

# Medical education at the cross roads

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## Introduction

*“Two roads diverged in a wood, and  
 I took the one less traveled by,  
 That has made all the difference.”*

.....*Robert Frost 1920.*

Reading some articles published in journals reminds me of an old saying in my mother tongue, Tulu, which seems to me the best commentary on our present efforts to “innovate, improve upon, remodel, and reshape the existing system: “Why do people fall into the well at night having spotted the same during day time?” One talks eloquently on the innovations done in the USA to train physician-scientists while another talks about the shortcomings of the MCI regulations and so on and so forth. All of them presume that the present system, while being inadequate, needs minor through radical changes. This presumption assumes to begin with, that the present system is tolerable but needs change: they suggest nibbling at bits and pieces of the same system. One needs to stand outside the system to audit the system before trying to change it for better or for worse. This could best be done by people who have spent the best part of their lives in this field and not outsiders. But we insiders need a detached attitude to be objective in our assessment. Certain vital questions need to be answered before we go into this job:

- 1) How did the present system of so called modern medicine come about in the first place?
- 2) In the Indian context was this system accepted to be better than the existing systems prevalent in 1857 or was this imposed on us by our masters then-the East India Company.
- 3) Even in the USA was modern medicine the choice of the consumers or was it imposed on the nation by vested interests?
- 4) Does modern medicine have a solid science base as

of now? How did modern medicine start around 5000 years ago in the Nile valley in Egypt?

5) Do we train our basic doctors to be taking care of the health of the public or to serve the needs of the Corporate Monstrosity that modern medicine is supposed to have become these days, according to serious medical historians?

6) In our country, where the large majority of the population is still below the poverty line, do we need to teach the same kind of medicine taught in the USA or UK?

7) What research are we talking about? The usual grant getting, CV fattening, repetitive research or do we bother to stimulate our younger generation to think out of the box to take knowledge forwards by refutative research?

8) What is lacking very badly is the lack of humanism among doctors who should be humane healers and not drug and surgery peddlers!

9) What should be the best model to teach and practice in the future?

Let us look at each of these questions in some detail although a full discussion is beyond the purview of this commentary.

One could start by auditing the system as it exists today. Professor Barbara Starfield at Hopkins in her article in the JAMA-Is US medicine the best in the world, debunks the claim that what they do in the USA is the best. <sup>1</sup> In the fourteen industrialized countries study quoted there, USA came last but one with Japan on top, the reasons are explained there. In a larger audit Dr. Garry Null and colleagues, based on the US government statistics, have shown that the modern medical fraternity there as the leading cause of death followed much lower down the scale by cancer and heart attacks. If we audit Indian scenario one could be shocked beyond recovery! Professor Mary Tinnetti of

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Yale writes that “The changed spectrum of health, the complex interplay of biological and nonbiological factors, the aging population, and the interindividual variability in health priorities render medical care that is centered on the diagnosis and treatment of individual diseases at best out of date and at worst harmful. A primary focus on disease may inadvertently lead to under treatment, overtreatment, or mistreatment.”<sup>2</sup>

Thomas Wakeley, a young MD and MP, at a very young age found that the doctors of London in the early 19th century were a bunch of “incompetent, nepotistic, and corrupt” lot that had become a stinking abscess full of pus on society. He wanted to drain that foul stuff using his new medical science journal named after the surgical instrument, The Lancet, which started in 1823. He would turn in his grave if he were to audit the same today! Hillary Butler, today feels that “The medical establishment has gone from being a fundamentally corrupt, nepotistic bunch of incompetent practitioners in 1823, into a corrupt corporate monstrosity who cuts all the “Wakefields” off at their knees, ... and which appears to run by the wartime mantra that anything which might be truth must be protected by a bodyguard of lies, while hiding behind the Sound Bits of “evidence-based medicine”. The watch dog bodies like the WHO, FDA and others of their ilk have been shown to be receiving more than 80% of their funding from the vested interests like the drug and device lobbies.

Talking of research let us audit them in the west today. A Greek origin Stanford professor, John PA. Ioannidis' 2005 paper Why Most Published Research Findings Are False has been the most downloaded technical paper from the journal PLoS Medicine.<sup>3</sup> This paper has met with much approval. A profile of his work in this area appears in the Nov 2010 issue of The Atlantic (Lies, Damned Lies, and Medical Science)<sup>4</sup> This shows that Ioannidis analyzed "49 of the most highly regarded research findings in medicine over the previous 13 years". And "Of the 49 articles, 45 claimed to have uncovered effective interventions. Thirty-four of these claims had been retested, and 14 of these, or 41 percent, had been convincingly shown to be wrong or significantly exaggerated."<sup>5</sup> David Eddy, a former Stanford professor of Cardiac surgery had shown that 85% of what doctors do was NOT based on science, while 15% had some data to support it. <sup>6</sup> Regarding audit of interventions in the USA the best report seems to be the one by Harlan Krumholz, a Yale professor of

cardiology, when he wrote that cardiac procedures in that country were done more for billions of dollars income for the hospitals, doctors and the industry and not to benefit patients! <sup>7</sup> Do we need to imitate those examples for our future medical education set up?

Let us answer the above questions one by one to know more about what is modern medicine (Allopathy) all about. Modern medicine could trace its origin to sorcery, witchcraft, mumbo-jumbo etc five thousand years ago in the Nile Valley from where it made a longish tour round the world to come back to Europe in the 12th Century when the European Universities accepted medicine as a science. From Egypt it first went to Arabia where it was influenced by some of the great brains like Ibn Siena (Europeans call him Avicenna) and many like him. Then it went to Greece in the days when the Temples of Healing in the Islands of Kos were very popular where people believed that God of Healing, Asclepius, himself cured the patient while the patient slept in those Temples, Asclepieion. The original Hippocratic Oath “I swear by Apollo, the physician and by Asclepius and by Hygieia, His daughter and Panacea and all other Gods.....” tells us a lot of those days in Greece. It was in Greece that Allopathy got influenced by Indian wisdom of Ayurveda through the texts brought in by the reversing army of Alexander the Great, although Alexander himself did not return. The wonderful Academia that he had built was the place where knowledge expanded in Greece of those days. Then on it went to other parts of Europe to be eventually accepted as science by the Universities there in the 12th Century. Surgery took another three hundred years to be recognized by the main stream medicine when in the 16th Century Royal College of Physicians was established in England!

When once the label science was attached, modern medicine got special respect and started following the inanimate sciences of physics and chemistry of that time as its foundation. Human body was considered as a machine like a motor car, made up of organs as parts. True science of human physiology died then which became sealed with the onset of the proclamation of the young mathematician, Rene Descartes in France who was forced to declare the human body as a separate part compared to the thinking part, the brain, Res Extensa and Res Cogitans. The division became complete killing even the last relic of science in modern medicine. To the present day we are totally blinded by this science! <sup>8</sup> Although there have been drastic changes in physics of the 12th Century to the

latest quantum physics which seems to be the true language through which Nature speaks to us, we in modern medicine have no idea as to what has changed in our science base.<sup>9</sup> Then we drifted to the wrong mathematical base for human physiology-linear mathematics and Euclidean Geometry, both of which do not fit the working of the human body. Human body follows the Fractal Geometry and non-linear holistic mathematics. To confuse the common man we took umbrage in statistical jugglery. That is where we are today.

2) Modern medicine was not our choice. It was imposed on us by the East India Company in the year 1857 when they started three medical colleges in Madras, Calcutta and Bombay of those days with the London University syllabus. Although London University syllabus has changed drastically since then we are still in the process of nibbling at the bits and pieces of the 1857 syllabus even to this day.

3) Let us look at the USA model of modern medicine. The American Association of Homeopathy was started 40 years before the birth of the American Medical Association by some of the MDs of those days who were disgusted with allopathy of those days imported from Europe. The Ameri-Indians had their own effective system which was destroyed by the white man systematically. Homeopathy was rage those days. But the few disgruntled elements started the American Medical Association, which was more of a trade union movement those days to defend their rights. The fears expressed by Benjamin Rush in the preamble to the American constitution have come true today. "Unless we put medical freedom into the Constitution, the time will come when medicine will organize into an undercover dictatorship to restrict the art of healing to one class of men and deny equal privileges to others; the Constitution of the Republic should make a special privilege for medical freedoms as well as religious freedom." Benjamin Rush, MD., a signer of the Declaration of Independence and personal physician to George Washington. How very, very true today? One can make out the fraud about the establishment of the AMA from the statement of one of their own leaders. "We must admit that we have never fought the homeopath on matters of principle. We fought them because they came into our community and got the business." Dr. J.N. McCormack, AMA, 1903. Same principle was the reason for the defeating other prevalent systems of those days in the US. In 1895 Dr. DD Palmer created the science of chiropractic. Energy

medicine was in vogue those days and the most popular system was Radioesthesia. Palmer was right according to quantum physics of today. He was very popular and so was his science and medical colleges sprouted all over to teach that science. The greedy drug lobby woke up then and The Carnegie Foundation paid for and published the Flexner report in 1910 that called for all medical streams other than those proven by their science then to be banned. Quantum physics was not known then!<sup>10</sup> So the other systems died and only drug and surgery of those days (modern medicine) survived. Strangely, a recent article in Science touted the benefits of transcranial magnetic stimulation<sup>11</sup> which is a very powerful therapeutic tool. This was not picked up by main line medicine even then. Even the chiropractic won a decisive battle in 1997 in the Federal Court where the verdict accused the AMA of using "unfair means" to scuttle a useful and easy tool for healing and Chiropractic became respectable there again but not in India where we have many useful methods like Ayurveda, Siddha, Unani and many more.

The very foundation of western medicine's scientific base, the Randomised Controlled Trials, (RCTs), has come for criticism in their own board rooms today. Sir Michael Rawlins, the venerated chief of NICE (national Institute of Clinical Excellence of UK), in his recent named lecture at the Royal College of Physicians admitted the much talked about RCTs, the bench mark of modern evidence based medical practice in the west, has been put on a undeservedly high position" He was putting it mildly as the truth could not be suppressed completely.<sup>12</sup> In fact, RCTs are no science at all. They are doctored statistics.

4) "There is no science of man today" wrote Nobel Laureate Dr. Alexis Carrel in his classic-Man the Unknown. "We use the inanimate sciences of physics and chemistry in an animate, conscious human being", he wrote-a square plug in a round hole! Douglas C Wallace, writing in the journal; Genetics, showed that the human genetic studies are all flawed. Using his new MIT chip he could show that all reductionist chemical molecules (legal drugs) only damage the human system but eastern herbal medicines are accepted as food by the body and they are effective medicines!<sup>13</sup> How do our patients survive despite our efforts to the contrary? This was very elegantly shown recently in a four University study led by Professor Bingel of Oxford. His colleagues from Cambridge, Hamburg and Munich have all shared the

experiments.<sup>14</sup> This study showed that all good effects of our drugs and surgery are due to the powerful “Placebo Effect” and not to the drugs! The latter only give rise to adverse drug reactions (ADR) which happens to be the leading cause of death and disability today.<sup>15</sup> Similarly, three large placebo controlled studies of coronary bypass surgery showed that the placebo group did much better than the operated group!<sup>16</sup>

I have been working on a new model of holistic science which I have already published which might make our future work more scientific.<sup>17</sup> That is closer to non-linear fractal mathematical model of man. The new science of sub-molecular biology gives much credence to what I have been doing for a few decades.<sup>18</sup> Fritz-Albert Popp, a German physicist has shown with the help of his bio-photon studies that health is a state of human body cells being in synch while ill health is when they are out of synch.<sup>19</sup> My definition of health “enthusiasm to work and enthusiasm to be universally compassionate” ([www.thejsho.com](http://www.thejsho.com)) comes closer to the original definition of Sigmund Freud who defined health as “work and love” which was reiterated by Richard Smith the former editor of BMJ. ([www.thejsho.com](http://www.thejsho.com) 2010). Just one month ago Fiona Godlee, the editor of the BMJ, writing her editorial on the need for a new definition of health, had published my definition in the response column.<sup>20</sup> The old WHO definition is reductionist and is not workable except to make every one of us a patient, a good business for the industry-named disease mongering by Ray Moynihan, the editor of PLOSmedicine journal.<sup>21</sup> The final seal was put by Hans Peter Durr, the emeritus director of Max Planck institute in Munich in his discovery that matter is not made up of matter but of energy!  $E=Mc^2$  or a-duality (which he claims is not as good a definition as Advaita in Indian wisdom!)<sup>22</sup> Hans is with us in our work and helps me as Co-Editor in Chief in our new journal, The Journal of the Science of Healing Outcomes. ([www.thejsho.com](http://www.thejsho.com)). With this new discovery in quantum physics medicine finds it easy to show how the human mind (consciousness) is present in the form of the human body. Mindbody is the new fashion in place of mind AND body which is an illusion. In fact, the Johns Hopkins University physicist, Richard Conn Henry, calls the universe: “The universe is immaterial-mental and spiritual. Live and enjoy.” I have many articles in this area which could all be accessed free at [www.pubmedinfo.com](http://www.pubmedinfo.com)

We have been working in the area of energy healing for

decades with remarkable success but I can not go into that here.<sup>17</sup> We have come one full circle from the 1800 to today from energy healing to energy medicine of today. Many others are working in this area.<sup>5-8</sup>

The medical college education must be totally revamped in view of this new science. Instead of making an enthusiastic (if there is one) young medico into a semi comatose one after the first couple of years of preclinical stuff where he gets to see only dead bodies, organ based wrong physiological concepts and studies in tombstones in the pathology laboratory, he could be taught live physiopathology of human cells in Petri dishes under the electron microscope where there is a new world happening with cells doing all that a man could do: much more efficiently. An enthusiast would be thrilled to see a live RBC in the subperiosteal clot of a fractured bone slowly transforming itself first by nucleation and then by converting itself into a pluripotent stem cell (endogenous) to heal the fracture efficiently. He would be thrilled to see how the cells in the periphery of an infarct in the heart slipping to take the place of dead cells with their fibroblasts forming more fibre to form a strong scar, which we doctors in the ICU stop by beta blocking and knocking off the Autonomic Nervous System! I think we should leave the bench scientists in basic research to their fate to do what they do better. Let us not make a physician a half baked bench researcher. Clinical research is a physician’s bread and butter and that happens all through his life on the bed side using the strict rules of the game of research. There should be no “statistical” research as happens now. Clinical research is having a problem on the bedside and trying to go as far away from the bed as is possible to get an answer. Basics of clinical research must be taught in the first two years.

The young students would do well to learn all the clinical methods on the manikins instead of on the poor patients who have to bear the brunt of the student’s onslaught! Final three full years must be spent literally living with practising doctors in society in addition to bed side medicine in the wards. The final product should be a human and humane healer with a kind heart and a skillful touch. Today the intern spends 90% of his time sitting with the books to memorize facts for the next entrance test having started it right from day one in the medical school. Greedy tutorials have started all over like mushrooms! No factual recall entrance test should be allowed. Aptitude testing and the review of his whole graduate career should be the criteria for PG studies. That

should preferably happen after a couple of years of being a basic doctor where he learns the art of medicine, which, in essence is all there is to medical practice and not rote learning of facts. Facts change faster than we think they do. Medline figures show that 7% new information pours into medical field per month through nearly 45,000 bio-medical journals! Most of that is noise and an occasional signal, if there is one, is lost in the cacophony.

That is complete medical education where one is taught to use the three pillars of good education: “to act skillfully, justly and magnanimously under all circumstances of peace and war.” Medical education needs a complete revamp to make the student a life long learner rather than a factual data collecting parrot repeater to pass the impossible to pass examinations these days. On going evaluation plus and end term or end year teaching class on a given topic by the student would do better than the present theory papers. Teaching is the best understanding of the subject.

Bed side clinical examination should not be replaced by anything that is artificial like the PACS etc. What is this syllabus and curriculum for medical education that we are talking about? That baffles me to see the efforts of the wise pundits in the MCI sitting and dictating like the Roman Kings transforming e-ducere of Socrates into e-ducare (instead of getting the best out of the student we push what we want him/her to know. The latter is dictated by the vested interests today, just like the Kings of yore wanting to brainwash the people. One would be shocked to know that most western textbooks (Indians are mostly their notes) are ghost written by industry’s ghost writers. The “renowned professors” give their names, for a price though, as editors and contributors. (Lancet 2000 April-The role of drug company money in US medical education)

Why do we need Indian medicine?

One good example will do to illustrate this point. While the whole world put together has about 33 million AIDS patients, we in India have a total of 67 million NIDS (nutritional Immune Deficiency children) children but even our professors are not aware of that. Those children die in thousands daily for want of food! Where have we lost our priorities? We have great AIDS specialists here because there is plenty of money in AIDS arena and no money at all in the poverty arena, thanks to the greedy politicians in addition. Research today is simple grant writing, grant getting, CV fattening exercise. As already shown

above most, if not all of it, is not worth the paper on which they are printed. Even awards and prizes are given for them! I was reminded of what Sir Winston Churchill once said: “While falsehood has almost gone round the world truth still has not had time to pull up its pants!” How true? “Poor pay for their poverty with their lives “was the pronouncement of a humane family physician, Julian Tudor Hart, who worked for forty years in a coal mining community of Wales.<sup>23</sup> Poverty is the mother of all illnesses along with ignorance. We have this combination in India which is not taught in our medical schools.

For us we need a future medical system that incorporates the best in all the systems of medicine which go through a strict scientific evaluation prior to being included in the future meta-medicine( medicine coming after modern medicine) along with the useful part of modern medicine like corrective surgery and emergency care. Founded and mentored by one of the greatest scientists ever to walk on this planet, Late Professor Rustum Roy, we have been working for over a decade in our World Academy of Authentic Healing Sciences ([www.waahs.com](http://www.waahs.com)) just put such a system into practice. We also publish our data in our own “super peer reviewed” journal-The Journal of the Science of Healing Outcomes ([www.thejsho.com](http://www.thejsho.com)) While I edit the journal our co editor in chief is Hans Peter Durr, the emeritus director of the Max Planck Institute in Munich.

This is the long and the short of future medical education scenario which could be fine tuned further as and when needed. Anything that does not change does not qualify to be scientific. Life is ceaseless change till death, medical education is no exception. Let us not waste our time debating which part of the existing system needs change; instead let us put in place a new scientific method in place of the age old unscientific method.

“People today don’t need a Wakley to tell them that parts of the medical empire are still rotten at its core. The evidence is in front of their eyes daily. Many have personally experienced the medical establishment at its worst. It’s no surprise that the medical establishment now hires a phalanx of paid bloggers, paid board trolls, paid media “feeders” . and where it can, attempts to rule the policies and words of medicine, the media and politics with an iron fist. Medicine everywhere, not just in China, is now a branch of politics.” Hillary Butler 2011.

“We have to recognise that life is a sexually-

transmitted terminal disease and that we cannot eliminate all risks. If we prevent deaths from heart disease, people will probably die of cancer and vice-versa. If we want to convert all individuals to pill-taking cost centres in the Medical- Industrial complex, then we should do so consciously rather than by sleep walking into an era when all risks must be mitigated medically. The international imbalance in healthcare expenditure means that in the West we strive to increase individual lifespan by a few months at massive cost, whilst in other parts of the world much lower expenditure could increase the ‘global sum of health’ by a far greater extent.”

Tim Reynolds

*“In the information society, nobody thinks. We expect to banish paper, but we actually banish thought.”*

Michael Crichton

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# Continuing Medical Education Program

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## Introduction

When we look at the growth and development of the Medical Science, human mind cannot but wonder at the enormity of its accomplishments. The things which seems routine today would have taxed the imagination of even the most futuristic person just a few years ago. With scientific achievement human structure and function has reached a level of comprehension which was unknown. Furthermore it has revolutionized our concepts and today not only we are talking in terms of medicine at molecular level but gene therapy. The sea of change in the concept and knowledge of medicine has come about due to major advances in diagnostic and therapeutic modalities.

## Medical education

The medical man enters the profession with a vast store of knowledge about various diseases and their manifestations, diagnosis, management and prevention. In this era to keep abreast and updated in knowledge, they must not be satisfied with their current level of proficiency and must take earnest attempts to enhance and expand their competence. It is done by improving the knowledge and by keeping abreast with the latest developments in the field. This, in essence, is a continuing medical education (CME) throughout one's career.

'Medical education' according to William Welsh, a well-known US bacteriologist, 'is not completed at the medical school. It is only begun. Hence it is not only the quantity of knowledge which the student takes with him from schools which will help him in his future works; it is also the quality of mind, the disciplined habit of correct reasoning, the methods of work, the way of looking at medical-problems, and the estimate of the value of evidence'. Education moves us from darkness to light.

During the medical course we try to learn too much and the teacher also tries to teach too much. This will

not have the desired response. Education being a lifelong learning process, the knowledge and experience we gain after graduation forms the most important part of education. Sir William Osler, the renowned physician of the twentieth century, in his '*Aequanimitas*' has stated that, 'the system under which we work asks too much of the student in a limited time. To cover the vast field of medicine in three years is an impossible task. We can only instill the principles, put the student in the right path, give him methods, teach him how to study and early to discern between essentials and non-essentials'.

## Keeping pace with development

When we have taken up the profession we have to keep abreast of the developments and advances in the diagnosis and management of a variety of disorders. We have to keep an open mind to recognize changes in the natural history of a disease and try to know more about it. It is possible to gain the knowledge from the books. Thomas Carlyle has said, 'the greatest University of all is a collection of books'. We have to kindle the curiosity and try to enrich the knowledge which we have gained already. Albert Einstein, has told, 'it is a miracle that curiosity survives formal education'. After our formal education in the Medical College, our mind is mature and it seeks to follow through the things.

