physicists are working on unifying the four basic forces of nature, gravitation, electromagnetic force and the strong and weak nuclear forces. They feel the theory of everything can explain nature. Will a law one day explain the human body and specific processes can it be regarded as various manifestations of the law? Quantum mechanics is the basic theory governing the interactions of our basic building blocks like all matter. What is the difference*

between living and non-living matter? Sagan calls human life as matter become conscious and contemplating itself and creation. 'The Snow leopard' is a remarkable book about a person's journey to the region of Dolpa in Nepal. In the book the author states that there are fundamental differences between the nature of eastern and western thought. Western thought he says is logical and likes to break things down to their constituent parts. Eastern thought he states like to intuit things and perceive the relationship between various objects. Eastern sages he states had correctly intuited many things about the Universe. We are basically easterners studying a western type of medicine. I feel that with all the emphasis and importance given to the western deductive and logical processes we are somehow missing out on the intuitive eastern understanding. What do you think? Can we one day have an integrated viewpoint of man in the Cosmos? A broad integrated view should understand not only man as a whole but man in the Cosmos. I think this could be an important philosophical underpinning for integrated teaching."

The concept of integration is not something new in medicine, Concern for integration and highlighting common diseases rather than rare diseases was reflected in the writings of Morgagni way back in the 18th century. [2]

Problems with deficiencies in medical education have been discussed in almost all countries. A review by the Oxford Centre for Staff Development identified five aspects of educational programmes that are associated with students adopting undesirable shallow learning techniques and failing to grasp the underlying principles of the topic. [3] The five features are heavy workload; excessive amount of course material; little opportunity to pursue subjects in depth; little choice over topics or methods of study; and an anxiety provoking assessment system that rewards or tolerates regurgitation of factual information. In this scenario, an integrated learning approach is expected to have better learning outcomes for the student.

Objectives

The objectives of this discussion include:

1. Define what is integrated teaching, and discuss the various models of integrated learning and merits & demerits of the same
2. Explain the current scenario of integrated teaching in India
3. Enumerate the strategies we can undertake for the implementation of Integrated Teaching / Learning

Basics of Integrated Teaching / Learning

As highlighted in the 'introduction' of this discussion, all fields of learning of are not compartments by themselves, example triage system followed in disaster management was a concept borrowed from the army, similarly the direction for integrated learning in medicine came from the research done in the field of 'Education' by educational researchers Flexner, Whitehead and Bloom. Their pioneering work, helped ***medical educationists*** to embrace integration with prospect of opportunities as well as challenges.

The Case Western Reserve University School of Medicine in USA[4] was the first school to introduce the "integrated" curriculum in 1952, which is described as "revolutionary" curriculum. It integrated the basic and clinical sciences and conformed to students' needs. Created by faculty members Dr. Joseph Wearn, Dr. T. Hale Ham and Dr. John L. Caughey Jr., the curriculum of '1952' became the most progressive medical curriculum in the USA at that time. The central themes of this revolutionary curriculum included the following ideas:

- Teaching should be based on problem solving;
- Students should accept responsibility for their own education
- Basic principles of medicine should be emphasized
- Curriculum should be designed as a continuum by faculty subject committees not by departments
- Teaching should be interdisciplinary; and basic sciences should be integrated with clinical sciences

It is important to remember ***"Learning can happen without a teacher but teaching can not happen without a learner"*** So for any innovations in education, the driving force is a learner, though we should not say that the students are customers, in a way we dispense knowledge to students just like as shopkeeper does to his customers. "Customer satisfaction" is very important***. So all innovations are for the "satisfaction" and benefit of students.***

There are two types of integration:

1. Integration by the teachers
2. Integration by the students

"Integration by teachers" can be compared to a mother's cooking for a child. Depending on the age of the child, digestive capacity, health condition etc, mother has to cook with proper ingredients and serve to the child (often spoon feed) who can eat and digest it easily.

"Integration by students" can be compared to a child or adult who can cook for themselves.

Conventional curriculum is the best example for this. Here, the teacher gives all ingredients in separate bags... the child will take home and learn to cook and prepare

a dish... as the child grows as an adult (in 5 years of time), the child/adult will know how to cook a good dish. That means integration takes place at the level of student.

In the above allegory words "child" and "adult" are not based on age. Here the first year medical student is the "child" and the final year student is the "adult". Spoon feeding and cooking is lecturing and integrating the topics at a "student comfort zone" and the cooking themselves means "self directed learning" and integration of disciplines learned by students...

Integrated teaching / learning is an area where there are a plethora of terminologies causing confusion in the minds of the medical educators.

(Several terminologies in Integrated Teaching /Learning look totally new and great. But the actual fact is that most of us know everything regarding that concept except the meaning of the terminology. For example: One man from a village (who was not educated much but could just read english) was eating sajjige/uppittu/upma every other day in his house and village restaurant. One day he went to a city and entered a restaurant. He just got the menu card and got confused because the card was full of strange items which he has never seen or heard. He just chose one item written "pudding" thinking it is some great snack and waited for it to come. When his order came to his table, he was surprised to see that it was the same sajjige/uppittu/upma that he was eating everyday! The moral of the story is that we often do a lot of things in education but are not aware that it is called with a different terminology in a different place/country...)

The terms "**Problem based** integration", "**case based** integration", "**task based** integration", "**need based integration**" are the terms which are commonly used in the medical curriculum. The emphasis here seem to be **attempts at integration in a predominantly discipline based curriculum** from a teachers point of view. Here the teachers from various disciplines would be using a **"Problem"** or a **"Case"** or a **"task"** as a trigger to integrate the teaching or explain the relevance of the subject matter from a related discipline to the understanding / solving the problem which is likely to be faced by the student later as a health professional.

When we use the terms **"Problem based learning", "case based learning", "task based learning", "need based learning"** in Integrated Teaching / Learning, there is a **paradigm shift from teacher centered teaching to student centered learning** with emphasis on mode of learning wherein these problems, cases, tasks etc act as the trigger to drive student learning and since the student (mostly) starts from scratch, all the matter from disciplines to be learned (related to the problem at hand) are new and the integration happens within the student's mind parallely (unlike in discipline-based curriculum wherein, the students after learning through watertight disciplines then integrates standing on the job or in the final years what was learned earlier....

Integrated Teaching / Learning can be defined as coordination among teachers of various disciplines for teaching a topic of clinical importance as a joint activity with a component of self learning by the student

The types of integrations in Integrated Teaching/ Learning include

i) **Horizontal integration**

ii) **Vertical integration**

	Horizontal integration	Vertical integration
1	The boundaries between the parallel parts of the course are removed	The boundaries between the sequential areas are removed
2	The preclinical disciplines like anatomy, physiology, biochemistry, microbiology, pathology and pharmacology are taught simultaneously.	The preclinical and clinical subjects are taught simultaneously. Clinical subjects are taught from the first year of the curriculum and continue till the end of the curriculum. The basic sciences also extend throughout the curriculum years.

Different Models for Integrated Learning

The models of integrated teaching and learning discussed here include:-

1. Spices Model

2. Wedge Model

3. Harden's Ladder of Integration Model

4. Parallel Curriculum Model

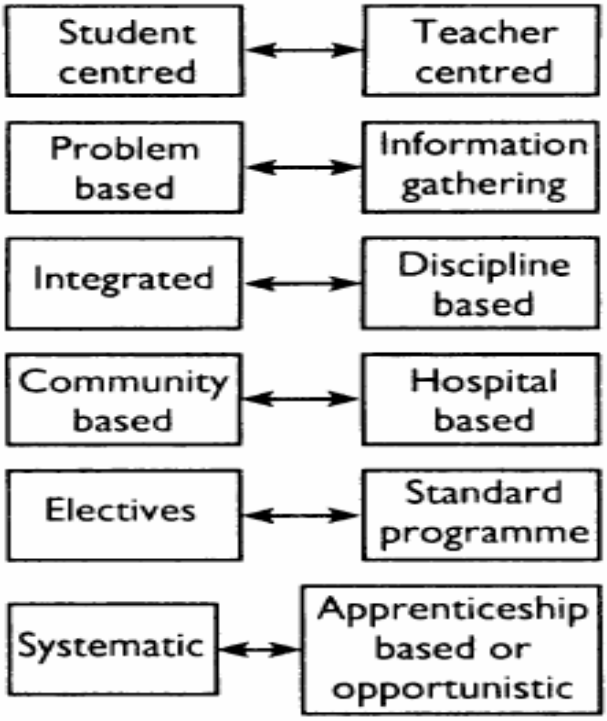
5. Spiral Curriulum Model

Discussing the models one by one:

1. Spices Model

The ***"Spices model"*** [3] describes curriculum change as a set of six issues. Each issue is represented as a continuum in the box. The model places newer 'progressive' schools to the left of the continuum and the older 'traditional' schools to the right. It suggests that schools need not adopt a wholesale approach to curriculum change, but can decide where they stand on each continuum and where they would like to be in relation to the issues. There are, however, parts of curricula that are inextricably linked. Curriculum planners need to be aware that changes made to one part of a learning system will invariably affect other parts. There may be unintended as well as intended consequences.

The Spices Model of integration in medicine depicted below

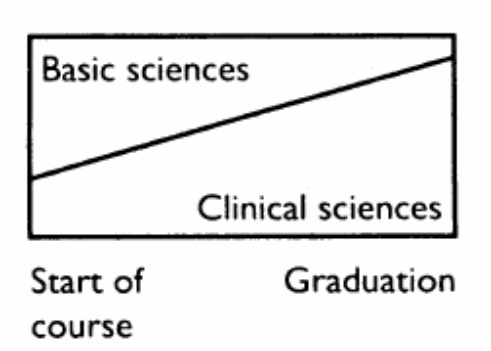


2. Wedge Model

In the "***Wedge Model***" [3] as followed by many institutions, the amount of basic sciences taught decreases gradually from first year to the last year of the curriculum

and the amount of clinical subjects taught increases gradually from initial to final years of the curriculum

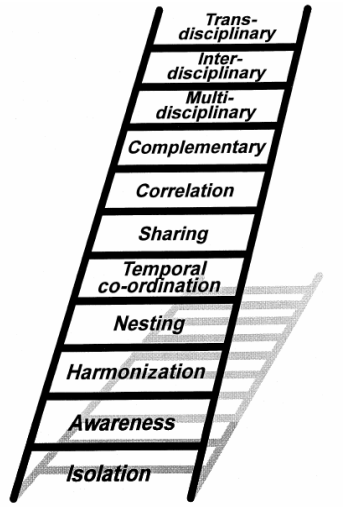
Wedge Model of Vertical Integration



3. Harden's Ladder of Integration Model

Professor Ronald Harden [5] talks about l1 steps on the integration ladder. As one moves up the ladder, there is less emphasis on the role of disciplines, an increasing requirement for a central curriculum, organizational structure and a requirement for greater participation by staff in curriculum discussions and planning. The higher the level of integration, the less prominence will be given to disciplines. "This integration ladder is a useful tool for the medical teacher and can be used as an aid in planning, implementing and evaluating the medical curriculum in our own setups.