Major advances in diagnosis and therapeutic modalities have brought a sea of changes in the concept and knowledge of Medicine. This has necessitated the medical men to enhance and to expand their professional competence to find a solution to real-time situations. Skills are attained over a period of time by following examples, and by experience gained by trial and error. There is need for life-long learning and involvement in a periodic self assessment.

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## Competence

Competence is a professional habit and it is an interaction of the task and clinical abilities. It involves a judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community. The competence develops on the scientific knowledge and basic clinical skills attained. The teaching also includes the conversations that take place in the ward rounds, and in the passageway and narration of interesting cases, stories and anecdotes and experiences.

## Medical Professionalism

The Medical Professionalism project jointly sponsored by the American Board of Internal Medicine (ABIM) Foundation, American College of Physicians (ACP) and European Federation of Internal Medicine began in November 1999 as a collaborative effort designed to raise the concept of professionalism within the consciousness of Internal Medicine both in US and Europe. It brought out a charter in 2002, on medical professionalism detailing the fundamental principles and professional responsibilities to both patients and society to be followed by the physicians. Among 10 Professional responsibilities, the commitment to professional competence and commitment to scientific knowledge have found the prime place<sup>1</sup>.

The Charter of 21<sup>st</sup> century highlights the ideals enunciated by *Charaka* long ago. The physician who is the chief in the medical practice must be knowledgeable and resourceful, honest and pure in his purpose and conduct, and competent. It will go a long way in improving the quality of care provided to the patients. He must uphold scientific standards and promote research which is of benefit to the patients. Patients equate 'goodness' with up to date medical knowledge and clinical skill, strong ethical standards and a bedside manner that is empathetic, courteous and kind. These qualities form the fundamental attributes of doctor's professionalism.

## Professional man

The qualities of a professional man, in the words of Thomas Russell, Executive Director of American College of Surgeons, are multi-dimensional. They consist of competency and dedication to improve the skills, becoming a roll-model for future generations of medical men and placement of welfare of the patients above everything else. The ultimate aim of the physician is patient care and to that end all their efforts

must be directed<sup>2</sup>.

Today, the medical profession is confronted by an explosion of technology, changing market forces, problems in health care delivery, bioterrorism and globalization. It has resulted in increasing difficulty to meet the responsibilities to patients and society. In these circumstances reaffirming the fundamental and universal principles and values of medical professionalism, which remains ideal to be pursued by all physicians become all the more important.

Epstein and Hundert have defined professional competence as 'the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served'<sup>3</sup>.

## Professional competence

Physician has to maintain his professional competence by updating his knowledge of medicine. The technological advances have given the facilities to do his best which was not possible earlier. He must be committed to lifelong learning. This he acquires by studying the books, reading the journal and attending the continuing medical education programs, and discussing with the experts. This will update his knowledge and enable him to be in the forefront of the profession. His mature mind will follow through. We have to maintain a sense of curiosity to learn, which Smiley Blanton has considered 'nature's original school of education'.

A competent physician results from good training and/or from keeping abreast with the current developments in the medical field. The task force appointed by the assembly of the American Board of Medical Specialties (ABMS) has identified the following six primary components as a measure of general competence: 1) adequate medical knowledge, 2) competent patient care, 3) a life-long commitment to evidence-based and practice-based learning, 4) interpersonal communication skills, 5) professionalism, and 6) system-based practice<sup>4</sup>. There is no examination after a person has graduated. There is no system of recertification in our country. Though the physicians are encouraged to attend the continuing medical education programmes held periodically throughout the country to update their knowledge, there is no yardstick to assess their knowledge. There is no procedure of self-assessment.

The ABMS assembly later adapted the following 4 basic components as an evidence of assessment of

continuing competence. They are; 1) continuous high professional standing, 2) continuous commitment to life-long learning and involvement in a periodic self-assessment process, 3) cognitive evidence, and 4) evaluation of performance in practice. There is no agency or mechanism in our country that can conduct an examination to assess cognitive knowledge of the physician during life time after obtaining the degree and licence to practice. It is a welcome thing that there is a greater awareness in the recent years about the process of life-long learning by attending the continuing medical education programmes relevant to their specialties.

As Oliver Wendell Holmes has said, 'it is the province of knowledge to speak and it is the privilege of wisdom to listen'. In this background, Medical man often finds the subject taught during his or her training either obsolete or altered with the availability of newer evidence on different disorders. As there is no formal course of study after emerging from the medical institution, the physician has to maintain his or her professional competence. Maintenance of professional competence is an exercise of lifelong learning as it forms an essential requirement for evidence-based medical practice<sup>5</sup>. There are various methods to update their knowledge that include reading books and journals, surfing internet, attending the continuing medical education programs and attending the hands-on-workshop. They will update their skill and provide new knowledge.

### **CME Programs**

The physicians attend the CME programs to update their knowledge, and for many such programs remain the main source. The organizers of the CME programs have to plan to provide appropriate curriculum so as to make it an effective and beneficial endeavour. The planning involves a process of the assessment of the needs of physicians and the training program must include such topics so as to improve their competence. Any physician who plans to attend a CME program must assess his learning needs and decide about the

topics for the learning<sup>6</sup>. This will then make it learner-centric. The persons participating in the program are already experienced and would be interested in trying to find solutions to the problems encountered in their practice. There is greater flexibility in designing the curriculum. Thus the learning becomes problem-centred rather than subject-centred. The latter is a teacher-centred learning process with a rigidly designed curriculum. These two learning experiences have been referred by Knowles as andragogy and pedagogy respectively<sup>7</sup>. Active participation of the learner and discussion they hold with the faculty plays a leading role in retaining the information taught. They will get information on the newer diagnostic methods, and therapeutic modalities, on new techniques and equipments, and recent advances in the knowledge of the subject and the program will enable to learn new skills.

Accreditation Council for Continuing Medical Education (ACCME) in USA has stated that CME should provide physicians with learning activities that update their existing skills and lead to continuous professional development<sup>8</sup>.

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# Competency Based Curriculum in Medical Sciences

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## Introduction

We live in an era characterized by unprecedented growth of knowledge. The growth of knowledge is exponential and unmanageable. 'Knowledge is power'--- Only when it is rightly applied, at the right time and for the right purpose. Everwijn et al<sup>1</sup> said that knowledge acquisition does not necessarily mean successful application of the knowledge. What is more important is "Knowledge in action" and not the knowledge languishing in books or minds. Academic professionals need to possess not just the domain-specific knowledge but also greatly the ability to apply expeditiously knowledge and know-how, where and when needed. The gap between classical disciplinary knowledge and its application in the form of know-how is closing down in the recent times. This has paved way for competency based education (CBE). In medical science the same is referred to as "Competency based Medical Education"(CBME).

Competency has become a buzz-word in medical science during last few decades. The competency approach has become prominent at most stages of undergraduate and post graduate medical training in many countries.<sup>2</sup> Competencies are the learning outcomes which are explicitly mentioned by the competency based medical curricula. Many organizations advocate identifying and assessing competencies as tools for defining the outcomes with our doctors in training.<sup>3</sup>

According to Webster's dictionary competency means - ability or fitness or capacity to do a defined task.<sup>4</sup> It refers to what all a successful learner should know and be able to do upon completion of a particular program or course of study. The term also describes the ability to function in context by applying prior experience

to new situations with good effect. A competent person would greet new and challenging environments with calm and confidence.

Competency is defined by Govaerts as an individual's ability to make deliberate choices from a repertoire of behaviors for handling situations and tasks in specific contexts of professional practice.<sup>5</sup> He considers competencies as context dependent and they always imply integration of knowledge, skills, judgment and attitudes.

Competence is defined by Mulder et al as the capability of a person or organization to reach specific achievements. Personal competencies comprise : integrated performance oriented capabilities, which consist of clusters of knowledge structures and also cognitive, interactive, affective and where necessary psychomotor capabilities, and attitudes and values, which are conditional for carrying out tasks, solving problems and more generally, effectively functioning in a certain profession, organization, position or role.<sup>6</sup>

Competencies as outputs have become very important in modern professional education. The information over load and also increasingly complex modern workplace environment have placed unique demands on professional schools and programs. The exit competencies for the graduates have shifted from knowing information to being able to solve problems, communicate clearly, and use lifelong learning skills.<sup>7</sup> Instead of solely determining whether students graduate based on the accumulation of course credits, graduation should be contingent upon demonstrating mastery over a defined set of competencies.<sup>8</sup>

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Are our institutions and organizations producing quality man power befitting to the needs and expectations of the society? For a very long time the prescribed curricula in many universities are discipline and time based. Student enters the medical school and will pass through various courses for specified period of time and obtains certain credits in order to exit s a doctor. Taking Hodge's metaphor of - Tea steeping, whereby the medical student (tea bag) is put into medical school (hot water) for a suggested amount of time with the belief that the outcome will be a competent practitioner.<sup>9</sup> This kind of curriculum is focusing majorly on structure and time although a minimal attention is given to competencies and their assessment based on set objective criteria. Medical education is facing a number of impending problems. The class sizes are increasing<sup>10</sup> and the health care environment has undergone a paradigm shift due to the advent of health insurance, HMOs, corporatization and commercialization. Mark Albanese considers that medical education is facing four challenges that are unprecedented and calls them as four horse men of the medical education apocalypse. They are:-

**1) Teaching patient shortages 2) Teacher shortages 3) Conflicting systems and 4) Financial problems.**

He prescribes competency based medical education as a panacea to mitigate these problems.<sup>10</sup> Health professions education should address these problems. A resounding call has been made for reforms in health professions education, training, professional development programs especially in relation to curricular content, outcomes, and process review.<sup>11-</sup><sup>15</sup> The curriculum design, delivery and assessment should align in order to provide the needed outcomes. The emphasis is on the product – What sort of doctor will be produced, rather than on the educational process.<sup>16</sup> Competency or Outcome-based education is said to improve individual performance, enhance communication and coordination across courses and programs and provide an impetus for faculty development, curricular reform, and leadership in educational innovation.<sup>17</sup>

In competency based education the expected outcomes (competencies) are clearly, unambiguously and explicitly specified. They are called competency statements. Various international,

national and local academies, boards and organizations have developed competency statements for specific domains. Core competencies reflect general expectations and specific competencies are quite specific by nature. The ACGME in 1999 developed six core competencies and 2001 adopted as requirements of all resident physicians in the United States.<sup>18</sup> They are:

**1) Patient care 2) Medical knowledge 3) Practice based learning and improvement 4) Interpersonal communication skills 5) Professionalism 6) Systems-based practice**

Canadian medical educational directives for specialists (CanMEDS) has prescribed seven roles for specialists. This was further adopted in Denmark and Netherlands also.<sup>19</sup> These roles reflect doctor as a medical expert. This has to be further complemented by six more competencies (roles) to be a good medical professional – **Communicator, Collaborator, Manager, Health advocate, Scholar and Professional.**<sup>19</sup> Such competencies as expected outcomes determine the curriculum content, and its organization, teaching methods and strategies, the course offered, the assessment process, the educational environment and the curriculum table. They also provide a frame work for curriculum evaluation.<sup>16</sup>

**The Historical Background and Evolution of Competency Construct.**

The cultural climate of 1960s and early 1970s fragmented the curricula and de-emphasized the basic skills. This resulted in lower scores by students in student achievement tests and classrooms examinations reflecting reduced educational effectiveness. Experts in the educational area initiated “back to basics” movement. Emphasis was placed on minimum standards and performance competencies at all educational levels.<sup>20</sup> The public voice called for increased competence even in those professions (like medicine) which were immune to consumerism. Public health leaders also called for competency based training.<sup>21</sup> They viewed that competence based education can produce a workforce which can better handle the populations' needs because training is contextualized.

American Dietetic Association, State board of higher education of university of Illinois joined this movement early which may be called “competency movement”, and developed guidelines and edicts for the paradigm shift in

education. These organizations were also instrumental in implementation of several competency based programs.<sup>22-24</sup> **Competence** is the capacity to realize “up to standard” the key occupational tasks that characterize a profession.

**Key occupational tasks** are the characteristic for a profession. A profession may consist of 20-30 key occupational tasks.<sup>25</sup>

**Core competencies** are those which are needed to realize a key occupational task at a satisfactory or superior level. They are further categorized into two groups as:

a) **Domain – specific** :- Includes clusters of knowledge, skills and attitudes within one specific content domain in the profession.

b) **Generic** :- They are needed in all content and can be utilized in new professional situations (transfer).

**Model of Competence** in a specific context and may be closer to real life situation. Knowledge and skills are observable and also discussible as they are visible and easy to measure, they constitute the visible part of iceberg whereas the attitudes, values, personality traits

are not easily measureable and concealed hence they constitute the hidden part of iceberg. This model was given in 1993 by Spencer and Spencer.<sup>26</sup>

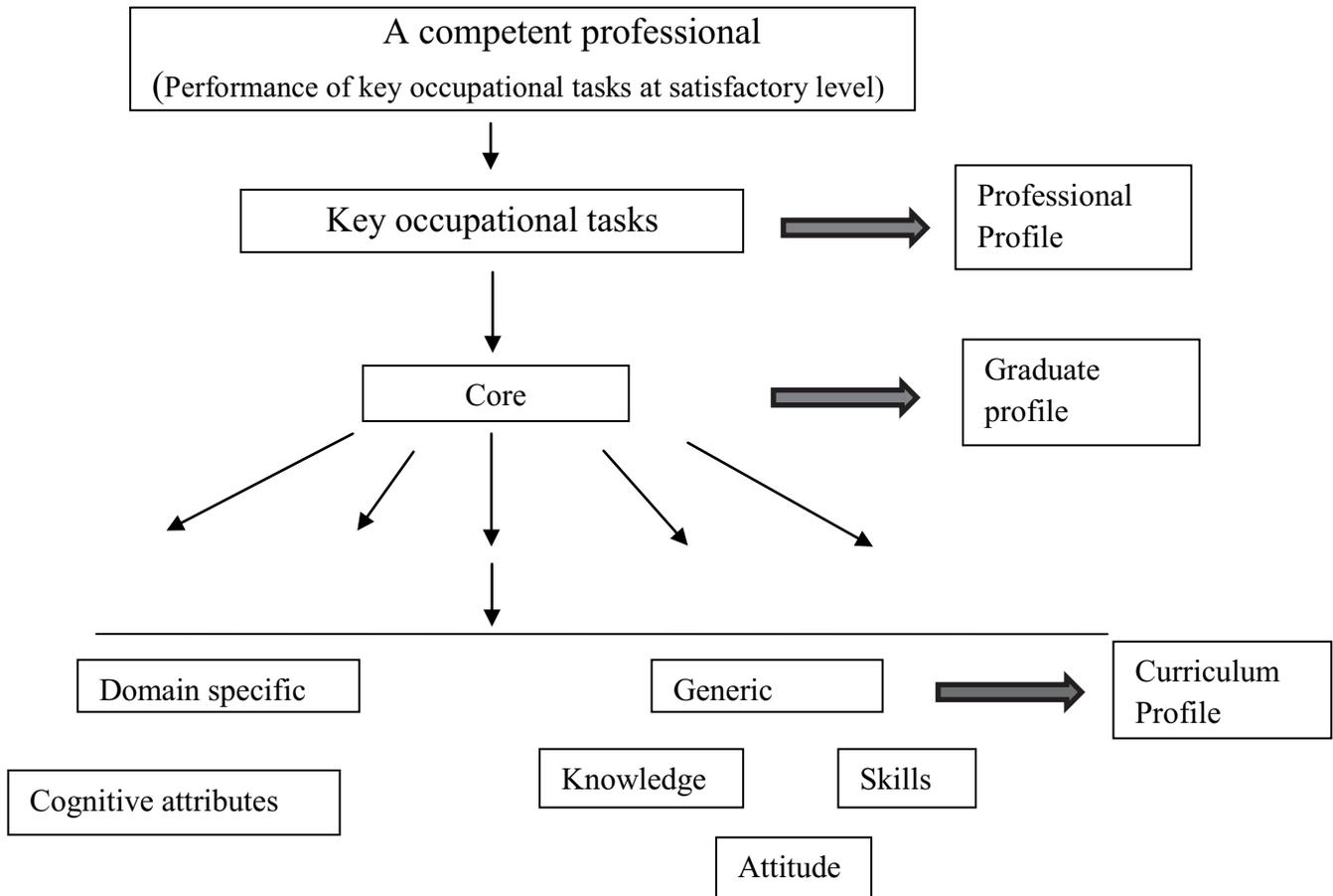
**Competency Based Curriculum – A road map for CBME**

Curriculum states the aims, objectives, content, outcomes and processes of a training or educative program. It includes a description of the methods of learning, teaching, feedback and supervision. It should describe the knowledge, skills, attitudes and behaviors that the learner will achieve.<sup>27</sup>

In recent years the research output in different specialties of medicine have significantly raised the interest in favor of CBME.<sup>28</sup> The features of CBME are:

**1) A focus on curricular outcomes**

The traditional curriculum (discipline and time based) fails to ensure that all medical graduates demonstrate required context based competence. CBME is focused on outcomes, it is inherently tied and related to the expected needs along with explicit measurable definitions of all competencies required to be attained.<sup>29-31</sup>



**Diagram 1 Showing the relation between Competence, Core Competencies and constituting (domain specific and generic) competencies. (Wim Kouwenhoven of VU University , Amsterdam, Netherlands)**

## 2) An emphasis on abilities

Competencies constitute the organizing principle of curricula. Curriculum is organized around a list of competencies not around knowledge objectives. The curricular elements are structured on one another reflecting constructivist model. Constructing knowledge through active participation is the hallmark of constructivism. CBME has adopted constructivist model.

## 3) A de-emphasis on time based learning

Students are allowed to learn at their own pace depending on their learning abilities. Those who develop competencies fast can always move through the fast track and slow learners can take their own time.

## 4) The promotion of learner centeredness

Learner is given enough flexibility in learning but acquisition of competence is mandatory before moving on further. The curriculum designers need to structure the sequence of opportunities and experiences to the students so that on graduation they are qualified beginners. There should be adequate representation of domain specific as well as generic competencies as needed for the profession in the curriculum.

## Reductionist trap of CBME

The competencies are reduced into a number of smaller competencies (sub-competencies) and into an inventory of longer and longer lists with increasing clarity. This kind of deconstructing a task to a catalogue of check-list amounts to over detailing. The "whole" may be forgotten being too pre-occupied with the "parts". Breaking down the competencies into smallest observable units, creating endless nested-lists of abilities can equally frustrate teachers and learners.<sup>29</sup>

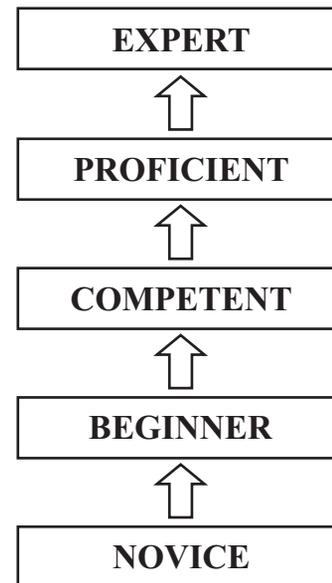
Few obstacles for CB-Curriculum are listed below<sup>30</sup> :-

- 1) Poor knowledge about the principles of CBME
- 2) Educating the educators
- 3) Time needed for staffing and educators
- 4) Implementation strategies are new and unknown to the educators
- 5) Development of evaluation technique needs meticulous approach
- 6) Changing the educational culture
- 7) Shrinking financing for health care education

## Competency Continuum<sup>10</sup>

Competency is neither the beginning nor the end on a

scale depicting the journey of a learner from the 'Novice' to 'Expert'. Competency is precisely the middle point in this process.



**Diagram 2.**

## Showing the steps in professional development

Knowledge, skills and attitudes do evolve quantitatively and also qualitatively when a novice moves in a graded manner to become an expert. It is not a time bound phenomenon and the transition need not continue and culminate in becoming expert. The growth may stagnate anywhere in between or may rise even to beyond expert stage depending on several factors.<sup>31</sup>

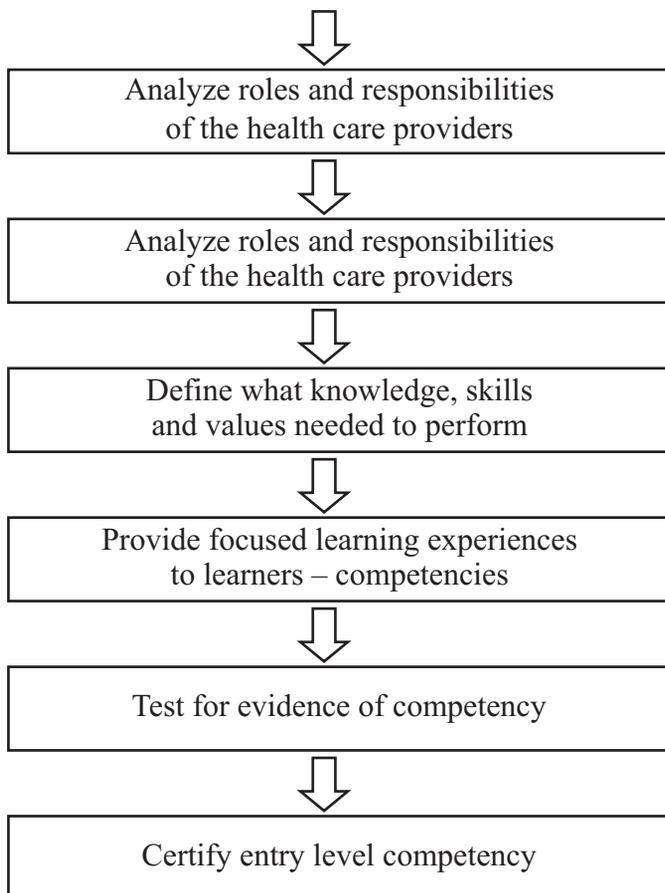
Education is a path—it is not the final destination.<sup>32</sup> It neither means carrying a baggage of knowledge or skills as arsenals in the quiver. Competency refers to a strategic location on this path where the learner is found to have the minimal knowledge, skills and values to practice independently in specific context or contexts as determined earlier. The learner has to manage a consistent and a continual growth. It is the point where responsibility for learning is transferred from teachers to learners. Competency continuum initiatives have been implemented by a number of educational establishments.<sup>33</sup>

## Competency Based Curricula – A Top Down Planning Approach

CB-Curricula are generally developed by top down approach. In this approach faculty start with well validated competencies as required for an entry

level practitioner and the model moves backward to performance based learning activities which enable student preparation for independent practice.<sup>34</sup> This provides scope for integrated learning which is holistic. This model can work effectively when a strong centralized curriculum management committee is established to keep a vigil on curricular delivery.

Grussing used the term '**Top-down planning**'<sup>35</sup> to imply that the roles, responsibilities and commonly performed tasks of practitioners while addressing the health care needs of public provide enough inputs to develop competency based curricula. According to this model public's health problems and the roles, responsibilities of the care providers form the 'TOP' of the model and curricular planning begins there and moves subsequently down with learning activities designed to certify entry level practitioner. As this model hinges on needs of population it is also called needs based curriculum.



**Diagram . 3.**  
**Showing Top-down Curricular Plan Model**

The bottom up approach is exactly converse to top down approach. It is used in 'Discipline based curriculum'. This is precisely the reason why the learners passing through this curriculum do not often match the expected requirements. Members of health professions education are more familiar with only bottom-up planning,<sup>36</sup> since it is in vogue for many decades in higher education.

Competency based education and curriculum are tested in dentistry,<sup>37,38</sup> nursing, physiotherapy and certain allied sciences also. Despite substantial research revealing effectiveness of CBME there are researchers who do not favour CBME. There are merits and also demerits of CBME.

### **MERITS OF CBME**

- 1. A new paradigm of competence:-** Provides a new discourse on what is meant by a physician's competence.
- 2. Customized clinicians:-** They are of high utility and it is in approval with social accountability.
- 3. Integrated learning:-** CBM-E promotes vertical and horizontal integration of disciplines and sub-disciplines. The learning is more meaningful and it is of utilitarian value.
- 4. Learner centred curricula:-** Flexible time frame, allows learner to progress at his own pace and focus is placed on learner's development.
- 5. De-emphasising rigid time schedule during learning:-** 'Each one at his own pace'---is the flexibility allowed in the curriculum. Time becomes a resource and not a marker of learning.
- 6. Easy portability of training:-** It eases the movement of health care providers across the jurisdictions.
- 7. Acts as glue to curriculum:-** It prevents fragmentation of curriculum. The learner is not kept in dark about what is expected of him at each phase.
- 8. Promotes Self-directed learning<sup>16</sup>:-** A higher order learning at professional education. As the competencies and ways to achieve them are explicitly stated learners can engage actively in self-directed learning.
- 9. Flexibility<sup>16</sup>:-** The structure and process both are flexible. Leeway is provided for certain desired changes in the curriculum.
- 10. Participation in curriculum planning<sup>16</sup>:-** It allows integrated teaching and learning along with

collaboration between different disciplines. This gives scope for all stakeholders to participate in curriculum planning.

**11. Tool for curricular evaluation<sup>16</sup>:** - Outcomes provide a set of standards against which curriculum can be judged.

**12. Continuity of education<sup>16</sup>:** - By stating the competencies need to be attained at a given phase, it provides eternal scope to continue education.

Competency-based education is fundamentally a very different method or approach in education. It is a relatively newer innovation and institutionalisation of such reforms proceeds through following steps<sup>39</sup>:-

Denial → Resistance → Acceptance → Bargaining  
→ Exploration → Commitment → Comfort

**Are our institutions ready to innovate?? At least are they ready to apply and check a recent innovation namely CBME ???**

The behavioural, political, economic, sociological, and cultural background needed for such an enterprise has to be studied in detail. Community as primary stakeholders constitute the focus in CBME because they are the end-users. It is said that curricular changes should be marked by more opportunities for community-oriented training and problem based learning with an integrated approach. Competency-based curriculum has all these attributes. Even post doctoral programmes with community based clinical care settings have been developed where competency continuum initiatives have been implemented.<sup>40</sup>

### Conclusions

Presently society is growing in awareness about the rights of its members. Every member of society has the right to receive care from a competent health care provider. Producing such competent health care manpower is the integral duty of our health care education system.

Competency-based medical education offers a ray of hope to meet the need for quality health care. Although CBME has some demerits as pointed out earlier, it has the potential to generate a product which is need based, custom made and competent. A professional, graduating through CB-Curriculum may be considered as a tool that will perfectly fit into the slot (needs). There is nothing wrong in expecting good results out of such a good fit. As CB-Curriculum's focus is not

on 'Inputs' but on 'Outputs' the gap between theory and practice will be bridged and it is for the benefit of the society.

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# Assessment of skills of performing benzidine test among II MBBS students

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## Abstract

**Background:** A mandatory and desirable comprehensive list of procedural skills has been planned and recommended for medical students during their MBBS course and benzidine test is one among them.

**Aim:** To assess the technical skills of 38 II MBBS students by asking them to perform a simple laboratory benzidine test on a given sample of urine.

**Methods:** The technical skill assessment was done by the pathology faculty by using a predetermined checklist.

**Results:** The desirable test result was obtained by 86.84% of students. The students showed carelessness in handling benzidine powder due to their negligence.

**Conclusion:** The students need to be emphasized on the importance of skill in performing this test and safety measures in lab practice.

**Key words:** Psychomotor skill assessment, benzidine test, laboratory safety.

## Introduction

Evaluation of psychomotor skills of medical students is one of the necessary step in the assessment of learning. The development of procedural knowledge and the ability to perform the technical tasks requires observation and practice and the assessment method adopted should be valid. Objective structured practical examinations are the most common methods of assessing procedural skills which utilise predetermined checklists in this assessment format.<sup>1</sup> Undergraduate trainees have to learn and perform a wide range of procedures during their MBBS course and chemical examination of urine is one among them. In this study assessment was done on a routinely performed simple laboratory procedure of benzidine test which detects the presence of blood in urine

The present study was undertaken to assess the procedural skills of undergraduate medical students in performing benzidine test on a given sample of urine

## Methodology

In the present study, we analysed the technical practical skills of the 38 undergraduate medical students who were slow learners and required 2 to 3 attempts to clear their I MBBS examinations. Each

student was asked to perform benzidine test to detect hematuria. The students were given prior instructions and demonstrations about the procedure of benzidine test and then they were observed while performing the test. A detailed checklist was prepared consisting of 7 task steps to be assessed. The checklist was reviewed by faculty members of the Department of pathology. All observers were provided with the predetermined checklist before performing the test. The following checklist was used.

1. Whether the student measured exactly 2 ml of glacial acetic acid?
2. Was pinch of benzidine powder added?
3. Was the benzidine powder added by using a spatula?
4. Was the handling of benzidine powder careful or careless?
5. Did they add exactly 2 ml of hydrogen peroxide?
6. Did they add exactly 2ml of urine next?

The assessment of the practical skill examination was followed by an interactive session discussion regarding the mistakes done by the students and about the rectification of the same.

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Table 1: Assessment of students in appropriate performance of the test

Observations	Measured exactly 2 ml of 10% glacial acetic acid	Added a pinch of benzidine powder	Used a spatula	Carefully handled benzidine powder	Added exactly 2 ml of hydrogen peroxide	Added exactly 2ml of urine
No of students (n=38)	31 (81.6%)	35 (92.1%)	35 (92.1%)	31 (81.6%)	33 (86.84%)	33 (86.84%)

**Results:**

II MBBS refresher batch consisted 47 students out of which 38 (80.85%) attended the practical demonstration class. Of these 24 were males(63.16%) and 14(36.84%) were females.

A total of 31 students (81.6%) could exactly measure 2 ml of glacial acetic acid. 35 students (92.1%) added a pinch of benzidine powder by using a spatula. 31 students(81.6%) were able to handle benzidine powder carefully as per the instructions given and 33 students(86.84%) could exactly measure 2ml of hydrogen peroxide and urine and add to the test tube. All the students observed for the color change and desirable test result was obtained by 33 students (86.84%).

**Discussion :**

Procedural skill competency is a central requirement of pathology training. Acquiring the psychomotor skills require observation, imitation and practice. One way of teaching skills is the four step approach suggested by Rodney Peyton of the Royal College of surgeons which constitutes demonstration, deconstruction, comprehension and performance. This ensures the teachers to break the process into manageable steps, asks the learners to vocalize the steps, provides repetition to reinforce learning and correct mistakes.<sup>2</sup>

Chemical examination of urine is routinely performed laboratory test which has implications on patients diagnosis and management and therefore competency is required to perform the test to obtain accurate result. In the present study a 7 students failed in adding the desirable amount of glacial acetic acid and 5 students did not add the desired amount of hydrogen peroxide and urine in the test tube probably due to their negligence. The desirable test result was obtained by 33 students (86.8%).

Benzidine dyes and related compounds are hazardous and potent carcinogens and their exposure through

dermal and respiratory contact is known to cause bladder cancer<sup>3</sup>. It is necessary for the students to understand the chemical laboratory hazards and the protection measures.<sup>4</sup> In spite of being repeatedly instructed, 3 students did not use spatula for benzidine powder and bare handled it and 7 students carelessly handled it. This can be attributed due to the lack of proper knowledge regarding lab safety.

**Conclusion :**

Laboratory skill assessment is mandatory under undergraduate medical education. A reliable tool selection for assessment of skill is very important. Assessment not only assists in assessing the performance of students but also provides a feed back to the teacher and enables to focus on the areas that need additional attention. This study not only gave us an opportunity to assess the skill but also made us to know that the students should not be exposed to such hazardous chemicals and this benzidine test should be banned by the medical colleges and has to be replaced by other methods. The students need to be emphasized about the importance of performing laboratory procedures accurately with proper interpretation of the results. The students also needed to be emphasized on the chemical laboratory hazards and safety measures in laboratory practice.

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# Introduction of Active Learning in Parasitology for II Yr MBBS students - An Experimental Study

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## Abstract

**Background:** Students of 21st century are no longer submissive students of yester years. They are the seekers of knowledge that they like to earn and not be just given. Many studies across the globe have proven that when students actively involve themselves in the class, they learn better and perform better in their exams too.

**Aim:** This study was taken up to introduce the concept of active learning and also to know the perception of students regarding the effectiveness of active learning.

**Methodology:** The study was carried out on a group of 100 students studying II yr MBBS in the department of Microbiology. While taking the class the students were actively involved by applying methods like think- pair-share, open discussions, pauses etc. Feedback was taken using a prevalidated questionnaire with scores on a five point Likert scale from the students immediately after the completion of the allotted portion by the faculty in charge.

**Results:** In a class of 100 students, 89% liked to have discussions, 87% appreciated team based approach. Whereas 90% of the students liked think pair and share and 96% of them really enjoyed solving MCQs. The most popular activity seemed to be Case based approach (94%) and the least liked was individual presentations (71%). But all most all of them (98%) liked to have breaks in the class.

**Conclusion:** Involving students in a large group makes learning effective. Our study results point out towards the fact that interactive lectures when carried out properly will have positive impact on the learners ability to learn, think and analyze the subject at hand.

**Key words:** Active learning, Interactive classrooms, Large group teaching, Think-pair-share, Effective learning.

## Introduction

In the era of innovations and advances in all sectors of Science and Health, where exactly the education stands is the question often asked by the health professionals. We often ask ourselves how effectively can we teach our students. How innovatively can we make our classrooms conducive for learning? Answer to this very important question lies in transforming the classrooms from teacher centered to student centered. The newer generation feels that it is high time for the paradigm to shift. Successful teaching and learning can occur in a classroom only when there is good teaching practice relevant to students learning. Traditionally students were mere passive listeners where as teachers were the givers of knowledge. In

contrast, a more modern view of learning constructivism, where students are expected to be active in the learning process by participating in discussion and/or collaborative activities<sup>(1)</sup>. Students can be actively involved in a classroom by asking them simple questions, asking them to recall some core facts, pulling them into discussions on the concept at hand, or simply by sharing their views. Active involvement does not necessarily mean that there has to be an activity. A simple pause of 1-2 min in between the slides can itself be freshening thing for students. An efficient teacher can utilize this pause time to put up an MCQ or a riddle or even a relevant joke to break the monotony of lecture. In an active classroom, the interaction need not be always between the teacher and

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the students. It can also occur between the students. Peer discussions and sharing of ideas amongst students are very important for those students who are hesitant to open up in front of a teacher. It also helps them to build a strong rapport with each other and form a team. Further, research on group-oriented discussion methods has shown that team learning and student-led discussions not only produce favorable student performance outcomes, but also foster greater participation, self confidence and leadership ability<sup>(2,3)</sup>.

**Methodology :** This study was carried out from July 2011 to Dec 2011 in the department of Microbiology, JJM Medical College, Davangere. Students in II yr MBBS are routinely divided into two sections A and B, comprising of 80-100 students each depending on the number of students entering II yr. Active learning principles were applied to section A and there were 100 students in that section. For that given term, allotted portion was Parasitology and it was taught with the active involvement of students. In each class, either **PPT** or **Blackboard** or sometimes a **combination** of both was used. Slides were planned in such a way that every 7<sup>th</sup> slide was blank. It was time for **pause!** The time was utilized as a break. During this time, an **MCQ** based on the portion covered so far in that particular session or sometimes even a riddle or a general microbiology question was posed. Students were asked to pick the options either by raising one hand or two hands or even to stand up according to the options given. Though there was some amount of noise, the students enjoyed to think and also to participate in the activity. The intention was to break the monotony. In some classes the topic was announced a week before and the **students were asked to present to the class** and the entire class was open for discussion. If the students could not find the answers for certain questions, the facilitator intervened. This discussion based approach, helped some of the students to open up otherwise. In other classes, **case scenarios** were put students were asked to think and then discuss with the person sitting on their right or left and finally they had to share with the entire class. Thus **think-pair-share** was applied to bring out participation or inputs from the shy students. Sometimes 3 benches were made into a **team** and given time to discuss and one of them had to answer the question at hand. These approaches were brainstorming and created **buzz groups**. They also helped the otherwise shy students to share their ideas with their peers. This was a kind of **reactive team building** process. At the end of the term, a pre validated feedback questionnaire was administered to

the students of section A only. The questionnaire was prevalidated before administration and the scoring was done using a five point Likert scale. This was to know the perception of students regarding the activities done.

**Results:** Data from the feedback given by the students was analyzed and tabulated. The same is shown in Table 1.

There were some students who gave a feed back that these kind of activities though seem good, do not have an exam oriented approach. They liked teachers to tell everything in their lectures. Most of the students liked to have breaks in between the class. They expressed that continuous class with out any breaks was very monotonous and not interesting at all. But here the breaks were utilized to engage the students mind.

**Discussion:** It is often seen that a well crafted and well planned lecture though is the most efficient way of transferring the information to a large class. But it emphasizes content rather the process and in doing so often fails to stimulate inquiry based learning and critical thinking of the students<sup>(4,5,6)</sup>. These one-way exchanges often promote passive and superficial learning<sup>(7)</sup> and fail to motivate students and builds neither confidence nor enthusiasm<sup>(8)</sup>. Many studies have shown that student centered pedagogy and interactive – learning activities increase students' performance<sup>(9,10,11,12,13)</sup>. Even though we get enough evidence pointing out the positive outcomes of interactive learning, there are vast majority of faculty still not accepting the fact that these principles and activities can be applied in the routine classes. Many are apprehensive regarding the size of the class, time and also the portion to be covered in that particular term. Well that can be managed by meticulous planning by the teacher. A large class (in our case-86 students) can be divided into smaller groups of 10-12 each and the activities can be carried out. Of course there will be some amount of buzzing in the class but then at the same time there is brainstorming going on! Regarding time, with proper lesson planning time can be definitely adjusted. In our study, only the must know topics were covered in the class. This way time does not become an hindrance to carry out any activities. Further we are handling adult learners and one need not have to teach everything. Few things have to be left for students to learn on their own. If find difficulty in understanding on their own, they can always seek the help of faculty. And coming to the content or portion to be covered using interactive learning is a difficult task is the general notion

prevalent among many. Yes it is justified, but again stress should be given to teach must know content only. And the faculty in-charge could complete all the core chapters well in time. Time has changed to customize our classes according to the learning outcomes of the students. Continuous class for 60 min or more is now a thing of past. Research findings suggest that student concentration during lectures begins to decline after 10-15 minutes<sup>(14)</sup>. So it becomes important to hold the attention of students spaced over a span of 45-60 min. This can be well achieved by giving breaks or pauses. The pause or break can be utilized to relax or the students can use it to jot down the points they have missed while taking notes or even they can discuss anything that they have not understood with their peers. The multiple concepts, methods & pedagogies associated with active learning, along with newly emerging technologies can lead today's learners to apply tools and knowledge in new domains and different situations, but only if we are willing to rethink the how, what, where and when of learning<sup>(15)</sup>.

**Hurdles faced:**

1. All the students did not participate actively but they needed constant encouragement. So the faculty had to spend more time with some of the students.
2. For each class a lot of planning had to be done to carry out the activities.
3. Objections from the other faculty for changing the trend.

**Limitations:**

1. The level of understanding of the subject by the students should have been assessed at the end of the term. This would have given more insight to the direction of students' learning curve.
2. Active learning methods were not applied to both the sections due to rotation of faculty.

**Conclusion:** Overall results of our study indicate that there is lecture based teaching leads to the ability to recall facts and superficial learning by the students as it stimulates only the cognitive domain. Whereas active learning or active participation of students results in higher level comprehension & fosters greater participations as well as self confidence. To conclude, active learning has more positive learning outcomes compared to traditional lecture based formats.

**Impact:**

Seeing the appreciation of students, active learning principles were continued and specifically to improve the critical thinking of students, case based approach

**Table 1 :** Perception of students on active learning methods adopted.

Sl. No.	Active Learning Method used	% of students who liked the activities
1	Discussions	89%
2	Team based approach	87%
3	Case based approach	94%
4	Think-pair-share	90%
5	Presentations	71%
6	MCQs	96%
7	Breaks	98%

to teach systemic bacteriology for the subsequent batch was taken up in (2012) and again in the next term while teaching immunology, posters were presented by the students (2013). Thus the study started in 2011, served as a stimulant to continue transforming the dynamics of lecture based classes.

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# Under the microscope : Assessment of microscope handling skills among pathology students.

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## Abstract

**Background :** Proper use and handling of microscope and methodical focusing of peripheral smear, is one of the most needed skills in the laboratory. Literature search reveals that there are scarce studies published on the skills of handling microscope by medical students.

**Aim :** To assess the psychomotor skill of II MBBS students in focusing a given stained peripheral smear under the microscope.

**Methods :** Students were instructed to focus the peripheral smear under the oil immersion. Assessment was based on observation & scoring using a pre-validated checklist provided to the assessors.

**Results:** Average score of students was 2.43 out of 3. Boys had somewhat better handling skills than girls. The average score of boys were 2.48 and girls were 2.38.

**Conclusions:** Students need to be emphasized about the importance of methodical focusing of slides for better visualization of the smear which is the key for proper interpretation when combined with the cognitive (knowledge) domain.

**Key words:** proper handling of microscopes, microscope safety, focusing peripheral smear.

## Introduction

Examination of the peripheral smear is a part of the mandatory exercise performed by II MBBS students in their routine formative and summative practical exams. Observation of the peripheral smear under the microscope is a skill and we often encounter panicky students who land up breaking the slide, adding to their agony and confusion during exams. Proper use and handling of microscope and methodical focusing of peripheral smear under oil immersion is taught to medical students in their first year physiology practicals. One of the most needed skills in the laboratory is developing effective microscope using.<sup>1</sup> It is not only important from students perspective, but is also required for maintenance & safety of the microscopes, which is one of the costly equipment in the laboratory. Literature search reveals that there are scarce studies published on the skills of handling microscope by medical students.

The present study was undertaken to assess the psychomotor skill of II MBBS students in focusing a given stained peripheral smear under the microscope

as peripheral smear reporting is a compulsory exercise for second MBBS students in their practical examination.

## Methodology

A batch of 98 students of second year MBBS, were explained about the examination pattern. Students were not compelled to participate. 81 students who were willing were included in the study after their consent. The students chosen for the study, were given instruction about the procedure, demonstrated and had hands on experience before taking up the study. This exercise was conducted in batches over a period of four days. Twenty students were assessed on each day. One batch had 21 students. Each student was provided with a monocular microscope with inbuilt illumination system, oil and stained peripheral smear. Students were instructed to focus the peripheral smear under the oil immersion. The time allotted to perform this skill was four minutes. Each student was observed by an assessor and scored using a pre-validated checklist, which was validated by pathology postgraduates and undergraduate students other than

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Table-I: Performance of students based on observation by using checklist

Observations	Identifies the side of the slide containing the smear	Places the slide correctly on the stage of the microscope	Focusses the slide first in low magnification	Uses oil immersion for identifying the smear	Uses fine and coarse adjustment to focus the smear
No of students(n=81)	77(95.06%)	81 (100%)	20 (24.69%)	72 (88.88%)	73 (90.12%)

participants for clarity, content and relevance. The student was observed for performing the following five steps and scores allotted were as given in the parenthesis.