The 11 steps on the integration ladder



Number of Rung	Stands for	Stage of integration
1	Trans-disciplinary	Complete integration with focus on clinical problems
2	Inter-disciplinary	Content of most subjects combined into one course
3	Multi-disciplinary	Systems based curricula where a body system unites disciplines
4	Complementary	Combination of subject based and integrated teaching
5	Correlation	Mostly subject based teaching with some overlapping courses
6	Sharing	Shared teaching across disciplines. Shared teaching
7	Co-ordination	Subjects grouped together into common themes and timetabled to facilitate co-ordination. Concurrent teaching
8	Nesting	Content drawn from other disciplines to enrich content
9	Harmonisation	Consultation and communication between disciplines
10	Awareness	Teachers aware of what is covered in other discipline
11	Isolation	Unaware of content and teaching in other disciplines

4. Parallel Curriculum Model

In this model each of the student was imagined as a diamond. The model's four parallels— Core, Connections, Practice, and Identity, [6] served as unique polishing tools to reveal the brilliance in each young person. The *Core* fostered deep understanding in a discipline, while *Connections* elicited the metaphoric thinking required to span the breadth of man's knowledge. *Practice* advanced the methodological skills required to contribute in a field, and *Identity* cultivated the attitudes, values, and life outlook that are prerequisites to self actualization in a field. "Knowing in part may make a fine tale, but wisdom comes from seeing the whole." Different curriculum components can be modified to help students gain an understanding and appreciation for the whole of a particular discipline. There are an infinite number of ways to draw upon the parallels. They can be used to *revise* or *design* tasks, lessons, or units. With a revised or
designed unit "in hand," a teacher can move back and forth across one, some, or all parallels in a single unit. Equally attractive, a teacher might use just one parallel to

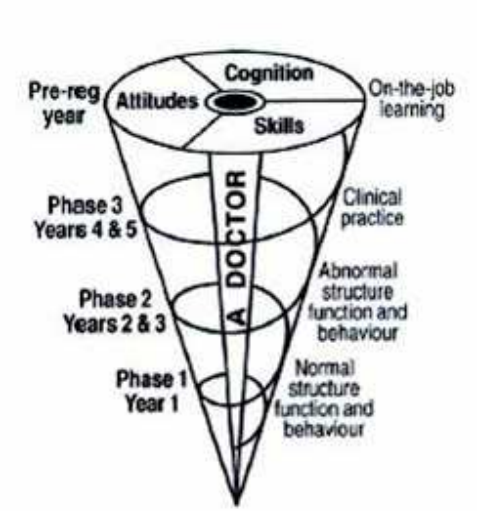
extend a Core unit. Various individuals within a school can use the parallels differently. A classroom teacher can use the parallels separately for different purposes, or teachers can work collectively— within grade levels, across grade levels and subjects—to use the parallels to support learning for all, some, or a few students. Furthermore, classroom teachers and teachers of the gifted can use the parallels to modify learning opportunities for students who need something beyond the grade-level curriculum.

The four parallels of the 'Parallel Curriculum Model'

5. Spiral Curriulum Model

The Spiral Curriculum Model [7] tries to break down barriers or boundaries between courses and departments and to look at the overall aims or objectives of the curriculum.

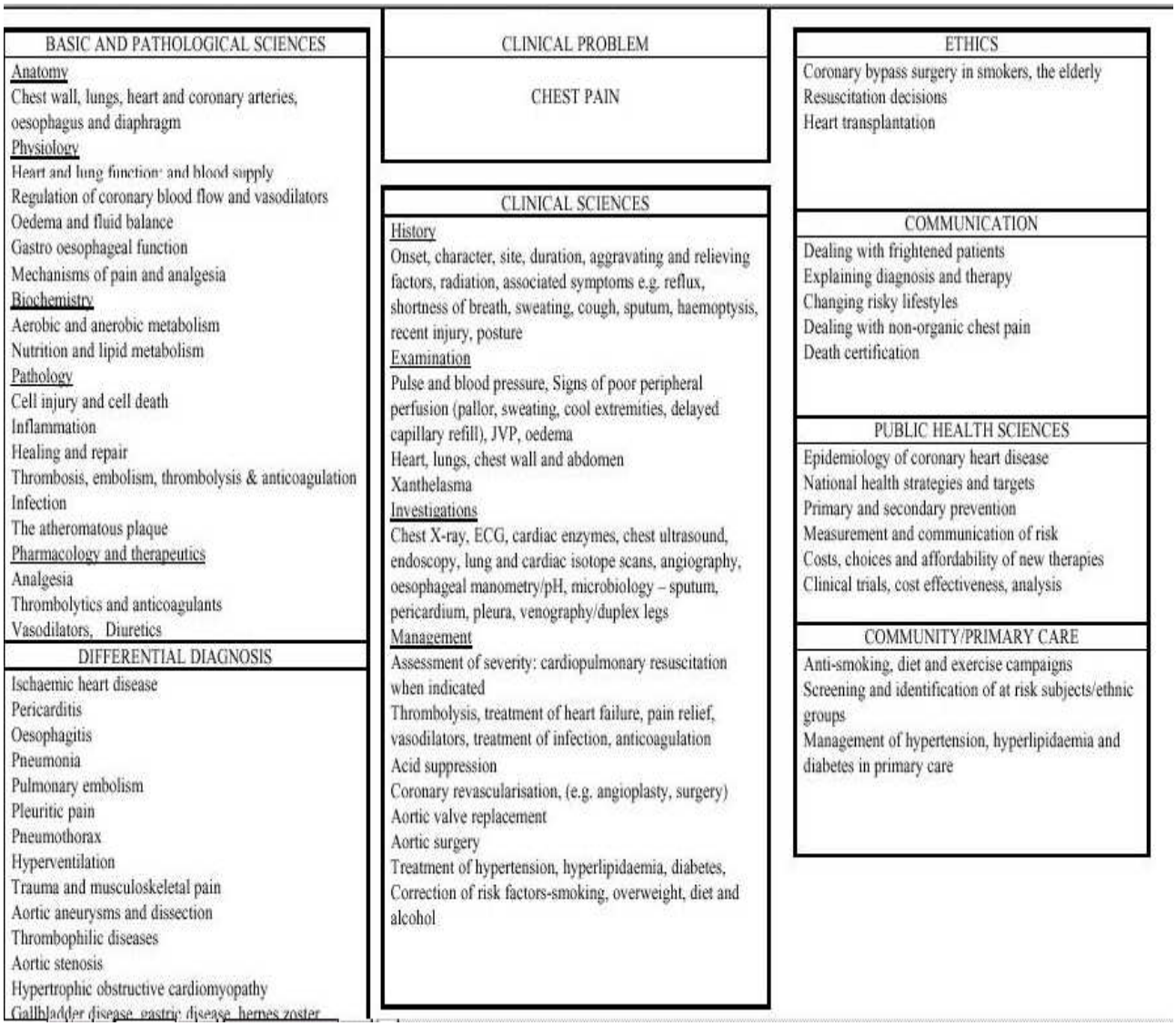
The Spiral Curriculum Model



An Example for Integrated Learning

The chart below takes the example of chest pain[8] and describes the approach to a clinical problem of '***Chest pain'*** using the integrated approach considering basic and pathological sciences, clinical sciences, differential diagnosis, ethics, communication, public health sciences, community/primary care, which would give us a better understanding of how to apply Integrated Teaching/Learning.
An example of Integrated Learning

An Example of Integrated Teaching /Learning: Topic - Chest Pain



BASIC AND PATHOLOGICAL SCIENCES

Anatomy
Chest wall, lungs, heart and coronary arteries, oesophagus and diaphragm
Physiology
Heart and lung function: and blood supply
Regulation of coronary blood flow and vasodilators
Oedema and fluid balance
Gastro oesophageal function
Mechanisms of pain and analgesia
Biochemistry
Aerobic and anerobic metabolism
Nutrition and lipid metabolism
Pathology
Cell injury and cell death
Inflammation
Healing and repair
Thrombosis, embolism, thrombolysis & anticoagulation
Infection
The atheromatous plaque
Pharmacology and therapeutics
Analgesia
Thrombolytics and anticoagulants
Vasodilators, Diuretics

DIFFERENTIAL DIAGNOSIS

Ischaemic heart disease
Pericarditis
Oesophagitis
Pneumonia
Pulmonary embolism
Pleuritic pain
Pneumothorax
Hyperventilation
Trauma and musculoskeletal pain
Aortic aneurysms and dissection
Thrombophilic diseases
Aortic stenosis
Hypertrophic obstructive cardiomyopathy
Gallbladder disease, gastric disease, herpes zoster

CLINICAL PROBLEM

CHEST PAIN

CLINICAL SCIENCES

History
Onset, character, site, duration, aggravating and relieving factors, radiation, associated symptoms e.g. reflux, shortness of breath, sweating, cough, sputum, haemoptysis, recent injury, posture
Examination
Pulse and blood pressure, Signs of poor peripheral perfusion (pallor, sweating, cool extremities, delayed capillary refill), JVP, oedema
Heart, lungs, chest wall and abdomen
Xanthelasma
Investigations
Chest X-ray, ECG, cardiac enzymes, chest ultrasound, endoscopy, lung and cardiac isotope scans, angiography, oesophageal manometry/pH, microbiology – sputum, pericardium, pleura, venography/duplex legs
Management
Assessment of severity: cardiopulmonary resuscitation when indicated
Thrombolysis, treatment of heart failure, pain relief, vasodilators, treatment of infection, anticoagulation
Acid suppression
Coronary revascularisation, (e.g. angioplasty, surgery)
Aortic valve replacement
Aortic surgery
Treatment of hypertension, hyperlipidaemia, diabetes, Correction of risk factors-smoking, overweight, diet and alcohol

ETHICS

Coronary bypass surgery in smokers, the elderly
Resuscitation decisions
Heart transplantation

COMMUNICATION

Dealing with frightened patients
Explaining diagnosis and therapy
Changing risky lifestyles
Dealing with non-organic chest pain
Death certification

PUBLIC HEALTH SCIENCES

Epidemiology of coronary heart disease
National health strategies and targets
Primary and secondary prevention
Measurement and communication of risk
Costs, choices and affordability of new therapies
Clinical trials, cost effectiveness, analysis

COMMUNITY/PRIMARY CARE

Anti-smoking, diet and exercise campaigns
Screening and identification of at risk subjects/ethnic groups
Management of hypertension, hyperlipidaemia and diabetes in primary care

Steps for preparing an Integrated Curriculum

Peter Cantillon, Senior Lecturer in Medical Education and Medical informatics, National University of Ireland, Galway describes the steps which must be followed for preparing an Integrated Curriculum.

The steps include [8]

- Step 1: Curriculum mapping
- Step 2: Agreed learning goals (core)
- Step 3: Overarching themes
- Step 4: Year and theme groups
- Step 5: Interdisciplinary courses replace departmental courses (concept mapping)
- Step 6: Integrated assessments

Merits and Demerits of Integrated Curriculum

In medical education there is no perfect and ideal method. Integrated Teaching / Learning also have their merits and demerits. These are listed below:

The merits of integrated curriculum include

- Integrated teaching aims at providing a body of knowledge instead of giving it in bits and pieces by isolated departments.
- When the curriculum is integrated, overlap of topics taught is avoided.
- The subject content can often be covered in a shorter period.
- The teachers and students of an integrated curriculum are often well informed about the overall goals to be achieved by the student.
- The learning of the subject in such an environment seems more meaningful.