The student

Check List :	Scores
1. Identifies the side of slide containing the smear.	(0.5)
2. Places the slide correctly on the stage of the microscope.	(0.5)
3. Focusses the slide first in low magnification.	(0.5)
4. Adds a drop of oil on the smear and uses oil immersion for identifying the smear.	(0.5)
5. Uses fine/ coarse adjustment to focus the slide	(1)

### Results :

Of the 81 (82.65%) students who participated in the study, 40 (49.38%) were boys and 41 (50.61%) were girls.

Table - I :

Seventy seven students (95.06%) were able to identify the smeared side of the slide correctly. All the 81 students (100%) could place the slide correctly on the microscope stage. Only 20 students (24.69%) focused the slide first in low magnification and then in higher magnification. Seventy two students (88.88%) used oil immersion for identifying the smear and 73 students (90.12%) used fine adjustment to focus the smear.

Table II: The mean scores of boys and girls:

Scores obtained	3	2.5	2	1.5	1
Boys	6	27	4	4	
Girls	6	28	2	3	1
Total (n=81)	12(14.81%)	55(67.90%)	6(7.40%)	7(8.64%)	1(1.23%)

Scores of students ranged from 1 to 3. Students who secured pass scores of  $\geq 2$  were considered as efficient in handling microscopes. Maximum score of 3 was obtained by 12 (14.81%) students, and minimum score of 1 was obtained by one (1.23%) student. Score of 2 were obtained by 37(45.67 %) boys and 36 (44.44%) girls.

### Discussion

Skill is proficiency, facility or dexterity that is developed through training or experience. Procedural skill requires practice. The fundamental skill that II MBBS students need to acquire is the effective use of microscope. Most students know to place the slide correctly on the microscope stage. However, some students err in identifying the correct side to be focused. Total mean score of all students was 2.43 and for all students to improve their skills and reach the level of 3(100%) perfection, much more practice is essential, as goes the quote "Practice makes the man perfect." Department of Physiology, Pathology and Microbiology practical laboratories provide opportunity and motivation for students to develop skills for proper use of microscope. One way of teaching skills, suggested by Rodney Peyton of the Royal College of surgeons, uses four steps:

- 1) Demonstration: Trainer demonstrates at Normal speed without commentary.
- 2) Deconstruction: Trainer demonstrates while describing steps.
- 3) Comprehension: Trainer demonstrates while learner describes steps.
- 4) Performance: Learner demonstrates while learner describes steps.

This four step approach ensures that the teacher breaks the process into manageable steps, asks the learner to vocalize the steps, and provides repetition to reinforce the learning and correct mistakes.<sup>7</sup>

As a general rule, it is always necessary to start and end the slide observation with low magnification as it is easiest to focus on a low power objective. Also since it is the shortest objective lens, there is less chance of scratching the lens when placing and removing the slide. Once focused in low power objective, switch over to the higher power objectives (40X, 100X etc). For 10X, coarse adjustment can be used to focus. For 40X, only fine adjustment knob must be used to focus, as the slide is close to the lens. Before observation under 100X (oil immersion) smear is observed first under low magnification, as it gives an idea about the distribution of RBCs and WBCs in the slide and the quality of the staining. Then the smear is observed under higher magnification and oil immersion.<sup>3,4</sup>

One must take care to see that oil does not touch the high power objective, as it is one of the common problems encountered which spoils the high power objective. The condenser is generally lowered for low power examination and raised for high power and oil immersion observation.

Care must be taken not to cause physical trauma to the objective lens as it leaves undesirable marks on the lens and damages it. After the observation is completed, the objective is turned to low power and the slide is removed. The lens is cleaned with a lens paper only. The lights must be turned off when not using the microscope and kept covered.<sup>5,6,7,8</sup> As microscopes are expensive scientific instruments, handling them properly and carefully will make them last for many years.<sup>9,10</sup>

Since this study was conducted on a small group of students, the same cannot be extrapolated to all the students. Hence larger groups may be taken up for similar studies in future.

### Conclusion:

No one becomes proficient at driving a car without practice and similarly, we should not expect students to be proficient at any procedural skills without

adequate practice. In the present study, only 14.8% students scored 100% and were considered to have the required skill of focusing a peripheral smear. Other students require much more practice. Students need to be emphasized about the importance of methodical focusing of slides for better visualization of the smear which is the key for proper interpretation when combined with the cognitive (knowledge) domain.

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# Structured Oral Examination: From Subjectivity to Objectivity - An experience in Community Medicine.

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## Abstract

**Background :** Oral examination or viva-voce is used mainly to test the cognitive domain and is conducted with the aim of evaluating the qualities like depth of knowledge, ability to discuss and defend ones decision, attitudes, alertness, ability to perform under stress and professional competence. The Conventional Viva-voce examination (CVE) is fraught with subjectivity and has been found to have poor validity, reliability and objectivity.

**Aim :** To study the opinion of the medical students regarding the new Structured Viva-voce Examination (SVE) compared to Conventional Viva-voce Examination (CVE).

## Methodology:

An objective viva system was devised after peer consultation and review and approval of the head of the department. The students were explained the system and consent was obtained. The feedback obtained from students was analysed and tabulated.

## Results & Conclusion:

It was noted that 61 ( 87%) of the 69 students preferred the Structured Viva-voce Examination (SVE) form of Oral evaluation over the Conventional Viva-voce Examination (CVE) and mentioned that given an option they would choose to be evaluated by the SVE

**Key words:** Conventional oral viva, Structured oral viva, examination.

## Introduction :

Evaluation is the process of determining whether pre determined educational objectives have been achieved. In the present pattern of Graduate Medical Examination a student is evaluated through Theory examination, Practical/Clinical Examination, Internal Assessment and viva-voce Examination<sup>1</sup>.

Oral examination or viva-voce is used mainly to test the cognitive domain and is conducted with the aim of evaluating the qualities like depth of knowledge, ability to discuss and defend ones decision, attitudes, alertness, ability to perform under stress and professional competence<sup>2</sup>.

The Conventional Viva-voce examination (CVE) is fraught with subjectivity and has been found to have poor validity, reliability and objectivity<sup>3</sup>. Hence an exercise during formative assessment oral examination in the subject of Community Medicine was carried out with the aim of

- 1) Introducing objectivity into the Conventional Viva-voce Examination
- 2) bringing uniformity in the system of evaluation by Oral examination
- 3) Minimizing the component of subjective bias, if any

## Methodology:

A Structured Viva-voce Examination (SVE) through the use of card system for the viva-voce was designed for the sixth semester term ending examinations for students.

**Table 1:** Choice of type of Oral Examination by students

Choice of Oral Examination	No.	%
Structured viva-voce	61	87.10
Conventional viva-voce	09	12.90
Total	70	100.00

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Based on the syllabus and after due weightage to the various topics as per the curriculum prescribed by the Medical Council of India, questions were framed under ten topics. The questions were developed with graded levels of difficulty for different topics of the examination. Topics were categorized as major and minor based on its public health importance. The questions were subjected to peer review and finalized with approval of head of the department. Cards were designed with questions written on them.

The students were briefed about the system prior to the examination and consent was obtained. The viva was conducted by two faculty members. Each faculty dealt with five topics. At the viva 10 sets of cards were laid out on the table. Each set had two subsets a) direct questions b) applied questions.

The student began from any of the major categories and randomly chose a fixed number of cards from each topic sequentially and attempted to answer the same. Depending on the initial response of the student, he/she was encouraged to respond to questions of lower or higher level of difficulty as the case maybe so as to assess the level of students knowledge. Also a mix of direct questions and applied questions from the two subsets was used.

In case the student failed to answer any question totally, he/she was allowed one to two attempts to select other cards.

On an average 3-5 cards were chosen from major important topics and 2-3 from minor topics. A SVE scoring sheet was prepared for marking which included the categories and 5 columns next to each

category A tick was marked in the corresponding column indicating correct answer.

Each tick corresponded to one fourth mark for direct questions and half a mark for applied questions. Totaling of scores for each topic and grand total was calculated later.

A feedback on their experience of the SVE was obtained from the 70 students through an anonymous questionnaire after two days.

**Results:**

The data obtained from the questionnaire filled by the students was analyzed and tabulated. One form was incomplete hence only partial data was available.

It was noted that 61 ( 87%) of the 69 students preferred the SVE form of Oral evaluation over the CVE and mentioned that given an option they would choose to evaluated by the SVE. (Table 1)

The most common reason cited for the preference of SVE by 58 (85%) students was that it offered the student an opportunity to be evaluated on all the topics. 52 (75%) of the students expressed confidence in elimination of subjective bias by the SVE system. Nine students did acknowledge the advantages of SVE but still opted for CVE if given a choice. (Table 2)

Overall the students opined that they found the SVE system was student friendly and thus helped them perform better.

Commenting on the CVE, 52 (75%) of the students felt that the examiner can be moody while 46 (67%) of the students expressed that examiners tend to skip some topics altogether especially for the later students. (Table 3) The other opinions on SVE and CVE have been depicted in the respective tables.

**Table 2:** Students responses to Structured Viva-voce examination (SVE).

Sl	Statements	No	%
1	Covers all topics, hence comprehensive evaluation	58	84.05
2	Eliminates subjective bias	52	75.36
3	Minimizes chances of repetitive questions for subsequent students	36	52.17
4	Helps to focus on one topic at a time	32	46.37
5	Students get more time to think	27	39.13
6	Helps student perform better	26	37.68
7	Is student friendly	22	31.88
8	Helps maintain chain of thought because of sequential questions	16	23.17

**Table 3:** Students perception of Conventional Viva-voce examination (CVE).

Sl	Statements	No	%
1	Examiners can be moody affecting performance	52	75.36
2	Examiners tend to skip some topics, hence incomplete	46	66.66
3	Tendency to be biased	37	53.62
4	Focus too much on one topic especially of their interest	37	53.62
5	Proceed haphazardly	31	44.92
6	Questions are predictable	26	37.67

### **Discussion and conclusion:**

Though Graduate Medical Regulations 1997 have streamlined medical education in the country the element of subjectivity in the evaluation process was not addressed. The MCI task force in its recommended curriculum for MBBS has emphasized the need for introducing structured viva-voce examinations for all subjects so as to have objectivity in the evaluation process.

In viva-voce examination there is bound to be subjectivity and a likelihood of judgment of examiners being influenced by various factors. To overcome these factors examinations too can be standardized

and structured. In that case, first and foremost the examiner has to have the openness to re look into the CVE and accept that there is a need for introducing objectivity into the system and be willing to work towards standardization of the system thus providing the student a fair chance and effective form of evaluation through Oral examination.

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# Student's Perception on Objective Structured Practical Examination in Pathology

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## Abstract

**Background:** OSPE (Objective structured practical examination) which is the modification of OSCE (objective structured clinical examination) has been widely used in the assessment of student's practical performance.

**Aim :** To evaluate student's feedback about OSPE as an assessment tool for their Laboratory exercise.

**Methodology:** OSPE module was introduced for eighty one undergraduate medical students during the first half of their second MBBS course. Student's perception towards OSPE was assessed by means of their response to standard questionnaire.

**Results:** OSPE has been accepted by 82% of medical student's as a fair assessment tool, which covered a wide range of knowledge, minimized the chance of failing and highlighted area of weakness. Going through OSPE was a useful practical experience for medical students. However, 31% of them felt that OSPE was stressful and time allotted for each station to be inadequate.

**Conclusion:** The feedback received regarding this evaluation tool provides evidence that OSPE is an acceptable, useful assessment tool for Practical skills. Such feedback is considered valuable for further development and enhancement of OSPE.

**Key words:** OSPE, Assessment tool, Practical skills, Student's feedback

## Introduction

Assessment drives learning. In spite of undergraduate medical education undergoing extensive reevaluation and faculty being trained in various methods of assessing the students, new evaluation system like OSCE/OSPE are yet to be introduced for summative assessment. This is essential as medical students are assessed for their knowledge, comprehension, psychomotor skills and ability to communicate.<sup>1,2</sup>

OSPE (Objective structured practical examination) is the modification of OSCE (objective structured clinical examination) for evaluating practical skills in basic science. Traditional examination overlooks the demonstration of individual competencies and the scoring system mainly reflects the global performance of the students. OSPE has been found to be objective, valid, and reliable tool for assessment and eliminates examiner bias.<sup>3</sup>

OSPE examination consists of about 15-20 stations.

Each station is designed to test a component of experimental competence. At "procedure stations" students are given tasks to perform on subjects or on instruments only. At all such stations there are observers with agreed check lists to mark the student's performance. At other stations called "response stations", students write the answers of the objective type questions or interpret data or record their findings of the previous procedure stations

The present study was undertaken to determine the student perception and satisfaction regarding OSPE as a method of assessment of laboratory exercise in pathology

## Methodology

The Present study was undertaken in the department of pathology at S.S. Institute Of Medical Science and Research Centre. OSPE module was introduced for eighty one undergraduate medical students during the first half of their second MBBS course.

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During the OSPE, students were made to rotate through 14 stations, of which 8 stations were procedural stations to test the skills that students had to perform before the examiner. At all procedure stations there were observers with agreed check lists to score the student's performance. 6 stations were response or non-observed stations composed of questions that tested their cognitive domain. 81 students were divided in to four groups. Seven rest stations were kept to accommodate 21 students. Students were given four minutes at each stations. Examination was conducted in four sessions with alternative 20 and 21 students in each session of 80minutes duration on two consecutive days with two sessions on each day.

In the present study students perception towards OSPE was assessed by means of their response to standard questionnaire so that its value as an assessment tool can be evaluated. Students were instructed to indicate their opinion by ticking one of the three alternatives viz., agree, can't say and disagree (Table 1).

Questionnaire	Agree	Can't say	Disagree
Exam process is fair	82%	16%	02%
Exam is well structured	62%	32%	06%
Covers appropriate knowledge area	59%	37%	04%
Assessed relevant practical skills	74%	21%	05%
It was stressful	31%	33%	36%
It is less useful than conventional exam	17%	28%	55%
Decreases the chances of failing	42%	43%	15%
Highlighted the area of weakness	72%	23%	05%
Need more time at each station	61%	22%	17%
Aware of level of information asked in OSPE	47%	44%	09%

**Table 1: show student's perception regarding OSPE**

**Results**

OSPE module was introduced for eighty one undergraduate medical students during the first half of their second MBBS course. Forty students (49.4%) were boys and 41 students (50.6%) were girls. Table 1 shows student's perception regarding OSPE.

Eighty one percent of students felt OSPE as an evaluation tool for the practical exercise is fair and

62% of students perceived it as well structured practical examination pattern.

Fifty nine percent opined that structured pattern of evaluation covers the appropriate cognitive domain in assessing the knowledge and comprehension. 74% felt relevant psychomotor skills were assessed using agreed check list.

Thirty six percent of students perceived OSPE to be less stressful and 55% felt it to be useful than the conventional examination pattern. 42% opined that OSPE decreases the chance of failing in the exam and 72% felt it highlighted the area of weakness.

Sixty one percent of the students felt that the time given was too short especially for observed stations and 47% felt they could comprehend the OSCE pattern of examination in comparison to traditional method.

**DISCUSSION**

As is your pathology so is your medicine as said by William Osler Pathology forms the basis of medicine and prepares students for clinical practice. The conventional practical examination is beset with several problems. The final score indicating overall performance gives no significant feedback to the candidate and are not based on demonstration of individual competencies.<sup>4,5,6</sup>

Objective structured practical examination is one of the new pattern of examination system designed to make assessment objective, valid and reliable. Over the years, experience has led to the use of OSPE not merely as an evaluation tool and also method of assessment in the international medical school. This has largely been attributable to the feedback that OSPE gives both to students and teachers.<sup>1</sup>

OSPE model in pathology was introduced for eighty one undergraduate medical students of second MBBS after briefing about the new system of examination. Feedback given by students was constructive which are presented in Table 1. OSPE was seen as a positive and a useful practical experience by most students (82%). We find this congruent with other study in which students perceived OSPE as a favorable experience that should be repeated regularly.<sup>1</sup>

Feedback from students (74%) suggests that OSPE is an objective tool in evaluating practical skills. Students perceived OSPE scores as a true measure for essential practical skills being evaluated, standardized and not affected by student personality. Standard to

check the competencies are made earlier and agreed check lists are used for marking and evaluation<sup>4,7</sup>.

Students provided positive feedback about the quality of OSPE performance in terms of the instructions of the exam (62%) and individual competencies being assessed (72%). Examiner variability can be reduced by adopting structured practical examination. In addition to the above points, OSPE ensures integration of teaching and evaluation.<sup>7</sup>

The evaluation of OSPE by students highlighted some areas that need to be enhanced in future, such as inadequate time at procedure stations. OSPE was perceived as a stressful experience by 31% of students. This perception could be due to the fact that this was the first time that OSPE has been implemented in Pathology. Hence, it was a new experience for all medical students which made them anxious about it.

From the students' point of view, OSPE was acceptable and generated wide appreciation. Feedback from the students indicated that students were in favor of OSPE. The feedback provided scope for improvement and refining the method. It serves as a tool for testing multiple dimensions of student performance because it tests both skills as in

performance exercises and knowledge. Present study was helpful in sensitizing the student towards OSPE.

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# Significance of types of questionnaires in assessing knowledge, attitude & practice of organ donation

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## Abstract

### Background :

Questionnaires are a very important part of research. Forming a questionnaire that gets us the exact information is quintessential. Questionnaires using both structured and unstructured questions appropriately will be able to assess both the particulars and the perceptions of the respondents. This paper tries to quantify the effect of structured and unstructured questions on various types of questions.

**Aim :** To assess the of 'Knowledge, Attitude & Practice' regarding organ donation among college students using structured and unstructured questionnaires.

**Methodology :** A total of 97 medical students participated where structured and unstructured questions were administered results analysed using Z/t/chi test.

**Results and Conclusion :** Knowledge of various aspects on organ donation among the medical students was low (33.1%) with mean score of 12.2+/-2.structured questions yielded more and specific responses although unstructured responses had an advantage of allowing participants to add their own inputs.

## Introduction

Questionnaires are a very important part of research, especially in descriptive studies and many studies do have a descriptive component in them<sup>1</sup>.

Forming a questionnaire that gets us the exact information we need while avoiding unnecessary questions is quintessential. The questions should not be ambiguous and subject to interpretation.

Questionnaires can be broadly be classified into structured and unstructured questionnaires<sup>2</sup>.

The best example of a structured questionnaire is the multiple choice questions used in various entrance exams. In a structured questionnaire, there are a limited number of specific responses.

The best example of an unstructured questionnaire is the term end exam question papers. In an unstructured questionnaire, the respondent has the flexibility to answer the question according to his perception.

Both types of questionnaires have their own advantages and disadvantages. Questionnaires using both structured and unstructured questions appropriately will be able to assess both the particulars and the perceptions of the respondents. Such questionnaires are called 'Semi structured questionnaires'<sup>3</sup>.

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This paper tries to quantify the effect of structured and unstructured questions on various types of questions.

### Objectives

- 1) To assess the of 'Knowledge, Attitude & Practice' regarding organ donation among college students using structured and unstructured questionnaires
- 2) To compare the differences in the pattern of answers to various questions in structured and unstructured questionnaires

### Methodology

This study was conducted on first year medical college students in Karnataka. Permission of the administration was obtained and the students who gave informed consent were included in the study.

The students were first given an unstructured questionnaire regarding organ donation like blood, eye and kidney. After they completed it, they were immediately given the structured questionnaire. Data was entered using Microsoft excel software. Descriptive analysis was done using proportions. The differences in responses to the 2 types of questionnaires have been described and t test has been used to test the significance of quantitative difference.

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**Table 1: KAP regarding blood donation using different types of questionnaires**

Blood donation	Unstructured Questionnaire		Structured Questionnaire			
Heard	Yes	97 (100%)	Yes	97 (100%)		
Source of information	School/College	44 (%)	Curriculum	15 (%)		
	TV	35 (%)	TV ad	29 (%)		
	Doctor/Hospital	26 (%)	TV program	08 (%)		
	News paper	17 (%)	Teachers	21 (%)		
	Friends	15 (%)	Friends	14 (%)		
	Posters	08 (%)	News paper	17 (%)		
			Movie stars	24 (%)		
Donated blood	Yes	02 (%)	Yes	02 (%)		
	No	95 (%)	No	95 (%)		
Reason for donating	Family / friend	01 (%)	Family / friend	01 (%)		
			Request	01 (%)		
			Blood donation Camp	Nil		
			Advertisement	Nil		
Reason for not donating	Fear	23 (%)	Do not have enough blood	19 (%)		
	Become weak	19 (%)	I may get disease	05 (%)		
	Anaemic	08 (%)	Afraid of needle pricks	21 (%)		
	Female	04 (%)	I may become weak	18 (%)		
	Not answered	43 (%)	Why unnecessary trouble	11 (%)		
			My family may object	04 (%)		
			My religion forbids	Nil		
			Others	08 (%)		
			Not answered	27 (%)		
Place of donation	Blood bank	97 (100%)	Authorized blood bank	97 (100%)		
	Donation Camp	11 (%)	Blood Donation camp	11 (%)		
Who needs donated blood			Any hospital	18		
			Government hospital	09		
			Accident / Injury	37 (%)	Accident	46 (%)
			Surgery	29 (%)	Burns	18 (%)
			Disease	27 (%)	Injury	31 (%)
			Weakness	19 (%)	Surgery	28 (%)
			Anaemia	13 (%)	Cancer	13 (%)
			Pregnancy	11 (%)	Pregnancy	16 (%)
			Blood loss	09 (%)	Fever	07 (%)
			Ambiguous	28 (%)	Jaundice	06 (%)
Who can donate blood			Dialysis	03		
			Others	Nil		
			Healthy	31 (%)	Males	97 (100%)
			>18yrs	26 (%)	Females	74 (%)
			Disease free	26 (%)	12-18yrs	05 (%)
			>45kgs	12 (%)	18-45yrs	97 (%)
			Various ages	29 (%)	45-60yrs	91 (%)
					60-70yrs	42 (%)
					35-45kg	37 (%)
					45-65kg	95 (%)
		65-100kg	83 (%)			

			Hb% >10	02 (%)
			Hb% >12.5	76 (%)
			Hb% >14	19 (%)
			SBP 80-120 mmHg	12 (%)
			SBP 100-140 mmHg	28 (%)
			SBP 120-160 mmHg	56 (%)
			DBP 60-80 mmHg	07 (%)
			DBP 70-90 mmHg	16 (%)
			DBP 80-100 mmHg	44 (%)
Can you sell blood	Yes	33 (%)	Yes	34 (%)
	No	47 (%)	No	48 (%)
Can you buy blood	Yes	16 (%)	Yes	14 (%)
	No	29 (%)	No	37 (%)
How will blood donation affect your body	Ambiguous	48 (%)	Reduces cholesterol	46 (%)
	Better health	19 (%)	Prevents heart attack	22 (%)
	New RBC	17 (%)	Does not cause any disease	65 (%)
	No change	10 (%)		
Do you know a donor	Yes	62 (%)	Yes	62 (%)
	No	35 (%)	No	35 (%)
Do you recommend blood donation	Yes	81 (%)	Yes	89 (%)
	No	nil	No	nil

**Table 2: KAP regarding Eye donation using different types of questionnaires**

Eye donation	Unstructured Questionnaire		Structured Questionnaire	
Heard Source of information	Yes	97 (100%)	Yes	97 (100%)
	TV	51 (%)	Curriculum	15 (%)
	School/College	34 (%)	TV ad	29 (%)
	Doctor/Hospital	18 (%)	TV program	08 (%)
	News paper	10 (%)	Teachers	32 (%)
			Friends	15 (%)
			News paper	13 (%)
			Movie stars	12 (%)
			Others	32 (%)
Place of donation	Eye bank	38 (%)	Eye bank	40 (%)
	Hospital	35 (%)	Hospital	31 (%)
Who needs donated eye	Blind	62 (%)		
	Ambiguous	16 (%)		
Who can donate eyes	After death	37 (%)	After death	48 (%)
	Anyone/healthy	13 (%)	healthy living person	01 (%)
	Ambiguous	20 (%)		
Can you sell eye	Yes	15 (%)	Yes	14 (%)
	No	49 (%)	No	49 (%)
Can you buy eye	Yes	21 (%)	Yes	20 (%)
	No	32 (%)	No	33 (%)
Do you know a donor	Yes	10 (%)	Yes	10 (%)
	No	79 (%)	No	79 (%)
Do you recommend eye donation	Yes	76 (%)	Yes	84 (%)
	No	nil	No	nil

Table 3: KAP regarding kidney donation using different types of questionnaires

Kidney donation	Unstructured Questionnaire		Structured Questionnaire	
Heard Source of information	Yes	96 (%)	Yes	97 (100%)
	TV	81 (%)	Curriculum	02 (%)
	School/College	18 (%)	TV ad	02 (%)
	Doctor/Hospital	08 (%)	TV program	73 (%)
Who needs donated kidney	Kidney failure Ambiguous	42 (%) 26 (%)	Teachers	04 (%)
			Friends	07 (%)
			News paper	28 (%)
			Movie stars	Nil
			Others	09 (%)
Who can donate kidney	Healthy Ambiguous	63 (%) 09 (%)	Any healthy person (AHP)	46 (%)
			AHP with similar genes	27 (%)
			Kin with similar genes	54
Can you sell kidney	Yes No	35 (%) 43 (%)	Any family member	19
			Other	Nil
Can you buy kidney	Yes No	21 (%) 32 (%)	Yes	33 (%)
			No	49 (%)
Do you know a donor	Yes No	01 (%) 47 (%)	Yes	22 (%)
			No	32 (%)
Do you recommend kidney donation	Yes No	65 (%) 02 (%)	Yes	01 (%)
			No	85 (%)
			Yes	67 (%)
			No	Nil

## Results

A total of 97 medical college students belonging to first term consented to participate in the study. Of these, 49 were girls and 47 were boys. 78 were urban residents and 19 were rural residents. 6 of them had Below Poverty Line cards. Most of them were aged 17 years.

All the students had heard of blood donation. The most common sources of information were school/college followed by TV and doctor/hospital. While the responses for the source of information could be grouped into a few responses in the open ended question, the responses in the structured questionnaire was more specific like if in college whether it was in curriculum, by teachers, etc. or if was TV whether it was advertisement or program etc.

Only 2 had donated blood, one of them for a family / friend. With regard to the reason for not donating blood, the response groups were few in unstructured and were more specific in structured questionnaire (table 1). The number of respondents who had not answered, fell from 44.3% in unstructured to 27.8% in structured questionnaire. This decrease was statistically significant ( $p < 0.05$ ).

All students knew about blood bank and some knew

about blood donation camps. But when the options were more (in the structured questionnaire), more number of responses could be elicited. This increase is statistically significant ( $p < 0.05$ ).

Responses regarding the uses of donated blood were similar in both questionnaires, many citing accidents and surgery. 27.8% was ambiguous response of 'diseased person', while none responded to "others specify" in the structured questionnaire. The difference is statistically significant ( $p < 0.01$ ). We could not include all the uses of donated blood in the structured questionnaire, which is a draw back in structured questionnaire.

Responses were very specific in the structured questionnaire with regard to knowledge about eligible person for donating blood. As multiple answers were correct, many answers were chosen. "This choosing pattern was because of too many choices were there leading to inattention." This information was picked up during the informal discussion with students after they had submitted the questionnaires.

Many thought that one can sell blood and few felt that one can buy blood. The difference to this 'yes' or 'no' question in the 2 types of questionnaires was not significant ( $p > 0.05$ ).

In the unstructured questionnaire, many ambiguous answers were given for the effects of blood donation to the donors' body showing the amount of ignorance regarding this issue. This information could not be picked up in the structured questionnaire where many responded that it did not cause any disease.

Two thirds of the students knew a donor. Blood donation was recommended by 83.5% students in the unstructured questionnaire and 91.8% in the structured questionnaire. The difference was significant ( $p < 0.05$ ) though it was a 'yes' or 'no' question.

All students had heard of eye donation. The source of information was more specific in the structured questionnaire. One third opted the 'others' option, which showed that the structured questionnaire was not complete.

Some specified eye bank while some thought hospitals accept eye donation. Some did not know.

With regard to 'who can donate eyes?', ambiguous answers decreased significantly in the structured questionnaire so did the number of responses.

Few thought that eyes can be bought and sold while very few knew a donor and most recommended eye donation. The difference to these 'yes' or 'no' questions in the 2 types of questionnaires was not significant ( $p > 0.05$ ).

Almost all students had heard of kidney donation. Responses, with regard to the source of information and 'who can donate eyes?' were more specific in the structured questionnaire.

About one third thought that kidneys can be bought and sold. Only 1 respondent knew a donor and two thirds recommended kidney donation.

In response to their knowledge on donation of other organs, 47 (%) wrote heart, 14 (%) wrote liver and 8 (%) wrote that any organ can be donated.

In response to their feeling regarding organ donation, 31 (%) felt that it was life saving, 27 (%) felt that it would be very helpful and 11 (%) felt that it would reduce suffering of the recipient.

Regarding organ donation after death, 72 (%) felt that it should be done, 58 (%) felt that the recipients would be grateful and 43 (%) felt that it makes them feel good that they are helping someone even after death

## Discussion

All first year MBBS students had heard about blood<sup>4,5,6</sup> and eye donation while 1% had not heard about kidney

donation. Most had heard from television and school/college. Only 2% had donated blood. Many were afraid of blood donation due to fear of needle prick, ignorance and false beliefs. Most knew the use of donated blood, eye and kidney. Many were ignorant about the criteria to be met by the donor for donating blood, eye and kidney. Many thought that organs can be bought and sold. While a few thought that blood donation would make one weak, many were of the opinion that it would cause no harm. Many knew blood donors while only a few knew eye donors. Only 1% knew kidney donor. Many expressed their recommendation of blood donation and organ donation, especially after death.

Majority of students never donated blood. The various reasons stated were ignorance, fear of sickness / complications<sup>5</sup>

The proportion of students having adequate knowledge<sup>6</sup> was 33.1% with the mean score of  $12.2 \pm 2$ . Only 13.9% had ever donated blood and out of which, 64.8% of donors were first timers.

A majority, were unaware of the age group permitted to donate blood. 29.5% of nursing staff were not aware of blood donation interval of 3 months<sup>6</sup>. 38.6% of nurses were not informed about the minimum weight required for blood donation. 43.9% of the nurses had incomplete knowledge of the donor deferral criteria in the blood bank with respect to certain diseases.

With regard to comparison of responses to unstructured and structured questionnaires, no significant difference was seen for dichotomous questions (Yes or No type of responses).

Structured questionnaires were very useful for getting specific responses to questions. In response to 'Source of information' while many mentioned TV in unstructured questionnaire, we were able to get specific answers whether it was advertisement or program, etc in structured questionnaire. Similar results can be seen for questions like 'Who needs blood donation' or 'Who can donate blood', where their knowledge regarding specific criteria like age, weight, Hb%, etc can be assessed. However this may also lead to more of false positive responses. Hence a combination of both can be used eg for 'Who can donate blood' we can give clues regarding the criteria like age, weight, Hb% but the respondent will have to write the criteria by him/herself. The unstructured questionnaire produces responses that we would not have been thought about in structured questionnaires.

Hence in the ideal semi structured questionnaire a last option of 'Others; specify' should be included so as not to miss out on responses due to lack of choices.

For the question 'Reason for not donating', 43% did not write any response in the unstructured questionnaire while only 27% did not write any response in the structured questionnaire. Non response to such questions may be attributed to the fact that though the respondents will know a response, they may find it difficult to articulate it in appropriate words hence leaving the question unanswered.

Some questions like 'Place of donation' though the same number of respondents have answered the question, the total number of responses is more in structured questionnaire, the respondents stop writing after one answer in unstructured questionnaire where as in a structured questionnaire multiple answers are commonly chosen.

Many ambiguous answers were found for questions like 'How will blood donation affect your body' or 'Who can donate eyes' where the respondents have understood the question incorrectly or have failed to articulate their responses appropriately. The choices in the structured questionnaire make them understand the question and they can choose the option that is nearest to their belief. An option of 'Others; specify' will help.

### Conclusion

The knowledge regarding organ donation that is

blood, eye, kidney, etc is inadequate among first year medical students. They have false beliefs regarding organ donation and the practice of blood donation is low.

Unstructured questionnaire helps us find information that we may not have considered as a possible response. Responses are more in a structured questionnaire and are also more specific. A semi structured questionnaire is ideal for KAP studies where options for own responses is present.

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# Integrated teaching - Student's Perspective

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## Abstract

**Background:** The innovative new MBBS curriculum that has been structured to facilitate horizontal and vertical integration between various disciplines bridges the gaps between theory and practical, between Hospital based Medicine and Community medicine.

**Methodology:** This was a vertical module of integrated teaching. Topic chosen was hepatitis B, students answered a pre tested questionnaire with 5 questions.

**Aim:** The topic chosen was Hepatitis B infection after a meeting with the concerned teaching faculty from Department of Pathology, Biochemistry, Microbiology, Pharmacology, Community medicine, and Medicine. **Result :** The feedback was evaluated. Factors that helped learning- Response rate was 79 %, (n=83). 78 (93.97%) students gave reasons of factors that helped them learn, 05 students ( 6.02%) said no factors helped them learn. Knowledge provided was 45 that is 54.2%, power point was 3.6%, were the main factors that helped many students learn.

**Conclusion :-** Teaching learning methods are changing, in order to make the learners learn the concepts of medicine more clearly, integrated teaching method can be incorporated on a routine facilitating better understanding. Conclusion This type of teaching would involve clinical faculty as well as basic sciences and vice versa, helps in linking the topic with what is taught earlier.

**Key words:** Integrated teaching, curriculum.

## Introduction

The innovative new MBBS curriculum that has been structured to facilitate horizontal and vertical integration between various disciplines bridges the gaps between theory and practical, between Hospital based Medicine and Community medicine.<sup>1</sup>

Integrated Teaching is an important strategy to promote meaningful learning and make it last for a longer time; integration helps to efficiently recall knowledge when required<sup>2</sup>.

Integration is most needed for basic sciences, integration for all subjects ensures continuity of learning and avoids duplication and redundancy<sup>2</sup>.

The dictionary meaning of word integrate is to form a more complete or coordinate entity often by addition or rearrangements of elements or organization of teaching matter to interrelate or unify subjects usually taught in separate departments<sup>2</sup>.

Medical council of India desires the incorporation of

integration in medical curriculum in order to provide students with holistic rather than compartmentalized learning.<sup>3</sup> Rajiv Gandhi University of health sciences curriculum proposes 30 hours of integrated teaching in the Department of Medicine<sup>3</sup>. 148 hours for II MBBS, that is 36 hours for Pathology, 36 hours for Microbiology, 10 hours for Forensic medicine, 36 hours for Pharmacology and 20 hours for community medicine.

Unless we train our students the way to learn through integrated teaching right from the beginning, it is difficult to accept it later on. The changing medical practice over years also demands that physicians are prepared to the multi disciplinary expertise for patient care thus the need for integrated teaching to be inculcated<sup>4</sup>.

## Methodology

As per MCI guidelines integrated teaching has become a part of regular teaching in the curriculum for

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MBBS students in our institute. To improve the methodology and to know the benefits and pitfalls of the same; a study on feedback evaluation of the programme was undertaken. 105 MBBS Students belonging to II phase, who attended the 5th integrated teaching, were included for the study. This was a vertical module of integrated teaching. Topic chosen was hepatitis B, students answered a pre tested questionnaire with 5 questions, concerned with areas of strength of integrated teaching, which aspects helped them learn, time management and also included open and closed ended questions.

The data from the questionnaire was compiled and analyzed based on their answers to the feedback questions in order to improve the teaching technique.

**Results:**

The topic chosen was Hepatitis B infection after a meeting with the concerned teaching faculty from Department of Pathology, Biochemistry, Microbiology, Pharmacology, Community medicine, and Medicine. The feedback was evaluated.

**Table 1: The following were the factors concluded to be the Strengths and Weakness of the teaching methodology**

2.strengths	No of students	3. weakness	No of students
Faculty who taught	29	Faculty	11
Information provided + knowledge	05 16	Exhaustive information	03
Topic chosen for this teaching	18	Topic/ Concept	03
Interest created	04	Monotonous	03
Interactive method	02	Less interest	03
Powerpoint prepared	08	Power point prepared	03
n	80	n	75

Q.1 Whether integrated teaching module was helpful. Response rate for the question was 85.7 % (n=90), 80.95% felt helpful, 3.15 % felt it to be not helpful and 16.66 % said can't say.

Q.2 and Q.3 was an open ended questions to know the Strengths and Weakness of the teaching methodology. Response rate was 78% (n=82) for Question.2 and 71.4%(n=75) for Question 3

**Q.4. Factors that helped learning**

Response rate was 79 %, (n=83), 78 (93.97%) students gave reasons of factors that helped them learn, 05 students ( 6.02%) said no factors helped them learn. Knowledge provided was 45 that is 54.2%, power point was 3.6%, were the main factors that helped many students learn. Other factors they found to be helpful were, topic chosen 10 (12%), teacher who taught 3(3.6%), interaction (3.6%), one student felt it was easy understandability when topic was integrated.

**Q.5. Attitudes of students to clarify their doubts by asking questions**

44 students (53.1%) were encouraged to ask questions, 39 students (46.9%) felt they were discouraged to ask questions.

**Discussion**

Teaching learning methods are changing, in order to make the learners learn the concepts of medicine more clearly, integrated teaching method can be incorporated on a routine instead of giving a lecture on hepatitis from etiology to prevention, we can start from brief history of a person presenting with signs and symptoms of the disease and then we can build up to teach clinical features, diagnosis and therapy, thus facilitating better understanding. The greyest zone in this integrated teaching was time management, 43% felt the duration of the teaching programme was prolonged and needed breaks. They suggested more pictures, videos, and even a tea break was needed to break the monotony. Some students have not attempted to answer all the questions. Few students felt that the topic should be announced earlier so that they would understand better.

Students felt that faculty was the weakness especially due to monotonous teaching, time management and repetition of power point slides. This can be curbed by moderator's effort in looking into these matters. Doraisamy R<sup>9</sup> in their study revealed that the average marks obtained by students after an integrated teaching approach was greater than the marks obtained by students after conventional teaching method. students trained with integrated curriculum were more accurate in diagnosis of the clinical disorders than those trained in a conventional curriculum. Integrated teaching improves the cognitive and psychomotor domains of students and creates interest in topics and eliminates that fear toward the subject. Studies done by Kate et al<sup>5</sup> show

that this teaching-learning method was welcomed with great enthusiasm both by students and faculty. This study also stresses on sensitizing the faculty (irrespective of cadre) for effective implementation of the curriculum.

### Conclusion

Students have accepted this teaching technique as this was the 5th the integrated teaching programme. This is a learning process not only to the students but also for the teaching faculty. Student's perspective has motivated the teaching faculty to conduct more integrated teaching programme on different topics. This type of teaching would involve clinical faculty as well as basic sciences and vice versa, helps in linking the topic with what is taught earlier. In order to make the integrated teaching more effective we need to develop faculty with a good knowledge about integrated teaching without which conducting an integrated teaching programme is not an easy job even though it helps students gain optimum knowledge. Teachers need to put in lot of effort to make this type of teaching successful.

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# Achieving Academic Excellence through Outcome based education - A case study

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## Abstract

**Background :** Attaining acceptable delivery performance is the most significant academic challenge faced by many universities and particularly private run institutions.

**Aim:** This project implementation is carried out using the outcome based education model. To gain an edge over competitors in an increasingly global and competitive marketplace, institutions today need to differentiate themselves not only in cost, but in the overall value of the educational programmes they offer. As customers demand more and more variety of skill driven programmes to cater to wider markets, the issue of mobility and portability becomes increasingly challenging.

**Results:** In reviewing the characteristics of outcomes-based education, there appears to be a shift towards learning rather than teaching, to providing experience rather than information. There is a move from normative, paper-based examinations towards outcomes-based assessment as reflected in national standards

**Conclusion:** This change is not only intended to meet the needs of industry more effectively, but also to create 'empowered' individuals who can take control of their own learning and their lives. As such, outcomes-based education has presented an opportunity to widen opportunities for learning and to promote equality. Using the bloom's taxonomy the outcome based education is implemented in an engineering undergraduate programme.

**Keywords :** Educational Objectives, Programme specific criteria, and Course curriculum

## Introduction

The National Board of Accreditation (NBA) has laid out guidelines for academic organizations to pursue excellence in order to get accreditation. Those guidelines are followed to define the programme outcomes and the course outcomes. This paper indicates the quantification of the programme outcome. Course outcomes are statements of what a learner is expected to know, understand and/or be able to demonstrate at the end of a period of learning. They are explicit statements about the outcomes of learning – the results of learning. They are usually defined in terms of a mixture of knowledge, skills, abilities, attitudes and understanding that an individual will attain as a result of his or her successful engagement in a particular set of higher education experiences<sup>1,2</sup>. In reality, they represent much more than this. They exemplify a particular methodological approach for the expression and description of the curriculum.

## Program Outcome(PO) :

Ability to:

- Apply knowledge of mathematics, science and engineering
- Design and conduct experiments, as well as analyze and interpret data.
- Design and improve integrated systems of people, materials, information, facilities, and technology.
- Function as a member of a multi-disciplinary team.
- Identify, formulate and solve industrial and systems engineering problems.
- Understand and respect professional and ethical responsibility.
- Communicate effectively both orally and in writing.
- Understand the impact of engineering solutions in a global and societal context.