The demerits of integrated curriculum include

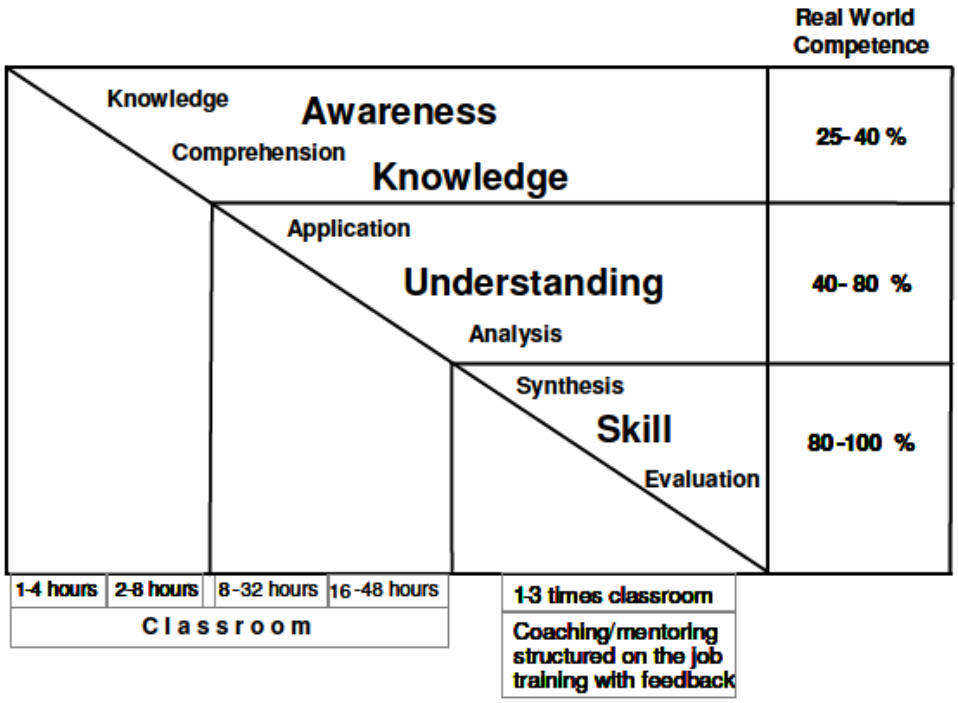
- It is very difficult to co-ordinate an integrated curriculum.
- It can be expensive and it is difficult to setup the integrated curriculum when compared to the discipline-based curriculum.

Aim of Integrated Teaching / Learning

The ultimate aim of all Integrated Teaching and Learning is to take a learner through awareness, knowledge, understanding, and attainment of skills from classroom to real world competence [9]***.***

This is depicted in the figure below:

Aim of Integrated Learning



Where do we stand in our awareness and knowledge of Integrated Teaching / Learning

Before attempting any change or intervention, it is very important to know, where we stand in respect of that activity. In the first week of the discussion on Integrated Teaching /Learning web seminar, a survey was done among the web participants to know about their awareness and knowledge in respect of Integrated Teaching /Learning and also to know the practices in respect of Integrated Teaching /Learning in their institutions.

Among the 32 fellows, who are currently doing their fellowship at PSGIMS – Coimbatore, 19 of them responded to this survey – a response rate of 59%.

The important responses are discussed below

1. In response to the definition of Integrated Teaching, 52.6% gave the right answer and 41% were partially correct. The important finding was 50% of them were not aware that Integrated Teaching has a self learning component by the students.

2. There was a lot of confusion between vertical and horizontal integration in the minds of the participants.

3. Regarding time integration more than 70% were not aware about it.

Time integration is teaching same topic from all disciplines at same time period, here the topic is the same but contents are different. For example if we take cardiovascular system, students learn in anatomy the features of heart, blood supply etc, in physiology they learn cardiac cycle etc, in biochemistry they read all the reaction and enzymes, in pharmacology they learn all the drugs acting on CVS, in pathology all diseased conditions and in medicine all CVS cases. ***Time integration includes both vertical and horizontal integration.***

The survey reveals that there is lack of awareness in the teaching faculty about Integrated Teaching / Learning.

The first step towards Integrated Teaching / Learning is creating awareness among the faculty about it.

Current Global Scenario of Integrated Teaching

As stated in the Introduction, the need for integration has been felt from time immemorial, and many medical schools have introduced integrated teaching with varying degrees of success. After describing the medical education curriculum in India, we will be discussing the current global scenario of Integrated Teaching.

Medical Education Curriculum in India

India has a predominantly discipline based curriculum. The curriculum is spread over - three phases. Phase I is also called Pre- Clinical, Phase II is predominantly Para Clinical and Phase III is Clinical with single final assessments in Phase I and II and two final assessments in Phase III.

In this curriculum horizontal integration means all the departments within a phase sit together and plan the teaching which means same systems covered during the same month simultaneously, example in Phase I cardiovascular system taught by anatomy and physiology and biochemistry in January, rather than as per their own calendar, this helps the student understand the system better.

In this curriculum vertical integration means the exposition on a topic by all ***three phase departments*** at the same time. This helps the student to know the relevance of the basic science subject to his/her future role as a physician.

The other type of integration is field based clinics (practiced at Sewagram, Wardha, Maharashtra State). This type of integration is ideally suited for preparing doctors for primary care.

The MBBS curriculum in India, has been designed to make a basic doctor; A doctor with skills to diagnose and treat common diseases seen in the community (which community medicine specialists refer to as the hidden part of the iceberg) and not the diseases seen at the hospital (which community medicine specialists refer to as the tip of the ice-berg). If students learn based on what they see in the hospital (rare conditions which the specialists treat in hospitals), then when they become doctors, they feel incompetent in managing the common diseases, (The very few number of case discussions on headache, fever ,diarrhoea , undernutrition and anaemia taking place in the hospital departments are a case to this point) and so feel like fish out of water and want to become specialists like the glamorous role models they observe in the hospitals. This is the reason why ROME or Re Orientation of Medical Education was started so that teachers from hospital departments go to the field and teach cases commonly seen in the community. It helps the students as well makes the teacher realise the ground reality of the cases that an MBBS doctor would be seeing as a General Practitioner.

The spin-off of such a practice – would be a change in institutional culture and maturity which would meet the basic health care needs of the community at large.

Current Global Scenario of Integrated Teaching

The information received from the participants of the web seminar is discussed below.

Andhra Pradesh, India

Lakshmi 2009 fellow commented, that in their college in Andhra Pradesh, they take a few topics for final year as Integrated Teaching as it is a syllabus requirement and she feels it is a real tough job to coordinate the whole process. At a personal level she has tried integration of Anatomy and Physiology for the Central Nervous System, this integration made the students happy, and they could understand the subject better. She had not taken feedback, but she feels if integrated teaching is forced on the teachers, they will move in that direction faster and this would give a holistic approach for the needs of a basic doctor, also this measure could save time in the course. She feels done the right way, the students enjoy it better and compartmentalization would get dissolved and staff must be ready to participate and spend time.

Sujatha also a 2009 fellow had this to say, that in their college Kamineni Institute of Medical Sciences, it started as a Curriculum Integration Project of FAIMER, two years back with a few topics such as organ systems. The response to this effort from faculty and students have been good and they are coming back asking for more They are also having vertical integration once a week on Wednesday afternoons for 2 hours for example the last one was on septicaemia and the students found it very useful as the topic as a whole was covered in two hours.

Bharatiya Vidya Peeth, Pune, Maharashtra, India

Ranjana, 2009 fellow contributed that in their Institute, selected topics are taken up for integrated learning - all aspects are talked about by students - more like student seminars, the first year student would talk about anatomy, second year student about pharmacology, microbiology, pathology etc. It was found that only the participants benefit and the rest are passive audience. There were also integrated teaching sessions wherein the faculty from different departments talked about the aspect of the topic pertaining to their subject. It was again an open house teacher seminar for all the three year students together. The draw back was that these programmes were few and far in between, may be only twice a year and the same topics would be repeated and this teaching would be considered as an extra co curricular activity. She felt more regularity, better time schedule and seriousness may help these sessions to be more fruitful and effective.

Christian Medical College, Vellore, Tamilnadu, India

Christian Medical College is a pioneer in medical education in India and 2008 fellow, Antony David, experienced the integration way back in the early eighties as an undergraduate student, in that institution. General feed back then was that the students

were not very keen on this approach. But few of the students were happy as these integrated lectures, helped them to integrate their own understanding of disease. But currently in the private medical college where he works in Andhra Pradesh, it is done more as a cosmetic measure.
A study conducted by Rashmi [10] et al at CMC showed that an integrated teaching programme is feasible and possible in the Indian medical school scenario.

Jawaharlal Nehru Medical College (JNMC), Belgaum, Karnataka, India

At JNMC Belgaum, Roopa 2009 fellow says they conduct integrated teaching through vertical integration for second year students in topics like tuberculosis, HIV, malnutrition, diabetes etc. Faculty from different disciplines speak on the given topic for twenty minutes. Student perspectives about this have not been looked into. She feels that the methods one uses for the integrated teaching are very important to make the teaching and learning more effective.

Jawaharlal Nehru Institute of Post Graduate Medical Education and Research (JIPMER), Pondicherry, India

At JIPMER to impress the students about the relevance of the subject, a newer teaching method was introduced. This included the presentation of actual epidemiological studies [11], during the class, along with discussion of the theory points thereof, and integration of the clinical teaching departments in such presentations. To inculcate further interest among students, studies from the local population were chosen for these presentations and the results thereof were carefully highlighted to strengthen the concepts/principles in epidemiology.

Kempegowda Institute of Medical Sciences (KIMS), Bangalore, Karnataka, India

At KIMS Bangalore, a beginning has to be made to start Integrated Teaching and learning, as of now no Integrated Teaching is practiced.

Melaka Manipal Medical College (MMMC), Manipal, Karnataka, India

Manipal Melaka Medical College, follows an integrated curriculum which is a hybrid curriculum with 80% integration. This integration is horizontal and a year wise integration. In the first year anatomy, physiology and biochemistry are taught as in the conventional curriculum. They follow body systems. The concepts related to systems like cardiovascular system, reproductive system etc are taught in a specified time.

They also have a Problem Based Learning (PBL) evaluation method, which is done in two sessions. First session is Brainstorming session and the next, after a week is the Presentation session.
They give the following grades

Grade	Marks
Excellent	6
Distinction	5
Honors	4
Pass	3
Fail	2
Absent	0

For discussion session, the grades are given for the content covered, active participation, and the style and confidence and the way in which they present. These marks contribute to 10% of the block exam marks. They also make sure that they ask questions on PBL topics. This is the driving force for students to participate in PBL's actively

To know if this integrated strategy or any teaching strategy is effective or useful, assessment is necessary. Exams on anything taught/learned are a must to ensure that the desired change has happened. Let it be essay, MCQ, MTF, OSPE, OSCE, VIVA.... some exam should be there. At Melaka, exams are conducted on all strategies. The curriculum is a hybrid of integrated curriculum. It has 4 blocks and each block has inbuilt tests and a block exam at the end of the block. In all the tests and block exams they include questions on SDL topics and PBL topics also. This makes the students learn those topics seriously. This system is working pretty well at Melaka Manipal Medical College

MOSC Medical College, Kolenchery, Kerala, India

MOSC Medical College, Kolenchery has a very conventional curriculum. There are occasional efforts from random teachers for making changes. The Community Medicine department makes some efforts in integrating. Community Medicine is in an ideal position for integrating teaching because this subject courses through a major period of the MBBS curriculum. They consider that they are at the interphase between steps 4/5/6 according to the INTEGRATION LADDER or in a community based and conventional combination in the SPICES model.
In the first year, the students are taken en-block along with the faculty and they live in the community, the students learn about health of the community and they can explicitly connect to what they are learning about healthy body and its functions. Once they complete pre clinical, they are taught about morbidity in the community and can integrate that with their learning in Microbiology and Pathology, and also about bodily morbidity and the classes would focus on epidemiology of various infections, methods of epidemiology and so on. In the final year they teach about control and management of morbidities through national programs and health

education and at the same time the student would deal with management of clinical problems in their other postings. Dr Marina 2009 fellow from this college, could implement all this because of the knowledge she received from her transactional analysis training as an educationist.

M S Ramaiah Medical College (MSRMC), Bangalore, Karnataka, India

At MSRMC integrated teaching was started in 2004. Since then the Medical Education Cell, has tried various methods of integrated teaching- viz vertical, horizontal, it is mainly a correlation, complimentary and multidisciplinary approach. Kalpana 2009 fellow from MSRMC, says that all of us use integrated teaching in traditional classes also. She says that when ever she takes any topic she tries to explain the clinical relevance, so that students are interested in the class. for example a topic like chemical mediators of inflammation in pathology which is actually a long list - students feel it is boring but when she gives examples, pharmacologic importance, newer medicine base on chemical mediators, etc students are definitely attentive. So the conclusion is that we are practicing integrated teaching but are scared of the new terminologies which are being used in Integrated Teaching.

Also at MSRMC they have case based integrated teaching on important topics for 5^{th}, 7^{th} and 9^{th} term students on anaemia which will be discussed by physiology, pathology and medicine departments.

In MSRMC after the integrated teaching students are given MCQ's on that topic and students or the faculty correct it. But the drawback is that these marks are not taken into consideration for internal assessment, hence the students do not take it seriously

PSG Institute of Medical Sciences and Research (PSGIMSR) Coimbatore, Tamilnadu, India

At (PSGIMSR) some sessions of integrated teaching are carried out by deputed faculty. If the topic has been dealt with previously, faculty conduct this session in the form of multiple choice questions or quiz or crossword puzzle etc which breaks monotony and creates an element of active learning in the students and these are well appreciated by the students. Integrated learning is the need of the hour, but a programme evaluation should be done to document its benefit to the students.

Sri Devraj Urs Medical College (SDMUC), Tamaka, Kolar, Karnataka, India

At SDMUC, Kolar, they have been trying to have an integrated teaching programme that is vertical for the past 2 yrs, but the results have not been encouraging. They cover topics like anemia, neuro muscular junction diseases and drugs used for these diseases etc. their general impression is that the students are not interested when there is a repetition of the basic sciences. They are not satisfied with the way the integrated teaching is happening in their college. Inspite of having attended workshops, reading articles on integrated teaching etc, in practicality, it is not found effective.

In the near future they are going to initiate an integrated teaching programme for post graduates. The post graduates of pre, para and clinical sciences would have to participate in an integrated manner mostly of the problem solving variety and the faculty would be evaluating them. The objective of this programme would be to integrate basic sciences with clinical sciences and make it part of the curriculum

Australia

The typical discipline-based curriculum was replaced with a longitudinal, patient-centred one. Students were attached to patients—called ‘‘the longitudinal patient’’—whom they followed through all stages of their care. The students shared with patients their experience of illness and disease, their varying care needs, and how these are addressed by different service providers, thus improving their learning vastly

Japan

In Japan an attempt [12] was made to teach neurological diseases through an integrated approach. The study found that this type of approach needs a lot of planning, priming the teachers, eliminating the barriers between departments and enhancing the cooperation between departments are very important before it can be actually implemented effectively.

Malaysia

Padmavathy 2008 fellow who had exposure to integrated teaching at Malaysia felt it was interesting for both the teacher and the taught. There the curriculum was designed on the SPICES Model and integration started from second year, vertical from anatomy to clinical subjects and from the third to fifth year during hospital attachment, paramedical subjects, related basic sciences and clinical subjects were taught. In between students would stay for two weeks in rural areas and get exposed to community based teaching and also do related projects

No clinical subjects were taught in first year,Only basics of anatomy, physiology, microbiology, pathology, pharmacology, community medicine, statistics, epidemiology and some university subjects required for MQA like language, morals etc. were taught.

Basic sciences as per the system were done in second year in addition to para clinical and clinical subjects in relation to the systems.

From third year para clinical, clinical, community medicine etc were taught.

Topics for symposium in medicine, surgery would include basic subjects also, so that the students could recollect from basic sciences/ para clinicals what they had learnt in the first two years.

The following steps were done

1 Content - designed during curriculum
2 Time Table - Schedule for each course / system
3 Expected learning outcomes : Methods of delivery
4 Resources(faculties)
5 Assessment - of integrated examination paper

So it can be said that the Malaysian college was having a hybrid integration. It is not a fully vertical integration as in a vertical integration, the basic sciences and clinical sciences will be there right from year one till the end. For example if the topic of discussion is jaundice - Anatomy, physiology, biochemistry, pathology, pharmacology, microbiology, medicine, all aspects will be taught/learned right from year one and there will be clinical postings also.

Nepal

In KIST Medical College, Nepal most of the faculty are comfortable with the concept of teaching through organ systems and integrating through lectures. In KIST Medical College an integrated organ system based curriculum has been used for a long time. So faculty have adapted and adopted this concept.

KIST Medical college also has this concept of Correlation seminars and assessments explained below.

At KIST Medical College the last week of any organ system is kept for Correlation seminars and assessments. A meeting is held about two weeks before the correlation seminar. All departments 6 Basic Medical Sciences (BMS) and Community Medicine are asked to prepare two or three objectives from their subject related to the topic under discussion. These objectives are discussed at a meeting of all BMS faculty in the presence of the Clinical coordinator from the department of medicine. The students are given the topic on Thursday or Friday the week before the seminar. They prepare their material and then consult with allotted faculty members. A problem they face is that the seminar week is also the week of assessments. The assessments generally finish by Tuesday morning and then students fully concentrate on their seminar. The seminar is presented by the students on Friday morning in presence of all BMS and clinical faculty members who are free. The students are graded and constructive suggestions given by the faculty. All semesters can participate in correlation seminars but at present they are using it for first and second year students.

Medical Education Unit team of KIST organizes the much-needed faculty development training every 6 months. This is very scientific and serves as a Continuous Professional Development for those who are involved in the teaching/learning activities at KIST.

In MCOMS, Pokhara, Nepal, certain faculty have strong reservations though basically agreeing on the concept of integration. They are very possessive about their subjects and want more time for their own subjects, thus putting the system out of gear.

The other medical college in Nepal ie PAHS follows a different pattern. This school has "six" months long "extra" block called "introductory courses" which aims to teach "medically relevant" physics, chemistry, biology, mathematics and medical informatics as well as basics of professionalism, ethics, communication skills alongside the community health (biostatistics, epidemiology, health education, society-culture-health) and scientific communication. When it was introduced they faced difficulty as they had enough exposure on writing PBL cases for MBBS where everything centered around clinical relevancy but lacked the knowledge as well as experience of making the PBL cases relevant for pure and health sciences. Thus,

following the terrible episodes of forest fires in Australia and cabinet meeting undersea (Maldives) and base camp of Mount Everest (Nepal), they outlined a case on "global warming" where they could integrate many pure science objectives as well as public health issues such as "elderly deaths" from heat waves in France etc. Science teachers (visiting faculty) were stunned with the learning objective that could be covered with a single PBL case. Community Health faculty with expertise on Environmental Health reviewed the case and gave valuable remarks and were requested to write the "PBL Tutor Guide" for the case, which was graciously agreed to. They are pre-testing this PBL case on 17, 19 and 21 of January 2010 with a public school going and recently passed 12th grade science students to see its relevance and practicality. Here, they are also validating their PBL assessment tools: Student evaluation by Tutor, Peer Evaluation among Students, Self-evaluation of individual student and, most importantly, Tutor's evaluation by students. They feel integrated teaching is feasible for other medical schools also. They are a strong believer in the Chinese proverb "Teach me and I will forget; show me and I may remember; involve me and I will understand" For those interested the website could give further clarifications and details on "How to implement integrated curriculum in a standard setting" http://www.archeworks.org/projects/tcsp/ic_guide_p5.html [13]

School of Medicine, Health Policy and Practice, University of East Anglia, Norwich United Kingdom

This school follows a spiral /helical approach, . For instance, "Blood and Skin" block would be finished during the stipulated time (12 weeks) but the more complex cases on the same organ system might come again in other blocks. This curriculum is innovative and exciting. Clinical placements take place from year one onwards and one day per week is spent in Primary Care throughout the course so that what is learnt in theory is applied to real patients in the same week. The main learning method is Problem Based Learning, with an emphasis on working in small groups to apply what is learnt to patient scenarios but there are lectures, seminars and on-line materials to support the learning. All of the clinical placements occur in the NHS partners within East Anglia apart from the elective period in 4th year when students can go anywhere in the world. All students undertake Studies Outside of Medicine in years three and four and all are required to undertake a research project in final Year. There are opportunities to intercalate for a Master's in Research degree at the end of year four. Since the school is part of the Faculty of Health there is a compulsory inter professional learning component during which medical students carry out case studies with students from the other health professions including nursing, midwifery, physiotherapy, occupational therapy, speech and language therapy and pharmacy. Students are drawn equally from school-leavers and mature students. The latter may be either graduates (any subject considered) or have done a recognised Access to Medicine course. The only absolute requirement for entry is an 'A' level in Biology or an equivalent qualification." http://www.uea.ac.uk/med/why [14]

Others

Other medical schools with Problem Based Learning and/or Clinical Presentation do the "integration" in the basic science phase and put the students in the "traditional" clerkship or residency program before they could practice medicine. Even the well known schools like McMaster (most North American school) will require the students to undergo at least 3 years of residency before they could practice as independent practitioner after 3-4 years of study. Graduates from Maastrich will do 4+2 years of study but will not be able to practice as they need to do another 3-6 years of specialty course to practice independently. In other words, one can only practice medicine after finishing PG level course in North America and Europe unlike what is practiced here. The main difference between North American and European model of medical education is the students come after finishing graduate studies and 10+2 in North America and Europe respectively. Therefore the Indian and Nepali medical education is actually different from others.

Dundee Medical School, Nethergate, Dundee, Scotland, United Kingdom has a Integrated Teaching Area (ITA), as part of the medical education unit. The Integrated Teaching Area was created in 1995.