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- i. Recognize the need for and an ability to engage in life-long learning. Industrial and system engineering throughout their professional careers.
- j. Have knowledge of contemporary issues. l. Manage Projects and Finance.
- k. Use update techniques, skills and tools of

The following table gives information about the courses offered for the programme and the outcome associated with each course. Example,

**Table 1 : Courses and their Outcomes**

Course Code	Course Name	Course Outcomes
MAT101	Engineering Mathematics –I	<ul style="list-style-type: none"> <li>· Understand polar curves and use this concept to find different parameters.</li> <li>· Using the concept of partial differentiation find the derivatives of implicit and composite functions, check the functional dependency using Jacobians, solve differential equations and extreme values of functions.</li> </ul>
PHY 101/201	Engineering Physics	<ul style="list-style-type: none"> <li>· Analyse and determine M.I. and elastic behaviour of materials.</li> <li>· Analyse and determine the wavelength of the laser.</li> <li>· Analyse and calculate the numerical aperture, number of modes and the attenuation in the optical fiber.</li> </ul>
PHYL101/201	Engineering Physics Laboratory / Tutorial	<ul style="list-style-type: none"> <li>· Analyse and determine M.I. and elastic behaviour of materials.</li> <li>· Analyse and determine the wavelength of the laser, radius of curvature of a lens</li> </ul>

**A Note on where the POs are Published and Disseminated<sup>3,4</sup>**

- The POs are published at
- Department website :
  - College website
  - Curricula books
  - Rules and Regulation books
  - ISO quality manual (e-copy)
  - Department notice boards

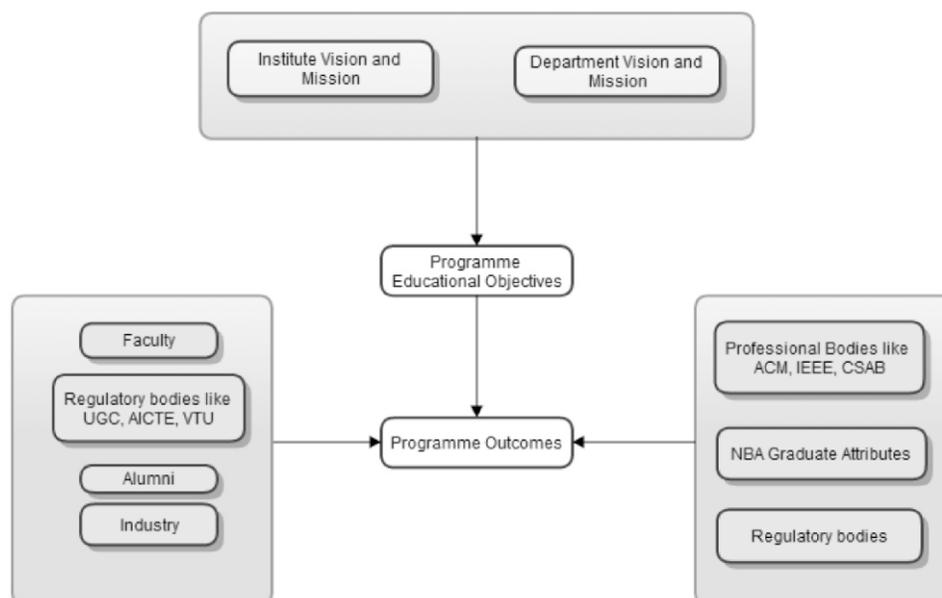
Apart from this, they are disseminated to all the stakeholders of the programs through

- Orientation programme conducted during the induction of a new academic batch.
- Awareness workshops to students and faculty periodically

**Processes Employed for Defining of the POs**

The Programme outcomes are defined taking into account the feedback received from faculty, alumni, Industry. Also the guidelines from the regulatory, professional bodies and graduate attributes in line with programme educational objectives which are in line with the mission and vision statement of the institute and the department<sup>5</sup>.

The following figure indicates the information flow.



**Fig 1: Process Employed for Defining of the POs**

**Alignment of the Defined POs to the Graduate Attributes Prescribed by the NBA****Table 2: Mapping of NBA's Graduate Attributes to Programme Outcomes (template)**

The relationship between Graduate Attribute's with the PO's is mapped & the same is represented in table 2 :

Sl. No.	Graduate Attributes	Programme Outcomes											
		a	b	c	d	e	f	g	h	i	j	k	l
1	Engineering knowledge	X	X			X							
2	Problem analysis	X	X			X							
3	Design/development of solutions			X		X							
4	Conduct investigations of complex problems					X							X
5	Modern tool usage							X				X	
6	The engineer and the society				X		X		X				
7	Environment and sustainability							X	X			X	X
8	Ethics						X	X					
9	Individual and team work				X								
10	Communication				X			X					
11	Project management and finance									X		X	X
12	Life-long learning								X		X		X

**Table 3: Correlation between the POs and the PEOs**

The Program Educational objectives and Programme outcomes are mapped in the table shown below:

Sl. No.	Programme Educational Objectives	Programme Outcomes											
		a	b	c	d	e	f	g	h	i	j	k	l
1	Apply the engineering practices to model and analyze the real life problems and interpret the results.		X			X		X					
2	Effectively design, implement, improve and manage the integrated socio-technical systems.	X		X								X	
3	Build and lead cross-functional teams, upholding the professional responsibilities & ethical values.				X		X						X
4	Engage in continuing education and life-long learning to be competitive and enterprising.								X	X	X		

**Example:****An understanding of project and finance management.**

The graduate is expected to become a team leader or project manager in three to five years after graduation. In this role he/she will be required to manage project teams, chart the activities, set goals and deadlines, allocate machine or human resources, monitor the progress and complete the project. All the while, he/she might need to make informed decisions keeping in mind the budget and business requirements specified by the client. Programme outcome (l) supports programme educational objective (3).

**Attainment of programme outcomes:**

The following table gives the list of courses of the programme along with the mapping against PO's keeping in mind the outcome for each course. The table reflects the contribution of individual courses in attainment of PO's.

**Contribution of the Course Outcomes to the POs**

Courses are mapped with PO's which are represented in the table represented Table 4 :

**Table 4: Mapping of Course Outcomes contributing to PO Attainment**

Sl. No.	Code	Course	Programme Outcomes											
			a	b	c	d	e	f	g	h	i	j	k	l
1.	MAT101	Engineering Mathematics – I	X				X			X				
2.	PHY101	Engineering Physics	X	X		X								
3.	PHYL101/201	Engineering Physics Lab	X	X		X								
4.	CV101/201	Basic Civil Engineering & Mechanics	X		X									X

**Modes of Delivery of Courses in the Attainment of the POs**

Different modes of course delivery are identified and represented in Table 5.

**Table 5: Modes of Course Delivery**

Sl. No.	Mode of Delivery	Programme Outcomes											
		a	b	c	d	e	f	g	h	i	j	k	l
1.	Lectures using chalkboard or presentations interspersed with discussions	X	X	X					X			X	X
2.	Tutorials	X		X		X						X	
3.	Demonstrations in laboratory		X					X			X	X	
4.	Practical exercises	X	X	X		X							
5.	Projects			X	X	X						X	X
6.	Industrial Training				X			X			X		
7.	Seminars							X		X	X		

**Contribution of Assessment Tools that are used to Assess the Impact of Delivery of Course towards the Attainment of Course Outcomes/Programme Outcomes**

The following methods of assessment are identified for assessing the impact of course delivery and course content<sup>2</sup>.

**1. Direct method**

- Continuous Internal Evaluation (CIE) tests<sup>7</sup>
- Semester End examinations
- Practical tests
- Project
- Seminar Presentations

**2. Indirect method**

- Employer Survey(Industry Survey)
- Alumni Survey
- Parents Survey
- Student feedback survey

**Attainment of Programme Outcomes**

Since each course is defined to address specific program outcomes, the **Direct methods** and the

**Indirect methods** of course assessment are used to map attainment of course outcomes to assess whether program outcomes are attained<sup>10-12</sup>.

The Direct methods of course assessment used are:

- CIE
- SEE

The Indirect methods of course assessment used are:

- Employer Survey(Industry Survey)
- Alumni Survey
- Parent Survey
- Student Survey

**Extent to which the Laboratory and Project Course Work are contributing towards the Attainment of each PO**

As a student progresses through the undergraduate programme, balance can be witnessed for a few courses where student is required to possess both theory as well as practical (laboratory) application knowledge and also Project exposure.

Table below gives details of the laboratory courses offered : Example

**Table 6: Laboratory work contributing towards attainment of PO's**

Sl. No.	Course Code	Lab Title	PO's											
			a	b	c	d	e	f	g	h	i	j	k	l
1	307	Process Lab	X	X	X	X								
2	308	Material Lab	X	X			X		X					
3	309	Design Lab	X	X	X		X							
4	407	Metrology Lab	X	X			X							

The following table maps the Project outcomes with the PO'. They are derived from individual projects carried out which is represented in table 7. Example

**Table 7: Mapping of project outcomes with programme outcomes**

Sl. Project Outcomes No.	PO											
	a	b	c	d	e	f	g	h	i	j	k	l
Implementation of Information Technology to improve productivity springs design			X	X								X
The process improvement was achieved by redesigning the flow of material at supplier and at the plant level			X		X					X	X	
The minimization of changeover time in the capacitor assembly line has led to productivity improvement.			X					X			X	

### Assessment Tools and Processes used for Assessing the Attainment of each PO

#### Assessment Process

Course outcomes of each course must be mapped with programme outcomes. The sample of course articulation matrix is provided below:

**Table 8: Sample for Course Articulation Matrix for Business Management**

Sl. No.	Course Outcomes	Programme Outcomes											
		a	b	c	d	e	f	g	h	i	j	k	l
1.	A understanding of business enterprises			X		X					X		
2.	To apply business systems, procedures and processes			X	X						X		
3.	To evaluate managerial roles and responsibilities			X		X						X	

#### Information on Data Collection Process

The following types of information are collected : Question papers of CIE tests, Question papers of Semester end exam, Question papers of practical tests/ quizzes, Course exit survey, Student exit survey, Employer survey, Placement records, Alumni Survey. The Data Collection was done once in 6 months.

#### Results of Evaluation of Each PO considering all the courses offered by the programme.

Below table is used to tabulate the results of direct and indirect assessments and hence to assess the attainment of program outcomes. The attainment level of a PO using direct methods is the average of the attainment levels of each course that address that PO. The attainment level of a PO using indirect methods is the average of the attainment levels of all related assessment tools. Finally the attainment level of a PO is the average of its attainment levels using direct and indirect measurements.

PO : a : Ability to apply knowledge of Mathematics, Science and Engineering :

Sl No	POs	Courses pertaining to PO	Measurement of Attainment by direct assessment method	Measurement of Attainment by indirect assessment method	Expected level of attainment
1		Courses are mentioned below in table	Avg marks of Continuous Internal Evaluation (CIE) tests, Semester End examinations, Practical tests, Project & Seminar Presentations.	By Industry, Alumni, Parents & Students	By experience and earlier records
2	<b>PO: a</b>		<b>46.41</b>	<b>40.00</b>	<b>65</b>

The courses of the program listed in table below are used to assess the attainment level of **PO<sup>3,4</sup>: a**

Sl. No	Course Code	Course Name	Average Attainment Level	
			2007-2011	2008-2012
1	MAT 101	Engineering Mathematics-I	48.75	41.53
2	PHY 101/201	Engineering Physics	33.54	30.93
3	PHYL101/201	Engineering Physics Lab	56.04	-
4	CV 101/201	Basic Civil Engineering & Mechanics	43.13	40.89
5	EE 101/201	Basic Electrical Engineering	41.04	38.98
6	CS 101/201	Fundamentals of Computing	48.33	28.6
8	ME 102/202	Computer Aided Engineering Drawing	66.46	54.24
9	MAT 201	Engineering Mathematics-II	41.67	48.09
10	CHY 101/201	Engineering Chemistry	50.21	41.74
11	CHYL 101/201	Engineering Chemistry Lab	82.5	-
12	ME 101/201	Elements of Mechanical Engineering	50.42	42.37
13	EC 101/201	Basic Electronics	43.33	27.75
Average attainment level- Direct method			<b>47.96</b>	<b>44.24</b>
1. Industry			-	41.50
2. Alumni			-	41.30
3. Parents			-	41.70
4. Students			-	35.50
Average attainment level- Indirect method			-	<b>40.00</b>

Example: Illustration of the calculation for the average attainment level is shown in table below for course MAT-101(Engineering Mathematics-I):

Grade	S	A	B	C	D	E	F
Weightage	0.4	0.25	0.15	0.1	0.05	0.05	0

$$\text{Actual attainment (\%)} = (0.4 S + 0.25 A + 0.15 B + 0.1C + 0.05D + 0.05E) / (0.4 X N)$$

S = No. of student obtained S grade

A = No. of student obtained A grade

B = No. of student obtained B grade,

C = No. of student obtained C grade

D = No. of student obtained D grade

E = No. of student obtained E grade

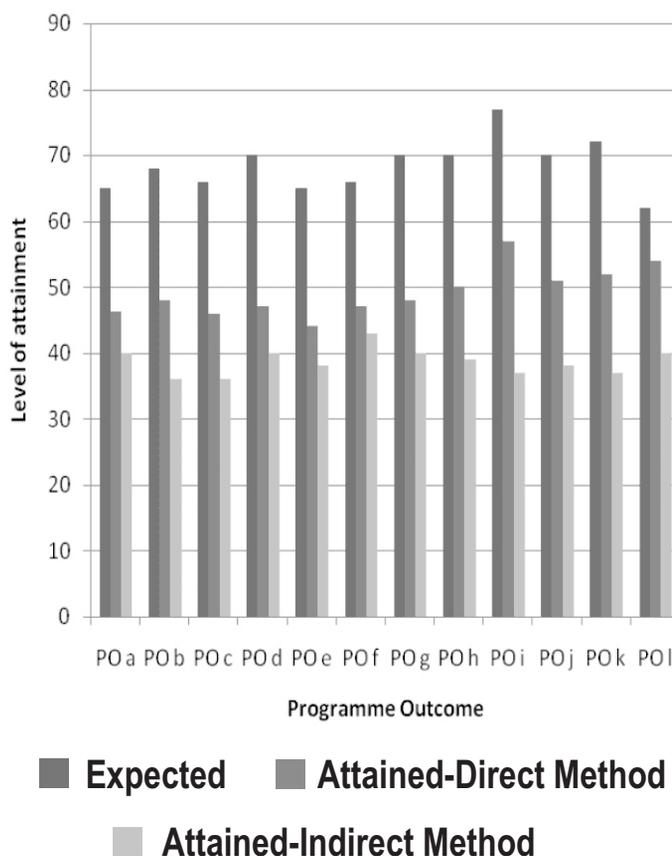
N = Total no. of student

Sample calculation for Engineering mathematics-I (MAT101)

$$\text{Actual attainment (\%)} =$$

$$(0.4 X 5 + 0.25 X 18 + 0.15 X 16 + 0.1 X 3 + 0.05 X 7 + 0.05 X 5) / (0.4 X 59) = 41.53\%$$

The chart indicates the actual level of attainment and the expected level of attainment of individual PO's:



### Use of Evaluation Results towards the Improvement of the Programme

The reality check of the POs being achieved or not will be carried out only after successful completion of OBE based programme, however the action plan for carrying out the reality check is as follows.

- The measurement of the outcome.
- If deviations are noticed / observed, remedial measures will be taken.
- The course coordinators will interact with the programme coordinator.
- The reasons for deviation or gap will be analyzed.
- The factors to achieve the desired POs will be listed.
- The matter will be discussed at length during Board of Studies (BOS) and the appropriate syllabus and scheme will be approved.
- All the stake holders will be taken into confidence if the POs are to be redesigned.

### Results of assessment used for improvement of course delivery and assessment

- At the end of the semester, student feedback (graduate surveys, employer survey, alumni survey and professional body survey) will be taken.
- The feedback will be discussed at length involving all faculties and HOD in the department meetings on the issue of the pace of delivery , the use of teaching aids, punctuality, role playing, posing questions to students, giving equal opportunity to students in posing questions, clarifying doubts, demonstrating case studies etc.
- Continuous training will be imparted to all faculty members.

### The process used for revising/redefining the POs

Considering the graduate attributes the PO will be assessed for its attainment. The following processes are used for redefining the POs.

### Advantages of OBE

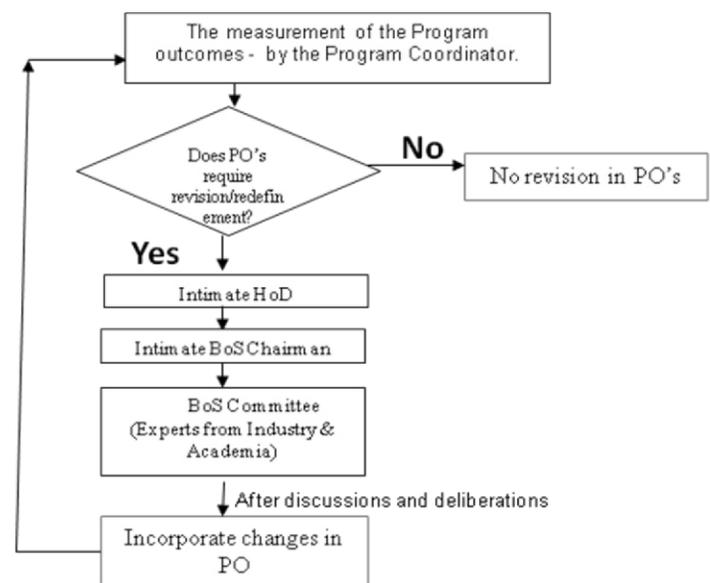
OBE has several advantages for the education and training in South Africa, such as the following:

- Learners know exactly what is expected from them as unit standards make it very clear what is required from them. There is greater buy-in and support for OBE from all role-players due to the extensive level of consultation and stakeholder involvement.
- OBE requires that international best practices be incorporated in training design.

- Well-defined assessment criteria makes it clear to both assessors & learners how assessment will take place.
- Assessment is more objective and fair as a result of the predetermined assessment criteria.
- OBE promotes the acquisition of specific skills and competencies in a country in which there are many skills shortages.
- OBE fosters a better integration between education at school, workplace and higher education level.
- OBE helps learners to accept responsibility for learning, as they are now at the centre of the learning process.
- Recognition of prior learning prevents the duplication and repetition of previous learning situations.

### Disadvantages of OBE

- Most learners are not ready to adapt to OBE because the gap between a trainer-led system and a learner-centred approach does not happen overnight.
- OBE requires that all learning material be rewritten which requires a major investment in time & resources.
- The process of generating and registering of unit standards is very slow.
- Indian academic structures are bureaucratic and by their very nature inhibit the good intentions of an OBE approach.
- People with vested interests and strong personalities in standard-generating bodies may manipulate the standard setting process to achieve their own objectives.
- The rapid changes in the modern work environment often require short-term follow-up training, a situation in which training staff can not wait for unit standards to be generated or updated.



### Conclusion:

The Institute has potential scope to improve “Every Academic Process”. The vision of the institute and departmental mission has to be in alignment. The industry input is critical in designing the curricula to cater to the emerging markets. The continuous training of the faculty along with the state of the art laboratory is very much required to attain the vision. Faculty exchange programmes goes a long way in transforming the attitude and the perspective of the faculty members. Standard metrics must be in place to measure all academic processes and take corrective action. This study on quantification of the programme outcomes is one alternative method where research could be done.

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# Objective Structured Practical Examination as a tool for evaluating competency in Gram staining

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## Abstract

**Background:** Objective structured practical examination is a good tool to assess skill competency. Subjectivity and inter-examiner bias is minimal in this method of assessment.

**Aim:** The objective of the study was to compare the conventional method of assessment with OSPE to assess skill competency to perform Gram stain.

**Methodology:** 25 Undergraduate students were included in the study. They were assessed using both methods

**Results:** There was a significant improvement in the scores obtained by the students in OSPE in comparison to the conventional method (p value < 0.001)

**Conclusion:** OSPE can be implemented as a teaching and assessment tool for skill competency in performing Gram stain.

**Key words:** Assessment, OSPE, Gram stain.

## Introduction :

Medical education has always had challenges with respect to assessment methods. Subjectivity and inter-examiner variation and bias have been the highlight of most examinations. There have been attempts to improve and increase the objectivity of written examination by the introduction of structured essay questions and Multiple Choice Questions. There has however been a lack of objectivity during the evaluation of students skill competency during the practical examination.<sup>1</sup> Assessment of the students should be based solely on student variability in the skill being tested. However in the current system of evaluation, experiment variability and examiner variability have a direct effect on the score of the student. The scores obtained by the student usually reflects the overall performance of the student in the practical examination and is not based on demonstration of individual skill competency of the student.<sup>2</sup> It is with this view in mind that educationists have been trying to devise ways by which skills can be evaluated using an objective tool. One method which can be employed is Objective structured clinical/practical examination (OSCE/OSPE). This

can be used as an evaluation as well as teaching tool. OSPE stations can be used to test laboratory based measurements or procedures, microscopic skills, simulation skills and applied medical aspects. There are many steps involved in designing and implementing an OSPE station. After defining the objective, the task to be assessed is identified. This task is broken down into subtasks and scores are assigned to each subtask. Checklists are created and the OSPE stations are set up. Stations could be equipped with photomicrographs, specimens, computer graphics or illustrations, X-Rays, laboratory reports etc depending on the objective of testing station. The students and examiners are oriented to the process. The results are analyzed and the process is reviewed for future use.<sup>3,4</sup> The current study was under taken as a pilot project to evaluate OSPE as a tool to evaluate skill competency in Gram staining.

## Methodology

25 students of MBBS were included in the study. The skill being assessed was performance of Gram stain. This particular skill was selected because the stain involved forms the basis of microscopic diagnosis in most of the infectious conditions.

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A checklist was developed for evaluating the student's skill to perform gram stain. (Table 1) This checklist had been shown to the students and discussed between the participating examiners. Four identical stations were set up and provided with stains, staining racks and slides. The four examiners were provided with the checklist and columns to assess the individual students.