The link is www.dundee.ac.uk/medden/groups/group232 [15]

In Taiwan which normally follows a seven year independent curriculum, a study on case based integrated teaching [16] showed that students agreed that case based integrated teaching can enhance discussion, integrate the curriculum and promote active learning.

At University of British Columbia Medical School at Vancouver, Canada, the medical school follows an integrated system of teaching learning during the first two years. The learning is organized around organ system blocks like cardiovascular, respiratory etc. Each block has a block coordinator and a coordinator for each week. Students are supported by extensive resources available on the college intranet. Each block has a set of quiz questions for self-assessment. Majority of the learning takes place through PBL sessions along with a few lectures. The University has medical schools in diverse locations in British Columbia and they use information technology to link together the different campuses.

In University College London, UK, they follow integrated curriculum. It is in 3 phases, Phase 1(year 1 & 2) students learn basic science with medicine. In phase 2 (year 3 & 4) for basic science with medical practice and Phase 3(year 5) students are posted mainly in medicine, surgery, accident and emergency, oncology and general practice. This phase is mainly for preparing the students for future practice and to reach the standard of competence required.

Thus we can see there is no uniform pattern of medical education globally, countries need to evaluate and adopt the curriculum that suits their needs the most.

Students and Faculty Perception of Integrated Teaching

After learning about the basics of integrated teaching, and the current global scenario in integrated teaching, we shall now look at what students and faculty feel about this form of teaching / learning.
Infact, it is more appropriate to call this type of teaching as integrated learning rather than teaching. The students are the main stake holders in this approach and unless they welcome it wholeheartedly, it will not achieve the goal it is meant to achieve.
In a study [17] conducted at M S Ramaiah Medical College, Bangalore, one hundred and twenty students of fifth term who had attended both vertical and horizontal integration sessions were given a questionnaire. The questionnaire on a five point likert scale with minimum of one and maximum of five rating had eight items and four open ended questions to know positive and negative aspects of the integrated teaching. This questionnaire was administered in October 2009. The suggestions from students to improve the integrated teaching in M.S.Ramaiah Medical College were also taken. The results revealed that most students agreed that integrated teaching improves the understanding of basic science and improves the clinical skills. However 33% of the students were undecided whether they prefer traditional or integrated teaching, suggesting, integrated teaching can be used as a supplementary material rather than a substitute for traditional teaching. Most of the students prefer horizontal integrated teaching to vertical teaching. The students could relate better to the subjects in the same field than to clinical subjects which were taught to the first year students or when basic science was taught to first year students. Many positive aspects such as integrated teaching improves understanding of diseases and correlation of basic sciences were listed by students and a few negative aspects were mentioned such as lengthy, boring similar to theory class. Students suggested mind mapping, concept maps, seminars by the students and small group discussions to improve the interactions. To conclude the student's perceptions varied but in sum the students recognized that integrating the medical subjects is of interest to them and should be continued.

However from a teachers point of view at MSRMC, even though the students say that they like integrated teaching, the attendance to these classes speak otherwise, the attendance is only forty to fifty percent. We could attribute the reason for this to integrated teaching being an additional method and not the mainline method and the assessments are not done on this method.

At the Kathmandu University School of Medical Sciences (KSUMS) where a fully integrated 'Hybrid Curriculum' has been in place for the last seven years, the overall experience and attitude towards Problem Based Learning (PBL) [18] was found to be very positive and the students were also willing to have PBL in the clinical years. They also felt that they were confident of facing self-directed learning in future as well.

In a study done by a medical school in Korea [19], the results showed that results favoring integrated learning were more positive in the second implementation rather than in the first implementation, in their school. They also say that integrated curriculum has to be reinforced by instructors teaching a coherent content, and also

by using a variety of teaching learning methods and by having the students participate actively and by offering holistic and integrated assessments

In Taiwan [20] which normally follows a seven year independent curriculum, a study on case based integrated teaching showed that students agreed that case based integrated teaching can enhance discussion, integrate the curriculum and promote active learning.

Jessica H Muller et al in their study of integrated curriculum [21] in the medical schools of United States, says that Integrating a curriculum is a complex process. It is differentially understood and experienced by students and faculty, and can refer to instructional method, content, faculty work or synthesis of knowledge in the minds of learners. It can occur at different rates and some subjects are integrated more easily than others. They mention about four themes, interdisciplinary teaching and interdisciplinary faculty collaboration, building curricular links and sequencing and framing curriculum content.

Lakshmi, 2009 fellow says that students do attend when integrated teaching is conducted but the attendance is fifty percent or less, final years feel it is a waste of time and they prefer discussions on exam topics and by Professors. Some students feel it is very boring and there is nothing new.

In Marina's 2009 fellow opinion what is most important is repeatedly communicating to student why they are being made to do each of the activities and explicitly linking it to their experience in other departments. Letting them know what they are expected to learn and how it is ultimately linked to their work as doctors, needs to be communicated to them repeatedly and by all teachers. She feels that this is the most important way of integrating in Medical Education.

A study done by Hacettepe University Faculty of Education, Turkey, on Metacognitive awareness and self-regulated learning skills of medical students in different medical curricula [22] suggests that students who experience a learner-centered curriculum, such as PBL during their medical education demonstrate improved metacognitive awareness and self-regulated learning skills.

The implementation of the Smart School Project [23] in Malaysia in 1999 signified a dramatic change in the Malaysian education system. This study looked into self-regulated learning in smart schools, an area of research that had yet to be explored. The predictors of self-regulated learning were examined comprehensively as both environmental (levels of IT-integration and student-teacher interactions) and personal factors (motivational beliefs, self-regulative knowledge, information literacy, and attitudes towards IT) were taken into account. Results showed that a high level of Integrated Teaching integration, student-teacher interactions, motivational beliefs,

and self-regulative knowledge predicted self regulated learning in smart schools. This finding has important instructional implications as it may guide teachers to structure learning environments that are conducive for self-regulated learning. The research findings are also congruent with social cognitive theory, in which both environmental and personal factors are found to be related to students' self-regulated learning.

Brueckner and Gould from University of Kentucky College of Medicine, Lexington, USA [24], conducted this study among health faculty with the objective of analyzing the results of a survey of basic science and clinical faculty regarding the integration of their institution's health sciences curriculum. Forty-four basic and clinical scientists responded to their survey, providing information regarding their level of interest in a more integrated curriculum and the level of integration that they currently enjoy at their institutions and opinions on obstacles to integration. Results indicated that interest in integration of the curriculum is high, that individual faculty members are interested in increased integration, but that the current level of integration is not adequate. Clinicians are less positive about curricular integration than were their basic science counterparts. The main obstacles cited by survey participants included the lack of a reward system for faculty to put effort into integration and lack of time. In sum, although faculty members recognized that integrating the basic and clinical sciences into a more cohesive experience for students is of interest to them and of benefit to their students, there is currently not sufficient support in the form of faculty time or reward to move forward towards a more vertically integrated curriculum.

In a study done at Turkey by Berna Musal [25] et al where opinion of tutors and students were studied regarding the effectiveness of PBL, the results showed that the ratings of tutors and students respectively on identified outcomes of PBL varied between 3.80-4.69 and 3.69-4.27 out of 5 points. Both groups gave high ratings to the areas of clinical reasoning, communication and problem solving and gave lower ratings to gaining basic science knowledge. Basic science tutors rated the areas of problem solving, gaining basic science knowledge and intrinsic motivation of students significantly higher than did clinical science tutors.

Komala 2008 fellow says they have conducted integrated teaching few times in the form of seminars where students presented topics guided by faculty. Although they did not take formal feed back, over all they felt the response was good. They are able to conduct only few sessions mainly because of paucity of time and the extra efforts required on the part of faculty. Though most faculty agree that integration is useful, she is not convinced that integration is useful for students to pass examinations.

An attempt was made at Seth G S Medical College [26] in Mumbai, to teach the Central Nervous System in an integrated manner and the opinions of 99% students were as follows:

1. This approach improved their understanding
2. Removed Central Nervous System phobia and

3. Helped them to develop interest in the topic

The students also suggested other areas where integration would help them.
In the examinations which followed later there was a significant difference in the performance of those who attended the integrated classes and those who did not

Scope of Integrated Teaching / Learning in the Existing Scenario

The discussions till now have clearly brought out that there are more merits than demerits in adopting an integrated curriculum. Though there are no fully integrated curricula – cent per cent integration is not possible, most of us in the so called conventional curricula have components of integrated curricula example in an anatomy class, the teacher while talking about the anatomy of the heart will definitely touch upon some aspects of physiology, clinical anatomy and may be even congenital heart disease showing both horizontal and vertical integration.

The question before us is, like in the United Kingdom the General Medical Council is responsible for the introduction of an Integrated Curriculum, is such a thing possible in India through a Medical Council of India (MCI) initiative.

The first survey initiated in this web discussion revealed half of the FAIMER participants did not have adequate knowledge about what integrated teaching was all about. Hence the general opinion was sensitizing the faculty should be the first step for introducing integrated curriculum.
But it was also noted that half of the participants in the first survey did have commonsense awareness on Integrated teaching. Ashwini 2009 fellow, felt that if Integrated teaching had to come into place, the faculty should be aware about the details, descriptions and responsibilities and the MCI should take a huge step forward to increase the awareness through workshops and give a hands on training as to how to actually plan, process and implement and also give feedback on Integrated teaching from the faculty and students. Setting up of nodal centres at state level by MCI for capacity building would be a step in the positive direction. But the need of the hour is to focus and have specifications so that the learning leads to productivity in the form of increased integrated teaching programmes
.
Roopa 2009 fellow was of the opinion that the first step in implementing integrated teaching is to create the faculty awareness with out which integrated teaching, would just be the regular theory classes taken by faculty of different disciplines which as of now is common method of Integrated teaching in most of the medical colleges. She also felt that with many colleges trying out Integrated teaching, in future it should be possible to integrate it into the existing curriculum.

Sathish 2009 fellow put in a word of caution saying integrated teaching is a really good strategy in the medical curriculum, but if care is not taken and if there is no proper planning, it may not be successful in the Indian scenario. He cites Terrence C Mason [27] extensively and various other studies quoted by Mason, and this discussion is being reproduced verbatim in this report.

The success of potentially good ideas in education depends on how classroom teachers enact them. Jacobs suggests that interdisciplinary teaching is now so widely accepted that it represents good mainstream education rather than a peripheral force (Kiernan, 1993). If this is so, why are there not more good examples of integrated instruction in schools? Jacobs may be correct that there is little dispute that an integrated curriculum can provide advantages such as those cited above, but serious obstacles exist to the successful widespread implementation of this idea. Seven of these issues are discussed below:

1. Curriculum Integration Can Prevent Deeper Content Exploration And Understanding

Recent discussions of interdisciplinary curriculum recognize this potential weakness in combining curriculum content (Ackerman, 1989; Brophy & Alleman, 1991; National Council for the Social Studies, 1994). Jacobs, for example, insists that the traditional disciplines should not be abandoned, but that integrating them can render them more meaningful for students (Kiernan, 1993). But even as proponents of curriculum integration make such claims, they sometimes provide illustrations that fail to portray the deeper understanding that connecting the curriculum is designed to bring about (e.g., the aforementioned video in which elementary students replicate the physical movements of animals of the rainforest during a physical education activity).