**Results**

25 students were asked to perform the gram stain and assessed using two methods of scoring namely the conventional method and OSPE. Mean score of OSPE was 7.56/8 (SD ± 0.48) with scores ranging from 6.5 to 8/8. Mean score by the conventional method was 4.96/8 (SD ± 0.53) with scores ranging from 4 to 6/8. Both the scores were then compared. The statistical test applied was Wilcoxon Signed Ranks Test. There was a statistically significant improvement in the scores of the students in OSPE as compared to the conventional method. (p value < 0.001). Refer Chart 1

**Discussion**

Examiners have always tried various methods to assess students in a fair manner. The conventional scoring system involves the global scoring patterns which categorises students into clear fail, borderline, clear pass, very good pass and excellent pass.<sup>5</sup> As this encourages assessment of the students overall performance there is a need to generate assessment methods which would test skill competency alone and have an increased objectivity. In addition to this the utility of any assessment tool is based on the reliability, validity, acceptability, feasibility and educational impact.<sup>6</sup> It was Harden et al in 1975 who introduced the concept of objective structured examinations as a better method for assessment of student skills.<sup>7</sup> OSCE and OSPE have been tools that have many advantages to use. They evaluate specific skills using multiple (15-20) testing stations. All the candidates are presented with the same test and there is a structured scheme of marking the student. OSCE can have the following types of stations History taking, explanation/response, clinical examination and procedure station.<sup>6</sup> Standardized patients can be used for these stations.

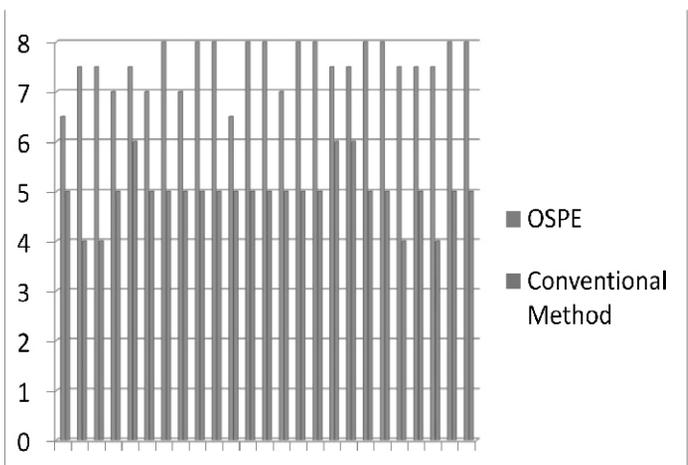
The current study was undertaken to evaluate OSPE as an assessment tool in comparison with the conventional method for assessing skill competency in Gram staining. Students were asked to perform the

gram stain and were assessed using both the methods. There was a definite improvement in the scores obtained in OSPE as compared to the conventional scoring system. The difference was statistically significant. The probable reason for the lower scores in the conventional marking system was because the student was also asked questions and was then evaluated on his overall performance whereas the OSPE assessed the practical skill of performing gram stain. This study suggests that OSPE would be a good skill assessment tool. Similar studies in physiology and biochemistry have shown that OSPE is a reliable tool that can be used both for teaching as well as assessment.<sup>8,9</sup> However in a critique published by Barman, the reliability, validity, objectivity and feasibility of this type of examination depends upon the number of stations, construction of the stations, methods of scoring (checklists) and number of students being assessed. Hence for a comprehensive assessment the OSCE/OSPE examination should be used in conjunction with other methods.<sup>10</sup> The limitation of the current study is the small sample size. The authors plan to continue and expand the study by inclusion of more students and other skills including performance of other stains and sample collection stations.

**Conclusion**

The authors conclude that OSPE is a tool which would help increase the objectivity while assessing skills in microbiology and needs to be evaluated further so as to enable teachers to use this valuable tool optimally.

**Chart 1.**  
**Individual scores of students using both the methods**



**Table 1**

**Checklist for the Gram stain OSPE station**

Sl No	Step
1	Student picks up the slide and confirms that it is the smear to be stained
2.	Confirms the side of slide on which the smear is on
3.	Puts the primary stain(Methyl violet) on the smear area
4.	Keeps the stain on for 1 minute
5.	Washes the smear with distilled water
6.	Puts the mordant(Gram's iodine) on the smear area
7.	Keeps it on for 1 minute
8.	Decolorises the smear with absolute alcohol
9.	Tells that the endpoint of decolorisation is when a colourless drop falls or a maximum of 30 seconds
10.	Washes the smear with distilled water
11.	Puts dilute carbol fuschin on the smear
12.	Leaves the stain on for 30 seconds
13.	Washes the smear with distilled water
14.	Air dries the smear and visualizes the smear under oil immersion microscope

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# Assessment of Suturing Skill among Interns using an Innovative Simulation

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## Abstract

**Background:** Junior doctors need to have the skills to competently perform a wide range of procedures and inability to do so is an important stressor for a new doctor. Internship is critical period for learning many of these skills.

**Aim:** To assess the basic surgical skill of putting a simple vertical mattress stitch by Interns through Simulation.

**Methodology:** 101 interns, working at various departments consented to participate in the study for a period of four weeks. They were asked to put a mattress suture on a simulated dummy.

**Result :** It was noted that 10% had awareness about aseptic precautions. Though 33% of them completed their surgical postings, only 38% of the interns could put the mattress stitch in the right way. Choosing the right instruments was not so difficult, but holding the instrument in the right way (28%) and tying the knot appropriately (21%) was like a marathon to many of them.

**Conclusion:** Suturing skill is a form of psychomotor domain which needs practice to perfection. Adopting a four step approach to teaching skills like suturing will enable junior doctors to perform skills with confidence.

**Key Words:** Interns, Suturing skill, Simulation.

## Introduction :

In Educational spiral each learning objective belongs to a specific domain of learning and needs to be measured and assessed to determine if they have been successfully learnt.<sup>1</sup> Teaching psychomotor skills to medical interns is one of the most crucial tasks of medical teachers and assessment of technical skills in operation theatres is difficult due to time, ethical issues and medico legal concerns. Some of these tasks are complex and difficult to be taught in real life situations.<sup>2</sup>

Psychomotor skill comprises perceptual and manual abilities towards patient care. The skill needs requisite knowledge and attitudes. Skill learning is an active process and it needs repeated practice by the student. Teachers cannot transmit skills to students but they facilitate skill acquisition by allowing appropriate practice to students. Facilitation process for skill learning includes the following fundamental steps: Explaining the skill and its theory, demonstration of the skill in a clear and effective manner and then

allowing students to practice using simulation labs or in reality.<sup>3</sup>

Suturing skill is a form of psychomotor domain which needs practice to perfection. Four step approach suggested by Rodney Peyton of the Royal College of Surgeons: Demonstration, Deconstruction, Comprehension and Performance ensures that the teacher breaks process into manageable steps, asks the learner to vocalize the steps and provides repetition to reinforce the learning and correct mistakes.<sup>4</sup>

Internship serves as a bridge between the theoretical learning of a medical student and the practical skills of a trained physician. Suturing and knot tying skills are two essential skills needed for a successful medical practice, regardless of the field of specialization. Traditionally however, it is taken for granted that students somehow pick these skills up along the way, only those who opt for surgery are taught to them formally.

Every doctor could encounter wounds in need of suturing and it is important to become proficient.

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Mattress suture are good choice when the skin edges are difficult to evert. It is technically challenging to place mattress sutures as good dermis to dermis contact is achieved. Vertical mattress suture is superior to all other stitches due to its quadruple ability to achieve deep and superficial wound closure.

So we chose this particular must and should know skill as an assessment tool for the interns to perform within the allotted time on a simulated module.

### **Aim**

To assess the basic surgical skill of putting a simple vertical mattress stitch by the interns on a simulated module.

### **Methodology**

Study was undertaken following Institutional ethical clearance and expressed consent from 101 interns working at various departments in the tertiary care hospital over a period of four weeks from 1<sup>st</sup> to 31<sup>st</sup> May 2013.

Each intern was asked to put one vertical mattress stitch using a non absorbable suture material (cotton thread) on a simulated dummy, for which a small cotton stuffed pillow with a thick cover was used and it was cut vertically to simulate a long lacerated wound.

The steps of the procedure were assessed by the demonstrator using marker checklists, as a part of formative evaluation. The total time allotted was 3 minutes. Appropriate feedback was given to junior doctors for reinforcing skill learning and also for correcting mistakes. Later the correct method of putting vertical mattress sutures was taught to them at the end of the session.

### **Check-list For Suturing**

- Has undergone Surgery posting Yes/No
- Wishes to scrub hands before putting gloves Yes /NO
- Wears sterile gloves Yes/No
- Skin preparation, xylocaine choice, drapes
- Chooses the instruments from the tray Yes/No
- Right choice of instruments a) Needle holder, b) Toothed forceps, c) Suture cutting scissors.
- Holding needle holder : Right way/Wrong way
- Holds the needle with the needle holder: Right way/Wrong way.
- Puts a vertical mattress stitch Right way/Wrong way.
- For knot tying a) Uses the instruments, b) Uses hands
- Tightening the knot a) Parallel to the suture line b) Perpendicular to the suture line.

- Tied knot is too tight /too loose /just right.
- Cuts the suture ends Right way(tip) / Wrong way (centre)
- Length of the suture threads left a) < 1cm, b) 1cm(adequate), C)>1cm
- Total time taken for the stitch to be put a) < 2 mins, b) 2- 2.5 mins
- Puts the instruments back into the tray Yes/No
- Leaves the instruments & walks off Yes/No
- Could not put the mattress stitch at all Yes/No

### **Results**

Of the 101 interns who consented for the study, about 33(32.67%) of them had completed their surgical postings as part of their compulsory rotatory internship programme.

As a prior necessity, only about 11(10.89%) interns wished to scrub their hands before wearing sterile gloves. The next step being choosing the appropriate instruments, 75(74.25%) interns were able to pick the required instruments from the tray. Then they were observed on how they handled these instruments. 29(28.71%) interns held the needle holder in the wrong way and 55(54.45%) could not even place the needle properly in the needle holder.

Putting this vertical mattress stitch using the standard technique, was possible only with 35(38.46%) interns. 56 (61.53%) interns somehow managed to put the stitch using various methods, not acceptable otherwise. 10(9.90%) of them could not put the mattress stitch at all, in the allotted time limit.

Ideally the knot has to be secured or tightened by pulling it parallel to the suture line which was well demonstrated by 20 (21.99%) interns. 54 (59.35%) of them used their hands to tie the knot like a shoe lace knot, which is poor skill performance.

The final step was to use the scissors to cut the suture ends. 25(27.49%) interns did it right while 74(81.37%) of them did not know the right technique of using the scissors and keeping about 1 cm adequate suture length.

After the task, only 61(67.03%) interns neatly put back the used instruments into the tray, degloved themselves and left the venue.

### **Discussion**

Skill is a refined pattern of movement or performance based upon and integrated with the perceived demands of the situation. As per the Miller's pyramid, a medical student initially gains knowledge or knows the subject, then knows how to perform (Competence), then shows how (performance) and then lastly does the procedure or applies it clinically<sup>1</sup>.

In the present study 32 % of interns had completed their surgical postings and they performed better than the remaining group of interns as compared to other study where authors conclude that simulated surgical skills station can be used to evaluate procedure performance objectively and to test for interval improvement.<sup>5</sup>

Van Empel conducted a study to compare objective assessment of open knot tying skills by 99 residents before and after a knot tying course, which showed improvement after one training day. This study shows that we need to implement training sessions using simulators to improve performance scores.<sup>6</sup>

Shabbir in their study conducted a one-day suturing and knot-tying workshop. The suturing skills of the trainees were assessed before and after the training by Objective Structured Assessment of Technical Skills (OSATS), using a checklist. In the first workshop, a pre-training questionnaire was used to assess their knowledge about sutures and their perceptions about the workshop. This study also shows that performance scores were better after training sessions and OSCE pattern of assessment can assess each step of the suturing technique in detail as observed in the present study.<sup>7</sup>

Educational programs should be designed to meet the training needs of junior doctors performing minor procedures. All the interns need to be trained in the basic suturing principles, which include handling instruments correctly, choice of appropriate suture material, know the types of sutures and the right way to put simple sutures. These sessions should be conducted by the teaching faculty on a regular basis for all the junior doctors.

## Conclusion

Medical education is rapidly evolving. We need to teach our interns the basics of suturing as it is not ethical to let them to conduct procedures without optimum supervision, as an unsupervised intern makes an error, it can have serious repercussions. Teaching of basic surgical skills is both feasible and advantageous using simulation. Basic surgical skills should be taught to all medical students regardless of their career aims, at all medical colleges.

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# Need of Continuing Education and Soft Skill Development for Medical Librarians

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## Introduction

Men continue to study to learn new material, new ideas, and new skills - new at least to them, if not to the world. It is a fact that everyone throughout his life reinforces and deepens his knowledge and attempts to learn new facts and techniques, though usually in informal, rather than formal, situations. It is a symptom of the accelerating pace in the changes in the world about us today that ever increasing numbers of our citizens are spending ever increasing portions of their post school life in education.

The mark of a learned society is that its members continue their studies during their entire careers. They do this partly to reinforce and deepen knowledge of their field which they already hold; this may be considered in the nature of a refresher, a review of half-forgotten ideas or skills.

Continuing Education opportunities may continue to take the form of traditional classroom instruction, but may also include the delivery of instruction or learning opportunities via distance education or self-study methods. They may employ technologies, including (but not limited to) the following: television and radio broadcast, satellite teleconferencing, and computer-mediated communication (computer conferencing, web, e-mail or electronic mail list technology) of various sorts.

Continuing Education course is defined as a planned learning experience with detailed learning objectives defined by the instructor(s). It can take the form of formal classroom instruction or distance education. Courses contain exercises and activities where the participants practice or are tested on what they have been learning. <sup>1</sup>

Conroy defined continuing education as "those learning opportunities utilized by individuals in fulfilling their need to learn and grow following their preparatory education and work experiences." <sup>2</sup>

Continuing Education helps to enhance library practice, education, administration or research and to improve health care by improving health care information, access to it or utilization of it.

## Need of Continuing Education for Medical Librarians

Rapid innovations in health care, information science, and communications are placing unprecedented pressure on health sciences librarians to broaden and enhance their skills and knowledge. <sup>3</sup> Medical librarians have specific training needs which concern continuing education in various subjects in their field, subject knowledge and teaching and education skills for user education.

Qureshi's 1990 survey was one of the few to examine subject knowledge as it applies to health sciences librarianship. His study of health sciences librarians found a need for subject knowledge; some respondents indicated that their formal education had been in non-health sciences areas and that they had to acquire subject knowledge on the job to do their work. <sup>4</sup>

One columnist in the Washington Post called "tons of irrelevant data and distracting fluff" <sup>5</sup>. The powerful technology, increasing complexity in the knowledge domains, and information overload in the health professions spells opportunity and hope because we are the profession most expert at quality filtering and serving as knowledge coaches and discoverers of trusted resources in a world gone wild with a surfeit of information. Changes in technology naturally affect the needs of librarians. The proliferation of electronic indexes and other resources challenges them to learn new skills and keep up to date with a resource base that is expanding faster and faster. By the same token the technology also creates avenues for providing the needed training and disseminating that training far and wide at the click of a button. <sup>6</sup>

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**Preferred Modes of continuing education:**

Seminar / workshop  
Online Courses  
Teleconference  
Self-study programs  
Professional meetings  
Providing educational material and instructions  
Conferences

**Some deterrents to continuing education:**

Distance  
High cost  
Time  
No training provided according to interests  
Low quality of organization  
No recognition of training

Continuing education facilitate the medical librarians in preparing for new responsibilities like, instruction and consultation to clinicians, administrators, and students in literature searching, providing information on new medical treatments, clinical trials and standard procedures by conducting research on various health related topics, providing clinical information services and other information to enable doctors to provide the best care to patients and being part of health care team. He needs to work with database management, using computer and other virtual infrastructure, various forms of media such as websites, digital archives, audio and video files.

**Soft Skill Development For Medical Librarians**

Skill is an ability or proficiency in execution or performance, which is required for a person to plan and execute an action designed to achieve some goals or accomplish a particular task. A skilled person has the ability to perform any task successfully. He can face the challenges occurs in a particular profession because of the social, economic, education and technological changes. Thus in order to cope up with the ever-changing library and information science profession, the library professional must be a skilled professional.<sup>7</sup>

These are new skills that current information Professionals, as well as those entering the field, will need to acquire.

1. Technological skills mean those skills which are required to handle information technology and its other related fields.
  - Computer and Information Technological Tools using Skill.

- Skill of using Internet and Computer Communication Networks.
  - Information Retrieval Skill.
  - Designing web tutorials to climbing the career ladder.
  - Selection and Managing of electronic resources.
  - Designing instructional websites.
2. Traditional basic skills.
  3. Basic managerial skills.
  4. Communication skills, like Fax, E-Mail, Bulletin Board, Web Sites, Blogs etc.
  5. Preservation Skill for traditional library as well as e-resources.
  6. Information literacy in the medical field to recognize when information is needed and having the ability to locate, evaluate and use effectively the needed information'.

Medical librarian skills in understanding the medical terms, medical literature and how it applies to individual patient care, helps in improving the abilities to communicate with physicians and patients, to read and understand the medical literature, and to relate clinical concepts in constructing a literature search.

**Discussion**

Part of the information overload that is apparent today in the health professions is not solely the information explosion, but it is the wealth of dross and the need to filter and sift through mountains of information to find the pearls of information and knowledge that our users seek—to make sound clinical, business, scientific, and personal health care decisions. As medical librarians, we know the path to knowledge and wisdom is not always a quick Google search, although the powerful search engine will definitely help in the journey to the truth.

To provide filtered information, there is a need to give particular attention to librarians training in medical terminology who don't have subject knowledge in health sciences field.<sup>8</sup>

Department of Library and Information Science of different universities and Institutions, some other organizations have also been working for the skill enhancement of library professionals in India. INFLIBNET organizes SOUL, PLANNER and ILMS training programme. Indian Association for Special Libraries and Information Centers (IASLIC) is also working for improving the technical efficiency of the library and information professionals. NISCAIR organizes different IT related short-term courses.

NISSAT encourages and supports variety of skill development programmes for the library and information professionals on CDS/ISIS, WINISIS, TQM, Internet and web design etc. DESIDOC and NASSDOC arrange different short-term training programmes.

In India there are 335 recognised medical colleges, in which libraries about 1350 professionals and 1350 semiprofessional are working. Medical Library Association (MLA), Chicago at International level, National Institute of Family Health and Welfare, New Dehi and Medical Library Association of India (MLAI) national level, some states level associations are also organising continuing education programmes on medical librarianship.

### Conclusion

Continuing Education is a professional development strategy that enables fledgling professionals to take advantage of the skills and expertise of the senior members for professional growth.

Most of the studies conclude that librarianship schools education does not provide adequate knowledge on health sciences terminology in order librarians to exercise their duties in health sciences libraries. The knowledge of subject terminology and classification acquired by studies or by professional experience in a corresponding library leads to improve librarian's skills in database searching and increases user's confidence to librarian. However, Library schools curricula give limited opportunities for education in subject knowledge in basic health sciences fields<sup>9</sup>. Hence the education of librarians has been possible only at the practitioner's level.

Continuing education is especially important to the medical librarians in preparing for responsibilities, in implementing new technologies, to deal with the change. Librarian-mediated services linking knowledge and critical decision making in health care have become more valuable than ever as technology continues to reshape an increasingly complex knowledge environment. Although continuing education has not been widely reported in medical librarianship.

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# School Health Education Programme

Kumar Sumit<sup>1</sup>, Ashrita Saran<sup>2</sup>

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## Introduction :

Ensuring that children are healthy and able to learn is an essential component of an effective education system. Good health reduces absenteeism and drop outs and increases scholastic performance. Effective school health programmes are one of the most cost effective approaches in improving community health. school health activities contribute to desirable health related activities and practices resulting in healthy lifestyle, thus leading to a healthy future generation. school children also communicate the health related information gained in the school to their families and neighbourhood, thus contributing to improved family and community health. Thus school health programme is a very useful and effective public health activity.

School health services were first introduced in India in 1909, when health check up was carried out for the school children in Baroda city (Gujarat). school health services also formed one of the functions of primary health centers, as recommended by Bhole committee. Government of India constituted a school health committee in 1960 under the chairpersonship of Smt. Renuka Ray. The committee reviewed the school health services in the country and patterns in various other countries and provided the school health services in the country and patterns in various other countries and provided comprehensive recommendations in 1961. These recommendations define the functions of school health services as school, health promotion including provision of school meals to improve nutritional status of children and health education. Health education was to be imparted through classroom teaching as well as through practice of hygiene. The recommendations also call for involvement of parents at the time of medical examination and involvement of community in school meal programme. Because of limited resources, first priority for health care was accorded to children in primary schools and medical check up was recommended at the time of school entry and thereafter.<sup>2</sup>

However in most states with the exception of few, either the school health services were not organized or were confined to a few elements like health check-ups, mid-day meals, immunization campaigns or limited attempts at increasing health awareness.

## Components of the School Health Programme<sup>3</sup>

It is recommended to be carried out twice in a year. However, in view of limited health manpower and large number of students to be screened, it may be carried out at least once a year.

**Organisation :** States have different models for school health services. Tamil nadu has dedicated health manpower for school health services. Gujarat provides it through routine health services. In West Bengal two nurses are posted in each community development block, solely for this purpose. In Andhra Pradesh a mobile health unit consisting of six ANMs provide once a month fixed day health service at rural habitations covering about 3000 population each day. It also provides school health services in the area besides general health services. Some of the states have also proposed training of school teachers to help in screening and provide simple and immediate treatment of common illnesses.

## Screened

Apart from these common skin problems and certain disabilities like visual, hearing, locomotor are also included in school health program.