2. Results From Studies On Integrated Curricula Are Inconclusive

For those who believe that valid research evidence is necessary to demonstrate the worth of educational practices, the results regarding curriculum integration offer little support. Reviews by Cotton (1982) and St. Clair and Hough (1992) suggest that few studies conclusively show that multi-, cross-, or interdisciplinary teaching enhances student learning in measurable ways. St. Clair and Hough note, however, that because the interdisciplinary curriculum is usually imbedded in other reforms, it is difficult to separate the effects of integrated curriculum from other features of instruction often occurring simultaneously: multiage groupings, flexible scheduling, extended day programs, learner-centered teaching methods. Vars(1991), on the other hand, concludes that interdisciplinary programs produce higher scores on standardized achievement tests than programs in which students enroll in separate subjects. It is unclear whether these results are attributable solely to the integrated curriculum or to a combination of other factors. Furthermore, the measures of achievement used in these studies may not have captured the kinds of knowledge (deep vs. superficial) interdisciplinary methods promote.

3. Using An Integrated Curriculum, Or Interdisciplinary Program, Can Lead To The Trivialization Of The Concepts Being Studied

The trivialization problem: It is sometimes appropriate for teachers to address ideas within a single content area. For example, some topics in mathematics are strictly

mathematics (e.g., number theory). Some ideas in science are best understood without introducing confusing or inconsequential subject matter. (A poem about photosynthesis may not help one understand photosynthesis as a process, or poetry as a genre.) In deciding to integrate curriculum, teachers must choose activities or tasks that do not trivialize concepts or fail to enhance student understanding of important ideas. Although Jacobs (1989a) and others have acknowledged this problem, it remains a major implementation issue. The National Council for the Social Studies (1994) cautions against integration for its own sake:

These integrative aspects have the potential for enhancing the scope and power of social studies. They also, however, have the potential for undermining its coherence and thrust as a curriculum component that addresses unique citizen education goals. A literary selection, writing assignment, cooperative learning activity, or computerized simulation cannot be considered curriculum simply because it features social studies combined with some other subject or set of skills. Nor can such activities be substituted for genuine social studies activities. To qualify as worthwhile elements of social studies curricula, activities must engage students in using important ideas in ways that promote progress toward social understanding and civic efficacy goals, Consequently, programs that feature a great deal of integration of social studies with other school subjects-even programs ostensibly built around social studies as the core of the curriculum -- do not necessarily create powerful social studies learning. Unless they are developed as plans for accomplishing major social studies goals, such programs may focus on trivial or disconnected information. (pp. 165-166)

4. Integrated Curriculums Cannot Work If They Are Implemented In A Top Down Fashion

Recently a situation-- was described to me (Satish, 2009 fellow) in which, a secondary school administrator, in an effort to lead his school toward developing an integrated curriculum, reorganized a portion of the school day into large time blocks and assigned faculty to interdisciplinary teams. This action occurred during the summer with the expectation that the program would be on-line the following September. Unfortunately, practices such as this can doom integrated teaching to imminent failure. In this example, teachers were not consulted in the development process, school resources were not surveyed, teacher interest and motivation were not assessed, and sufficient time was not allocated for designing the program. Rather than approaching a potentially valuable innovation in curriculum design, this school merely boarded a bandwagon headed for a very short ride. (One teacher at this school who favored this idea was certain that interdisciplinary teaching would disappear quickly due to the top-down nature of the process and the teacher resistance it created.) Curriculum integration cannot become an end in itself. Many curriculum theorists and developers are now recommending this idea, but teachers and school systems may be guilty of bandwagoning without establishing the conditions to successfully implement the concept.

5. There Are Many Preliminary Steps That Must Be Taken Before Integrated Curriculums Can Succeed

In the preceding discussion, I have described the major themes, arguments, and justifications associated with an integrated curriculum and raised some potential pitfalls that may interfere with its implementation. Clearly, as others have suggested (Jacobs, 1989b), deciding whether or not to design curricula from a disciplinary or interdisciplinary perspective is not an either/or issue. There may be a place in the curriculum for both approaches. But serious consideration must be given to several important issues if broad-based integrated curricula are to be successful. Simply possessing a willingness to engage in interdisciplinary teaching is not enough.

6 Integrated Curriculums Do Not Have Proper Assessment Tests To See If They Are Working For The Students

The assessment problem: Several features of the current approach to student assessment mitigate against the widespread implementation of an integrated curriculum. First, the monolithic enterprise of standardized testing is organized around the assessment of knowledge in the traditional subject matter areas. Furthermore, recent movements toward authentic or performance-based assessments notwithstanding, most standardized tests are primarily designed to measure knowledge and recall or, at best, the ability to solve routine problems. As a result, firstly the mode of assessment in most school systems would not be able to effectively assess students attainment of deep understanding. Secondly, the standards for student performance being generated to guide educators in curriculum design are primarily being developed along disciplinary lines. Many of the recently developed curriculum standards documents (e.g., National Council for the Social Studies, 1994; National Council of Teachers of Mathematics, 1989) call for curriculum integration, but the assessments associated with content and curriculum standards remain within rather than across disciplinary boundaries.

In order for curriculum integration to take hold as a mainstream educational practice, the methods of evaluation of student (and teacher) performance must become interdisciplinary.

7. Many Teachers Do Not Have Enough Knowledge On All Necessary Subjects In Order To Teach An Integrated Curriculum

The teacher knowledge problem: Some teachers may not possess sufficient understanding within disciplines to effectively lead students toward a thorough knowledge of important concepts (e.g., Mosenthal & Ball, 1992; Simon, 1993). If teachers lack knowledge and skills within disciplines, their ability to integrate those disciplines is highly problematic. Typically, secondary teachers are prepared as content specialists and elementary teachers as generalists; the former group receiving limited exposure to knowledge and pedagogy in disciplines other than their own, and

the latter only superficial exposure to ideas, concepts, and teaching methods in the various disciplines and subject matter areas. Prospective teachers, however, do not typically experience a curriculum that explores connections and interrelationships among disciplines. Hence it is unknown whether this dilemma is attributable to the capacities of those who enter teaching or to inadequate opportunities to learn provided by teacher education programs grounded in the traditional disciplinary molds. This raises the next serious threat to the curriculum integration concept.

Marina 2009 fellow seconded Satish's extensive points on why Integrated teaching fails and said that planning, teacher training and preparation are extremely important for the success of integrated teaching. She went on to add that most medical teachers have become teachers not because they wanted to be one or had a great vision but because it just happened so, and she feels once they enter the system they should be groomed and primed especially for something like integrated teaching. Moreover teachers are post graduates and they loose out on the integration from undergraduate days and tend to emphasize what they teach and undermine other subjects. She feels it is very important especially for medical teachers to have the right perspective. Each subject should be taught so that the students are enabled to comprehend and integrate them and ***develop into good human beings and excellent physicians rather than becoming Anatomist / Cardiologist / Gynaecologist. Ultimately all the 'ists' work with humans!!***

Jaya 2009 fellow brought out the fact that the MCI had taken initiative in 1997 for implementing integrated teaching, but had not followed it through, with the result that it had not got implemented in all colleges. She comments that few established colleges have adopted integrated teaching, but for the new colleges she feels MCI should include it in the syllabus and also have some form of assessment. It would also be apt to reproduce the MCI regulations in respect of integrated teaching here.

Regulations of MCI 1997

15) 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 should be made to **de-emphasize compartmentalisation of disciplines so as to achieve both horizontal and vertical integration in different phases.**

(16) Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.

(17) Faculty member should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/

Departments be established in all medical colleges for faculty development and providing learning resource material to teachers.

The first survey for this ML web learning also revealed that 74% of the colleges are doing some form of integrated teaching. This is considered as very positive.
Different methods are being followed as listed below:

1. Organ system integration and a hybrid approach.
2. Concept of lead departments & collaborating departments based on subject of importance. The lead department call for a meeting and jointly plan an integrated session
3. PBLs and skill labs and PBL based Organ System integration
4. Time integration.
5. Combination of both vertical & horizontal integration
6. Integration is done separately for different terms
7. Topics of clinical and theory which are important are dealt together. and dealt

Some of them were not sure about methodology, but few were planning to do time integration, vertical integration and horizontal integration.

Ravi 2007 fellow had thought about many options for integration and they were:
One option is to have six IBMS subjects along with Community Medicine in the first two years and going in for organ system-based integration supported by PBLs and Correlation Seminars. There is early clinical contact with some time spent in the wards to emphasize clinical teaching and the clinical relevance of various subjects.
The other option is to have a predominantly PBL-based system of teaching which follows organ systems. This has been followed in many medical schools in developed nations. Weeks are fixed for each organ system and students approach the system through clinical cases. There is a basic concepts slot in the beginning followed by various systems. There has been debate about whether a paper and pencil case or a case supported by different multimedia resources or real patient cases will be the best for teaching.
He also felt Community Medicine has got good scope for integration as has been done in many medical schools. In the community the different basic science subjects can be integrated with social and cultural issues and clinical subjects. Medical schools especially in Canada and Australia are experimenting with decentralized schools and learning in the community. These countries have isolated rural areas and problems of health care delivery in rural areas. Considering the substantial problems of healthcare delivery among the urban poor and the rural population decentralized schools and a 'community' system of education should be given serious consideration in South Asia also.
Many medical schools are following a double helix curriculum with the basic sciences and clinical subjects intertwined throughout the course. During the first two years the clinical sciences are used to set the stage for and stimulating learning of the basic sciences. During the clinical years basic sciences are revisited in the light of increased knowledge and understanding of the clinical subjects.

The most important requirement he felt was, for integrated teaching to occur we need high quality faculty, flexibility in planning and a decentralized system of medical education. FAIMER has been active in improving the human resource in terms of training faculty members and preparing them for educational leadership

Marina 2009 fellow seconded Ravi's view and said she shared his views on role of community medicine in integrated teaching. Infact she repeatedly told students that in the present curriculum they come to community medicine in all semesters, the objective of which is horizontal integration. Also all that is taught in community medicine, has been learnt elsewhere and here everything was being put together so that they could understand it in a better perspective especially during community medicine internship. She also felt that all this makes sense, only if we teachers envision undergraduate training as training for holistic doctors and help students perceive it as the solid base on which they may post graduate. She also thinks it very important that we be very clear that graduates are good enough to work as doctors and break the myth that to be good doctors they need to have a post graduate degree. She tells them "post graduates are persons who know more about little while you under graduates know much about everything and they should not loose it during postgraduation".She repeats that for integrated teaching to occur teachers training and vision are very important. ***But the important question is "What are our objectives/ goal/ vision for Medical Education in our institutions and in our state and country as a whole?"***

The question of rural urban divide in the distribution of doctors in developing countries is well known, but the fact was also raised, that this is not only in developing countries but is also a problem in developed world. The following links give more details on this issue.

1. http://www.openmedicine.ca/article/viewArticle/52/8
2. http://www.implementationscience.com/content/1/1/18 (Factors likely to benefit Telehealth support for rural patients)

In the UK, there has been some systematic analysis:

3. http://www.rcgp.org.uk/pdf/ISS_INFO_23_NOV04.pdf

On the other hand, "Family Medicine" as a "specialization" too has some proponents:

4. http://www.aafp.org/fpm/2007/0200/p13.html
5. http://www.vcfm.net/fellowships/international-medicine-fellowship/ (Medicine in Developing Countries is different)
6. http://kmapo.edu.ua/en/mdeyatel/1familymedicine (Ukraine)
7. http://www.fondulglobal.ro/en/sub-recipients/tb/the-national-centre-for-studies-in-family-medicine-cnsmf.html (Romania)
8.http://www.squ.edu.om/LinkClick.aspx?fileticket=UEHQFAStnmE%3D&tabid=4930&language=en-US (Oman)

In Roopa 2009 fellow's opinion one should have integration at two levels, one at the initial phase and one in the final phase and at both levels, importance is to be given to clinical applications and implications. This two stage is important because clinical relevance and applications are not understood by the first year students because they have no clinical contact.

Latha 2009 fellow commented that if MCI is committed, integration can be brought about and also since deemed universities are also losing their status, all the more reason why MCI has to take leadership for bringing about changes for integration.

Nirmala 2008 fellow pointed out that "The compartmentalisation of education and specalization narrow our view from looking at the patient as a whole to a particular system. She shared the experience of her friend's father who was referred to eight specialists, with no one actually listening to the patients complaints and felt that lack of integrated teaching was the reason for this.

Ravi 2007 fellow, strongly felt that true change is possible only from within. External agencies can only act as agents to stimulate change. This is true for both medical students and medical colleges. One problem he sees in many South Asian countries, is that people not directly connected with medical education are opening medical schools. In many cases the primary objective is to make money. He is not sure about education imparted by such schools. Also many students are taking it for granted that because they have paid the money they have a right to be passed without working. He feels each college will have to work out the aims and objectives of its medical programs and what its graduates should be capable of. We should also remember many South Asian countries are Europe in miniature with a number of nationalities held together within a country. Despite harmonization of standards and all the talk of European integration the Europeans still have national bodies to oversee medical education. He feels national bodies can frame competencies to be achieved and check on their achievement or frame a model curriculum like the WHO Model list of essential drugs which schools can modify according to their own requirements. One of the most important points to be kept in mind is the commitment of college authorities (the investors) to quality medical education

Having an integrated curriculum needs people across basic and clinical sciences to sit together and chalk out the objectives and this requires intrinsic motivation . State Universities to which the colleges are affiliated should try to formulate this within MCI regulations and conduct workshops for deans and faculty of the affiliated colleges for implementation. The state universities can have a team which shall inspect colleges, evaluate the functioning of these programs and suggest corrections if any. This might be a feasible model rather than making it a clause under MCI regulation is what Vinutha 2009 fellow feels.

To conclude, everyone unanimously agrees that integrated teaching has more merits and the time has come for implementing it in the Indian scenario. It is also unanimously agreed, that there should be meticulous planning, training of the faculty, discussing things through, develop assessment plans and co-operation from both teachers and students before implementing, so that it will succeed.

Perception Of Feasibility Of Having Integrated Teaching in the MBBS Curriculum

Our survey tried to get the opinion of the group regarding the feasibility of having integrated teaching in the curriculum.

The first question on whether integrated teaching could be included in the curriculum had 95% agreeing that it could, however 75% felt that integrated teaching cannot be a replacement for the conventional methods of teaching.

The explanation given for the paradox to this question was that the responders felt that integrated teaching is good but at the same time it can not replace the existing conventional curriculum totally. Just like saying "sugar is very sweet" but it can not replace our "Lunch". Responders definitely want to have integration but they feel we should also have certain aspects of conventional curriculum. So probably what people like is a "Hybrid curriculum"

The other reason for this paradox was explained by the fact there was difficulty in getting proof of effectiveness in education. Integrated teaching looks conceptually sound and better but we do not have 'hard' evidence of its effectiveness.

The other reason was a lot of people would be uncomfortable with this sort of learning. Faculty from Nepal were quoted “students do well in the correlation seminar type of integrated teaching but do not recollect much about the topic during assessments and as of now, no reason could be assigned for this”.

Another explanation offered for this paradox was it could be because of difference in "**felt needs**" **of the students** who are targeting best performance in up coming examination and "**felt needs" of teachers** who take into account demands of conventional curriculum and newer methods like IT, PBL etc. Such **duality** may occur in the phase of 'curriculum transition.' At present integrated teaching is experiencing positive and negative forces.

From the students perspective (MSRMC Experience) also there was confusion and they did not want traditional curriculum to be replaced totally by integrated curriculum, so it was felt a hybrid curriculum was best.

The discussion to this question concluded with the opinion that a hybrid curriculum with the co -existence of both methods is ideal for now. But it was strongly felt that an assessment method should be incorporated with integrated teaching as a complete package and if not in the form of marks, incentives and prizes can be awarded.

Force Field Analysis Of Factors Favouring And Not Favouring The Workability Of Integrtaed Teaching

Sl No	Factors favourable	No. of responses	Sl. No.	Factors unfavourable	No. of responses
1	**Corelates with clinical subjects**	**15**	1	**Getting coordination among faculty and various departments**	**15**
2	**Helps students by better comprehension**	**11**	2	**Organisation of time schedule and time management, lengthy sessions**	**10**
3	**Makes teaching interesting**	**2**	3	**Teacher preparation, planning, content finalization and updating of content**	**7**
4	**Holistic approach**	**10**	4	**Difficult to implement**	**5**
5	**Avoids repetition of topics**	**7**	5	**Additional and interested faculty needed**	**3**
6	**Experience of sharing**	**4**	6	**Useless if the examination pattern is not integrated**	**2**
7	**Team work promoted**	**5**	7	**Problem in students to adapt to the new method**	**1**
8	**Promotes self study**	**3**	8	**Needs dynamic balance**	**1**
9	**Increase humanitarian behavoiurand communication skills**	**2**	9	**Not relevant to doctors who do not go into practics**	**1**
10	**Better treatment by doctors**	**2**	10	**May become a mere ritual**	
11	**Feasible**	**1**	11		
12	**Helps in sensitizing the student to topic**	**1**	12		

Comments on the force field analysis included

- As assessment pattern is not aligned to integrated teaching and the drive or interest to implement it is not strong.
- Doubts were also raised as to how to integrate integrated teaching with assessment methods about which there are a lot of confusions.
- The level of integration was also not clear.

- Discussion again was in favour of having a hybrid curriculum as vertical integration needs lot of planning, co-ordination and expertise to put it in place. Using OSPE stations covering all subjects was also suggested as a method of assessment related to integrated teaching.

In continuation of the analysis of the second survey, in response to the survey question

Will the basic sciences be at stake or lose their individuality with the introduction of Integrated teaching? 54.2% have disagreed whereas 20.8 % have agreed

The discussion to this question was 'yes' that the basic sciences may lose their individuality as the clinical faculty would be competent to deal with the basics.

The other important point quoted was the basic sciences have not upgraded themselves by diversifying or doing cutting edge research, example we could have done a lot of research on sports physiology etc. and also the basic science specialists are not contributing to clinical activities

Will the basic sciences be at stake or lose their individuality with the introduction of Integrated teaching?

Kalpana 2008 fellow's answer to this question was '**Yes',** because Basic science subjects in India have stagnated and has come to almost standstill because the whole scope of their post graduate education geared to make them capable of teaching MBBS i.e. undergraduate students.

There has been no upgradation in basic science subjects. There is almost no facility to do cutting edge research or to diversify. for example sports physiology is the need of the hour but we hardly have anybody who is specialized in sports physiology. There is no training in any of these areas for our postgraduates. If these issues get addressed, then the basic sciences will not lose their individuality.

Hence the need for basic sciences to chart new territories is very important, this could open up more new vistas and they would find themselves busier than ever.

A solution suggested for these issues were effective collaboration between, clinical and basic science departments.

The other suggestion was that the integration should be such that all the subjects get as much credit as they deserve...

To conclude, nobody is saying it cannot be done. Again meticulous planning is required for success.

Concerns about Integrated Teaching and Learning

Till now we have seen that though every one feels that, integrated teaching is beneficial, there are a lot of concerns which have been raised as to whether it can be successfully implemented in India.

Few of the concerns raised by the participants in the discussion are referred to below:

Medical Education

We are not clear, what we are training our medical graduates for? Is it for a career in primary health care? Is it to serve rural populations? Is it to emigrate to the west?

We have not indigenized our medical education to suit our needs

Also the status of medical graduates is steadily decreasing.

Colleges lack freedom and space to create curricula and determine their learning methods
Governments in South Asia cannot achieve good health status without investing at least 10% of the national budgets on healthcare and education-

Decentralization will lead to lower the standards case to point is derecognition of deemed universities and decentralization needs committed and dynamic faculty at all institutions.

Need to develop a standard method by documenting whatever is happening in various institutions, so as to know which method is working better.

Student's often do not understand the link of community health with the basic or clinical sciences student's will be "role modeling" their clinical faculty who knowingly or unknowingly express less importance of community medicine and "drag" them to the Individual Health Care.

Assessments

Assessments in integrated teaching is a concern, we do not have a system in place, for assessments if integrated teaching is adopted.

We have to align the teaching/learning with assessment and avoid the repetition of the topics taught

Students pay attention on what they need to pass exams rather than real learning for practicing as a doctor. Hence assessment should follow, integrated teaching sessions without which the response of the students will be very poor.

Time Factor

Quality time for the faculty is required in planning an integrated teaching curriculum, it is very difficult to coordinate this activity.

Terminologies in Integrated Teaching

"Many innovative schemes in medical education are described in jargon terms that make them sound quite out of the ordinary. But most medical teachers are already using problem based, self directed, small group, and integrated approaches as part of their teaching and doubtless have useful comments to make about when such approaches are helpful. We should ensure that people are not excluded from the current debates because they do not recognise the simple concepts behind the jargon phrases."

Teacher Centred Approach!

All teachers need to have the integrated vision that we are not making anatomists or physiologists or Cardiologists. Primarily we are making physicians who must treat human beings more than their organ systems.

Integration is primarily needed in the teacher's vision and has to be consistently shared by all teachers irrespective of the topics/ subjects they teach.

Integrated curriculum can produce a "better" (the views vary on better or worse) doctor but at the same time it may have adverse effects on teachers.

Teacher centred approach is **not beneficial** to the cause of integrated teaching. Ego issues between specialists, is another cause for concern. A lot of coordinated effort towards convincing the concerned people and coordinating the actual implementation will be needed to take even a few steps into the realm of integrated teaching

Most of the current teachers are trained in discipline based curriculum and they have mastered their disciplines. They know each and everything in their subject. If the same teachers have to teach in integrated curriculum, they will feel like fish out of water. It looks a bit odd when we imagine a person trained in a different setting, teaching in a different setting. One of the complaints (and my own experience) is that the unused knowledge gradually fades off from us. In integrated curricula, the

information taught to the students by the teachers is much less compared to the conventional curriculum. So the teachers gradually start to rust their brains...

These are some of the reasons as to why there are a lot of drawbacks in integrated curriculum.

Other factors

1. Shital quotes his personal experience on what happened to a school which was founded on the principle of “Hybrid Curriculum” - “A medical school founded on the very principle of "Hybrid" curriculum i.e. horizontal and vertical integration from Day 1 forced to return to "conventional" curriculum because:
a. The team that envisioned the program was "fired" from the school after students listened more to them and less to the authority as the team encouraged and gave more importance to the "feedback", "mentoring" and "formative assessments".
b. Once the founding team left, the academic and administration is then headed by the "tired and re-tired" faculty who never appreciated the integrated curriculum and teaching/learning methods even after being "pretended" to be attached with the program for certain number of years. (Strictly, Teacher-Centered Attitude)
c. The students began to have "conventional - ALL didactic lectures" style of teaching supplemented by "self-directed" PBL sessions (too much for anybody to have formally!!!). (Strictly, Teacher-Centered Attitude)
d. After some time, students paid less attention to the PBL sessions and more to the lectures because they came to know that PBL does not drive their assessment and, more importantly, their summative scores.
e. This school is now trying to go back to the basics and the main problem - as cited by the Academic Director and PBL coordinator - is the lack of expertise as well as coordination among faculty over what to teach in the PBL and what not-to-teach in the Lectures/Practical followed by student's motivation and interest”.

2. As it has been rightly said, the integrated curriculum in India means, teaching the same systems of the body in a specified time (a block period or a semester).

3. Actual integration is the one where everything about one area has to be taught within a day or a few days, just as it happens in the problem based curricula. The students must know in detail the preclinical, paraclinical and clinical aspect of the topic (like anatomy, physiology, biochemistry, pathology, pharmacology, forensic medicine, medicine, surgery aspects of liver) within a week. We do not have that type of a curriculum in India yet.

4. In India, the real integration takes place in the mind of the student at the end of the 5 years MBBS program.

5. It is said that it is impossible to have 100% integration. Different colleges follow different levels of integration in a hybridized form best suited to the students of the region.

6. One participant felt quite lost when teachers in Anatomy and Physiology were teaching same topics as though they are 'different' when she was a medical student

7. Other concerns were will integrated teaching -

- Will it be like making it too simple for the student? Is it not good for the student's intellect to grapple with these things and get things integrated in his/her own style and time.
- Whatever said and done specializations are rule of nature. So is it not more balance to maintain some identity for specific subjects and departments?
- Many teachers may feel like they are loosing there departmental identity and hence become defensive and resistant to change when the whole curriculum is integrated.

Barriers to Progress

Some of the barriers [8] expressed which come in the way of progress are

• Old curriculum does not need to change
• Loss of prestige, control or resources
• Competitive relationships
• No shared mission or goals
• Resistance to change

Finally, one has a challenging task ahead if integrated curriculum is to be implemented in India

Strategies for Implementation of Integrated Teaching / Learning

Integrated Teaching is no child's play, it is difficult, but that should not stop us from giving up integration. We should take it as a challenge. Integration is the need of the hour and it makes sense of what one is learning. Having coffee is much better than eating sugar, coffee powder, and drinking milk and water separately. For sure everyone can not make the coffee which tastes good in their first attempt... it needs a lot of effort and to be done repeatedly, and after some time it will be fine. All good things are difficult. We need to make a beginning and ***'We Shall Overcome'*** should be the motto**.**

Integrated teaching needs to be implemented in a planned manner.

Initially we need to have certain base line data like

- In which type of curriculum are we in and are we thinking of changing the curriculum into an integrated one and
- What do we know about integrated curriculum before we really think of changing?

The other things to be looked into is

- To take the teachers and students into confidence... we must brainstorm, convince, brainwash, give incentives, praise and use all strategies. Initially there will be a lot of "**forces against**" and we have to know how to use the forcefield management technique effectively. If we are consistent in our efforts and clear with our goals, we will get success.

As Alfred North Whitehead the famous educationist has emphasized, all these interdepartmental 'fights' and ego issues are because the teachers themselves have not elevated themselves to be '***teachers with vision***'. When each teacher sees himself beyond the parochialisms of 'his/her discipline' and sees the objective as educating a generation these difficulties will disappear, which to some extent is an Utopian dream.

In this context having a ladder model is just great and useful for beginning integration.

In the current practice of integrated teaching in most places, we are attempting a student centered approach in which we are facilitating (learning) from the student's perspective presenting the learning material in a holistic way (not compartmentalized and taught by different departments from their own narrow perspective, often losing sight of the "Gestalt" or bird's eye view and the students feel lost and start thinking why am I learning all this?) We need to overcome this "Teacher centered" mind set. The key to planning integrated teaching would be - first the identification of topics for integration starting with what the Basic doctor "must know". Once such a list has been agreed to by the concerned departments and schedule laid to deliver integrated teaching on these topics, then a integrated teaching lesson planning template prepared and shared among the departments involved in the integrated teaching for use in

planning each topic. This template prompts the identification of session learning objectives, the session broken into small parts beginning with a session which briefly introduces the relevance of that (basic science) topic through a case-study/ scenario by a clinician followed by the basic parts of the basic disciplines presented briefly in a nutshell (and resisting from attempting to show how much the teacher knows about that topic by posing the question to oneself- how much should I facilitate learning which would be of practical use for the student in the future as a basic doctor), summarizing the key learning (ideally making the students to summarize what they learned and the facilitator listing their learning as stated by them and reflecting on it to re-emphasise and clarify misunderstanding (if any) by students. Nice to know elements could be addressed by inviting students to do a self study (by giving them a list of further reading). Topics delivered through an integrated teaching session is a must know topic and so even if repeated, it would serve only as a re-inforcement.

Manipal Melaka College has been having a problem based integrated curriculum for more than a decade now. Initially they did not have assessments and the integration was not taken seriously by the students. Once the assessments were introduced, the response to integrated teaching was better. Hence it is very important to have assessments in place before adopting an integrated teaching methodology.
In fact any new innovation should always be tagged with an assessment.

Lessons Learned from Shital's experience of a school starting out as an integrated curriculum and then reverting to conventional curriculum were as follows:-
a. Don't overwhelm students with "mixture" of what you know and what to "experiment".
b. If you want to "experiment" innovation then tell them frankly and ask for their "consent" as well as support.
c. Go through the SPICES, Integration Ladder, and other approaches and plan well before implementing
Last but not the least:
d. We should change our own attitude from "teacher-centered" to "student-centered" approach of integration and teaching/learning.

According to Ravi 2007 fellow, the most important factor is, we should not be bothered much about the status of otherwise of our own individual departments/subjects. We should teach students in an effective and interesting manner. There are many other things basic sciences can do besides undergraduate teaching to improve patient care and other services for example in their Pharmacology department they have taken up promoting more rational use of medicines as one of our focus areas

Jessica Muller [21] in her article titled ***'Lessons learned about integrating a medical school curriculum: perceptions of students, faculty and curriculum leaders'*** talks about building curricular links. In building curricular links course directors and students defined integration in terms of co-ordinated curricular components and faculty who understood the overall curriculum and made conceptual links between new and previously learned material. Students in particular viewed these links as essential in a curriculum where different subjects and disciplinary perspectives were represented in one block. This was one area where students believed the curriculum often fell short. They described numerous missed opportunities for achieving true integration because their teachers did not know the curriculum beyond their own lectures, did not communicate with one another, made no effort to discover what content had already been covered or what students would be learning in the future and failed to link their subject matter with the rest of the curriculum. As a result, redundancies and gaps occurred. We get certain really basic things repeated over and over again, and then some basic things not taught at all because there is no communication between disciplines. Students as well as course directors felt that co-ordinating and monitoring curriculum content should be the responsibility of course directors, as this student observed:" I think even in a conventional curriculum the vision and integration in the mind of teachers make a big difference.

Some possible strategies [8] suggested for achieving successful integration include
• Leadership + clear goals
• Consultation
• Adequate contextual information
• Involvement
• Agreed timetable for change
• Reward involvement and excellence

Perseverance and the 'Strong Will to Overcome' will make one succeed against all odds.

Conclusion

There is no single solution to the problems in medical education that will be panacea for all schools. Changes should take note of local contexts, including any historical and geographical considerations. Some schools may find it impossible to set up a fully integrated course from day one but might, for example, make use of a wedge structure in designing the curriculum so that both preclinical and clinical subjects are taught throughout the course, but with preclinical studies predominating in the early years and time devoted to clinical subjects increasing as the course progresses.
Before integrating the curriculum, one should be very clear about the following points:

- **It is very important to decide on what type of doctor we need to produce to meet the health needs of the community.**
- **It is not possible to integrate the curriculum totally, but integration is the need of the hour and an attempt has to be initiated to have guidelines for integrated teaching in the curriculum with a student centred approach.**
- **There will be many practical restrictions on the amount of integration that is possible.**

For success of any program or business, we should have a ***Win - Win situation***. Both the donor and recipient must be happy. Same thing applies to an educational setting. For the curricular success, the teachers as well as the students have to be happy with it. If teachers are unhappy, they will leave the institution and go elsewhere to find their happiness. If the students are unhappy, they may leave or they may not encourage their friends and relatives to join the program. So in either case, the program will be a flop show.

Where There Is Will... There Is A Way...

So let us not say it is not possible... let us ask why it is not possible?
How to make it possible and let us make it possible to the extent possible...

To conclude quoting Jessica Muller [21] integrating a curriculum is a very complex process. It is differently understood and experienced by students and faculty and refers to instructional method, content, faculty work or synthesis of knowledge in the minds of learners.
Interdisciplinary teaching,
Interdisciplinary faculty collaboration,
Building curricular links and
Sequencing and framing curriculum content
are the keys for achieving success in integrated teaching.

Let us work hard to achieve the goal

Reflections

The best experience

As pointed out in the foreward, FAIMER through its unique way of teaching/ learning has introduced me to the 'LEARNING CHAKRA' which will remain with me as the most valued gift in my life.
Separated by time and space, we a group of eight (five fellows and three faculty mentors) could work as a team, overcoming all barriers to put in place a stimulating discussion. The base line knowledge of the group revealed a huge gap, which, I think the discussions to a large extent, was able to bridge.
The simple allegories used by Satish, for most discussions was an eye opener for me, and gave me ideas on improving my own teaching methodologies.
Personally, my own understanding of the subject increased tremendously through the discussions and also made me realize, how much we need to work to improve medical standards in our country.

What could have made it better

To quote Dr Thomas, 'Perfection is the enemy of completion'. Even nature is not perfect, but there is always scope for improvement in whatever task we undertake.
To begin with ***myself***, I could have participated more actively in the discussions (but somehow talking technically is not my strength), was as usual a passive learner.
We had active discussions, but when it comes to sitting down to write the report one is overwhelmed with the downloads, it was 2094 pages! Of course, so much was repetition and it took a lot of time to delete the repetitions.
I did not know any easier way of handling this, so had to device my own way and do it, this I found was quite strenuous. After working continuously for two weeks, towards the end, fatigue set in, and I just wanted to finish the job!
Some one should tell us how to download the information in a simple manner, to be able to write the report more easily.

On the whole positive experiences were much more than the negative and it was a good educative and enriching experience to write this report.

This is my sincere effort, but I am sure it leaves, a lot of scope for improvement.

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