**Learning Disorders, Problem Behaviours, Stress, Anxiety -** Teachers need to be sensitized to identify children with such problems at an early stage and send them to appropriate referral centers. These conditions may not be detected through screening, but a trained teacher can detect these during regular course of school.

The findings of screening for each child are to be maintained in a school register and child health card. The latter would be given to the student and

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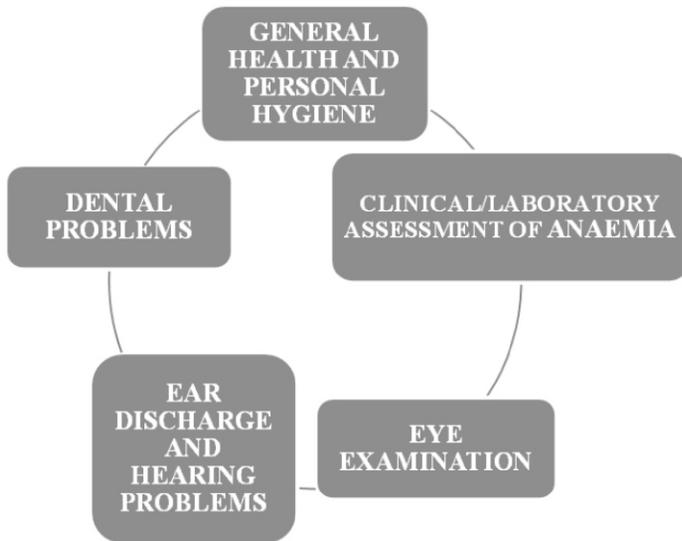
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## HEALTH CONDITIONS TO BE



would have record of height, weight, immunization and sickness episodes of the individual child. Kerala has introduced a child health card called “from minus two to plus two”.

After screening or as a part of routine medical care, either the students are managed at the school itself or if required referred to predesignated centers.

### Remedial Action at the School

Minor injuries and common illnesses can be treated at the school, using first aid kit. provision of spectacles, hearing aids or supporting equipment for children with disabilities are initiatives that many states have built into their programmes.

Corrections of anaemia, vitamin A deficiency or linkage with mid-day meal programme for undernutrition are other examples of action at the school.

Counselling of children with chronic health problems or children with disabilities should also be done at the school.

The school nurse (if available) or nodal teacher would be responsible for administering the first aid and coordinating all such remedial actions with the health personnel identified for this purpose. The nodal teacher would also be responsible for follow on referrals.

**Immunisation** - School children are to be given DPT at 6 and tetanus toxoid at 10 and 16 years as per national immunization schedule.

### Nutrition Interventions

**Mid-day meal programme**-mid day meal programme has proven to improve school enrollment,

retention in schools and levels of learning achieved. it is also one of the important sources of access to balanced diet for the poor child. however, to get its full benefit, it needs to be ensured that it is taken as a supplement to food at home and not as substitute for it.

**Mass deworming** - a large number of student have hidden of worm infestation leading to anaemia and growth failure burden of worm infestation leading to anaemia and growth failure. therefore, mass deworming of children with a single dose of albendazole (400mg tablet) every six months has been recommended for districts with high worm load. siblings of the students are also to be removed.

**Iron and folic acid tablets**-students are given weekly or daily IFA supplementation. students from class 1 to 5 are given small IFA tablet (30 mg of elemental iron+500 microgram folic acid). some states are distributing IFA tablets as a pack pack of 60 during six monthly check up for consumption during next 60 days.

**Vitamin A**-vitamin A to be administered in children with deficiency.

**Iodised salt**-mid day meal preparation should use iodised salt. encouraging students to bring salt they use at home to school and get it tested for iodisation serves a valuable means for health education.

### Health and Nutrition Education

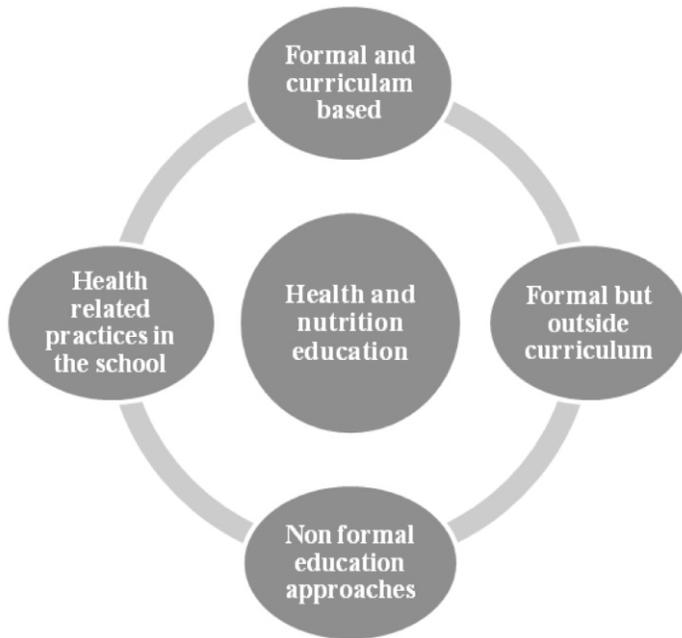
It is one of the most important component of the school health programme. Its aim is to provide health, hygiene and nutrition to students and also help develop skills to put such knowledge into their day to day practice. There are four parallel ways in which health education would be implemented.

### Safe And Supportive Environment

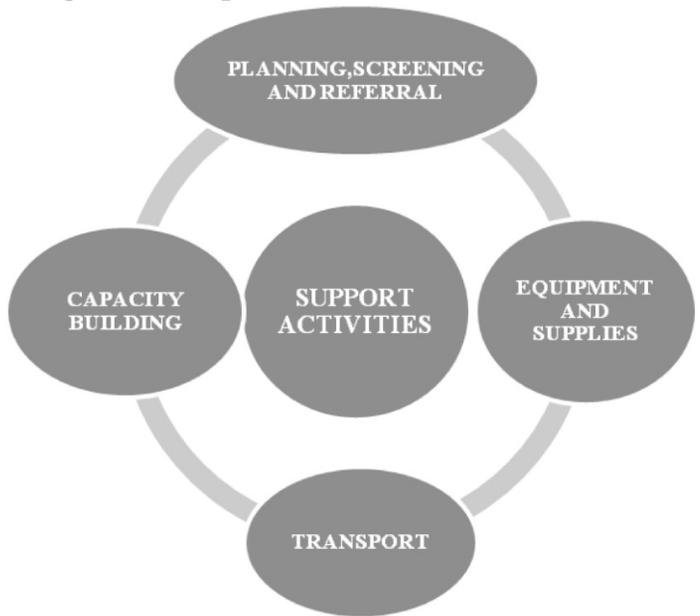
School would need to make arrangements to ensure that environment is safe from injuries, e.g, grills in the windows, furniture should not have sharp edges, provision of protective gear while participating in sports etc. The school should be clean with sufficient toilets separate for boys and girls, should have potable and hand washing facilities and have canteen that provides healthy foods. The schools should have first aid rooms/corners or clinics.

As health promoting schools they should provide for counseling services, regular, practice of yoga, physical education. There can be a system of peer leaders as health educators and health clubs, health cabinets. The schools must have a policy to exclude

## Health and Nutrition Education



## Programme Implementation



corporal punishment and be able to protect the students from abuse. A supportive environment provides opportunity to teachers and students as well. Also the supportive environment provides opportunity to teachers and students to be heard and participate in management policies.

### Planning, screening and referral

- ✓ Regular visit of health professional
- ✓ Proper communication to the authorities, parents and local government bodies
- ✓ Referral to the designated health facilities

### Equipment and supplies

- ✓ Supply of equipments like weighing scales, height measurement equipment, snellen's chart
- ✓ First Aid kits to school, one each for 250 students per year.

### Transport

- ✓ Funds for providing transport/hiring of vehicles for visit of health staff to schools and to take children for referrals.

### Capacity building

- ✓ Training of nodal teachers, medical and paramedical professionals
- ✓ Follow up for referrals
- ✓ Remedial action at school level and health education activities

The school health programme intends to cover 12, 88750 government and private aided schools covering

around 22 crore students all over India.<sup>4</sup> Based on the cost estimates, it has been proposed that the programme may be taken up in a phased manner covering 20% schools in the implementation so phased can then be met out of RCH 2 flexible pool/NRHM flexible pool. For those states which have not yet started the programme, it is proposed that ANM may be spared once a week for school health if she has either MPW (male) or second ANM to support her at subcenter. The multi-purpose worker (male) will be appropriate for exclusive senior boys basic schools.<sup>4</sup>

Under the school health programme in 2011, 705.9 lacs students in 4.93 lacs schools were covered with an expenditure of rs.4618.93 lacs. allocation in 2011-12 for the programme was in the tune of Rs.13, 650.83 lacs for 33 states. Establishment and maintenance of safe potable water health educators and counseling services (ARSH and/or ICTC) are being promoted. capacity building for master trainers, teacher is towards sustaining the intuitive within the school system.<sup>5</sup>

### Monitoring and evaluation

Health register and follow up record: teachers would maintain a health register that would record findings of periodic health screening, remedial activities, referrals and sickness record for each student. These will be kept in safe custody or maintain confidentiality such registers will help in tracking coverage of screening in each class as well as provide data on nutrition and morbidity profile. it will also help in monitoring the quality of screening programme in terms of

abnormalities picked, ensuring referrals and complete of follow up treatment.

**Student health card:** This will help track growth and illness of child. It will have provision for recording weight, height, immunization, details of episodes of illness and any aspect that require follow up. It would also have health messages printed on it. This will be given to students who will keep it safe and bring it for subsequent annual with referral slip during referral and follow up. Health staff would record entries on this card.

**Reporting:** Quarterly report of periodic health screening, referral and follow up treatment would be prepared by school principals and sent to district education officer and district education officer and district CMO, who would get it compiled and transmit it to state directorate of Health , which would share it with the state education directorate. States would

compile an annual report based on quarterly reports and transmit to ministry of health and family welfare at the national level.

**Evaluation:** Baseline and periodic rapid assessments to be carried out to evaluate the impact of school health programme in terms of improvement in knowledge of students about hygiene and nutrition, scholastic performance and school absenteeism

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# Creative Class : An Innovative academic tracking workbook for SSLC students of Karnataka.

Ananth J G, Raghavendra Bagadhi  
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## 1. Introduction:

Creative Class – A research based workbook to enable Students to take active interest in Studies (Visual learning) and tracking their learning in an innovative way. No Student is a poor performer; but it depends upon what influences them over a period of time... When it comes to Academics, anybody can score good marks provided they are guided the way which interests them to take part in organized and activity based learning's rather than just mugging it and forgetting the learning's during exams and score low. Thousands of students of Karnataka fail in SSLC (Secondary School leaving Certificate) exams by marginal marks and stop their academic education for rest of their life and even those with high scores still struggle in their career. So, we believed, “Actual Learning is important and rest will follow by itself.”

To help these students a Creative Class Workbook was designed. This 24 pages workbook covers all 617 topics of Social Science, Science and Mathematics of SSLC Board Karnataka in a Visual way along with essential tracking tools.

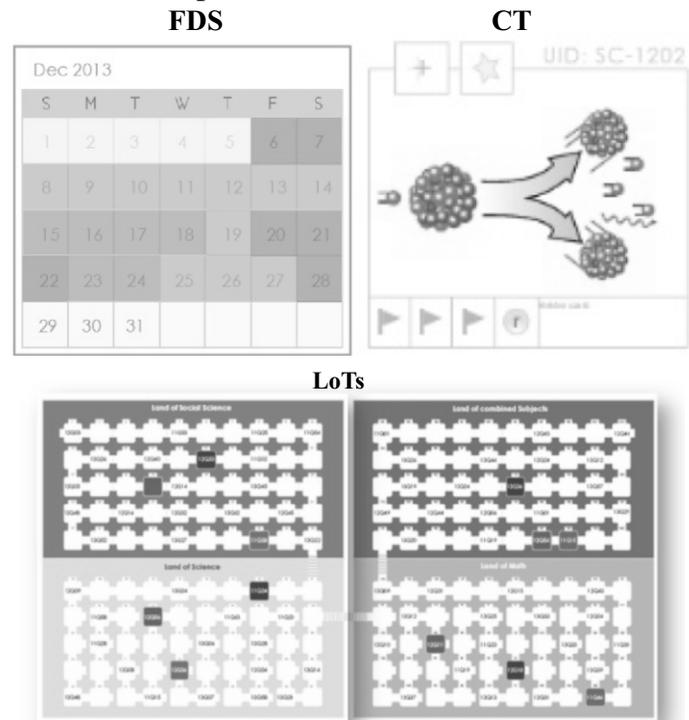
**Creative Class tools are based on following methodologies.**

- 1) When we write, the **ego** is active (pleasure principle, reality principle, guidance/influence principle), but it is not always active to the same degree.
- 2) **Pleasure principle** his/her psychological needs (natural desire or tendency which is not learned)
- 3) **Reality principle** his/her ego comprises the organized part of the personality structure that includes defensive, perceptual, intellectual-cognitive (awareness, perception, reasoning, and judgment), and executive functions. Conscious awareness resides in the ego. (FDS and CT)
- 4) **Guidance/Influence principle** which takes on the influence of those who have stepped into the place

of parents — educators, teachers, people chosen as ideal models. (FDS, CT, LoTs)

- 5) **DIKW Pyramid** (Data (facts), Information (captured data and knowledge), Knowledge(map of brain), Wisdom(map of applied learning)) (CT) - Know, to Know, Learned using Appendix Topics
- 6) **Gamified Learning Approach** – Collaborative Learning, Student Engagement, Brainstorming, Revision, Competitive (LoTs, CT) and Activity based Learning.

**The 3 powerful learning / tracking tools which are based on various Principals and Motivational Factors are explained below.**



**Note:** Visit <http://jermt.org/> to know the color coding of the above diagrams.

**FDS - Fair Day Study:** It's a simple organizer which creates enough visibility and emphasizes topic level

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awareness, perception, reasoning, and judgment on Daily Studies. Over a period of time this activity will build confidence among Students. Color codes are used as psychological influencers.

**CT - Chapter Tracker:** Creates Chapter awareness at Topic level plays a key role in learning and exam preparations. CT elements help identify Question occurrence patterns and enables discussion, Key points tracking, Revision tracking, Prediction and Confidence marking. Visual learning makes study more organized.

**LoTs - Land of Tiles:** A board game to encourage group or collaborative learning among students, which engages them in revisions of key points in fun

filled way. This tool is designed to encourage average and below average Students to take part in active learning.

**Results:**

A Pilot Study was conducted in Government school of Shimoga to know the impact of this Workbook on learning curve of students (Above average, average and below average performing Students). 92 SSLC Students – 42 Kannada medium Students and 50 English Medium Students participated in the study.

Data from the Observations of the program is presented as below. Students are categorized under 3 Principles.

**Observations – Kannada Medium**

**Pre-Training Data**

Observations	PP	RP	G/I P	Description
State of Mind/Engagement	75	20	5	Students engagement on First Day of Session
Study Habits	75	20	5	Data gathered on initial 4 sessions
Comfort Zone with their group	92	4	4	Regular seating arrangements makes class a setback kind and very few students are disruptive and few students don't even turn up to school
Comfort Zone with different group	65	25	10	Group engagements will be effective and less disruptive
Question Paper Tracking/Solving	0	0	3	Only 2-5 percent of student refers question papers and few have a habit of solving questions papers.
Prediction / Importance Tracking	0	0	5	Very few students are aware of Important topics.
Confidence Tracking	0	0	5	Confidence on Subjects are not clearly visible
Discussion on Topics with classmates	0	0	10	Very few motivates there friends to Study
Discussion on Topics under parental guidance	0	0	5	Only G / I P group has a support from parental guidance which is very less and should be addressed as part of the system.
Revisions	0	0	5	Very few students know about effective revisions
Self-Assessment	0	0	5	Very selected students can evaluate their studies

**Post-Training Data**

Observations	PP	RP	G/I P	Description
State of Mind/Engagement	60	30	10	Students engagement throughout the program
Study Habits	65	25	10	Data gathered throughout the program
Comfort Zone with their group	80	10	10	Even regular seating arrangements made class effective because of study awareness towards Exam
Comfort Zone with different group	60	20	20	This will be good try to nullify setback attitude in class over time which can be monitored by teachers
Question Paper Tracking/Solving	65	25	10	Question paper tracking / Solving is effective now
Prediction / Importance Tracking	50	40	10	Exam preparations made effective with Prediction tracking
Confidence Tracking	50	30	20	Confidence tracking at topic level helps better preparations.
Discussion on Topics with classmates	50	40	10	Better understanding and Key points tracking with in a group found effective
Discussion on Topics under parental guidance	75	15	10	Only G / I P group has a support from parental guidance which is very less and should be addressed as part of the system.
Revisions	70	20	10	Group discussion & Key points leads to better Revisions
Self-Assessment	70	20	10	CC Workbook started to build the Self-Assessment qualities in students and this will increase over the period of time

Pre-Training Data – **English Medium**

Observations	PP	RP	G/I P	Description
Students Engagement	50	40	10	Students engagement on First Day of Session
Study Awareness/Habits	70	20	10	Data gathered on initial 4 sessions
Comfort Zone with their group	90	5	5	Regular seating arrangements makes class disruptive
Comfort Zone with different group	35	55	10	Different group makes class less disruptive but it has some other difficulties which can be addressed easily by teachers
Question Paper Tracking/Solving	0	0	7	Only 5-10 percent of student refers question papers and few have a habit of solving questions papers.
Prediction / Importance Tracking	0	0	7	Very few students are aware of important topics.
Confidence Tracking	0	0	7	Confidence on Subjects are not clearly visible
Discussion on Topics with classmates	0	0	2	Very few motivates there friends to Study
Discussion on Topics under parental guidance	0	0	15	Only G / I P group has a support from parental guidance which is very less and should be addressed as part of the system.
Revisions	0	0	7	Very few students know about effective revisions
Self-Assessment	0	0	15	Very selected students can evaluate their studies

Post-Training Data

Observations	PP	RP	G/I P	Description
State of Mind/Engagement	20	60	20	Students engagement throughout the program
Study Awareness/Habits	15	65	20	Data gathered throughout the program
Comfort Zone with their group	60	35	5	Regular seating arrangements makes class less disruptive, because of study awareness of Exams
Comfort Zone with different group	20	70	10	This nullifies disruptiveness in class over time which can be monitored by teachers
Question Paper Tracking/Solving	30	50	20	Question paper tracking / Solving is effective now
Prediction / Importance Tracking	10	70	20	Exam preparations made effective with Prediction tracking
Confidence Tracking	60	30	10	Confidence tracking at topic level helps better preparations.
Discussion on Topics with classmates	30	40	30	Better understanding and Key points tracking with in a group found effective
Discussion on Topics under parental guidance	75	10	15	Only G / I P group has a support from parental guidance which is very less and should be addressed as part of the system.
Revisions	70	10	20	Group discussion & Key points leads to better Revisions
Self-Assessment	70	10	20	CC Workbook started to build the Self-Assessment qualities in students and this will increase over the period of time

**Discussion / Survey- Various Surveys conducted to Students and Teachers...**

**SAS – Study Awareness Survey** - Before training, the clarity on their learning patterns were very messy, disorganized and most of them were logically disconnected with less clarity on their learning's (Study Hours, Chapters Studied and Revisions).

During the training program, students understand the idea behind tracking daily learning and importance of it. Awareness about their individual study patterns was fine-tuned with better clarity.

**QIIQ – Questions Identification Intelligent Quotient** - Awareness about previous Exam Question papers brings seriousness and gives an idea about forth

coming question paper formats. The **QIIQ** activity enabled all the participants to understand the questions and to trace the appropriate Topics in respective chapters. Many found it difficult to start, later with proper guidance / training they found it interesting and understood the importance of identifying each topic before they prepare for Exams. Participation from the below average students in test group were really appreciated.

**CTTA – Chapter Tracker Topics Awareness** - Awareness on the complete Chapter is possible provided **Topic level** awareness is strong. **CTTA** was conducted to test the awareness level on Topics and to help them segregate learning based on **Know, To Know and Learnt**. There was lot of confusion among students on segregating the Topics under these 3 categories, as they couldn't have enough clarity on their learning / preparation. But still few did it in a best possible way.

As a practice, CTTA process will lead to a better clarity on their learning at Topic level and certainly a good tool to build confidence over a period of time.

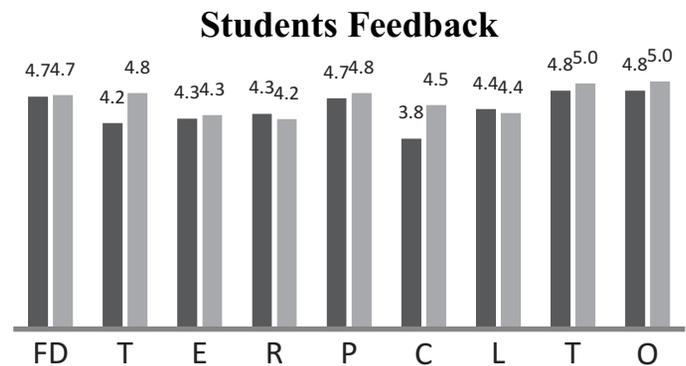
**PCT – Prediction & Confidence Tracking** - Tracking or marking important topics is one of the key process, many Students miss out in their regular notes / Text book.

In the Creative Class Workbook, Prediction marking at the Topic level gives an easy access to identify all the important topics within 15 pages.

Note: Important topics are shared by Subject Teachers. Students mark Confidence, once they are through with their preparations & Revisions.

**Students Feedback on Creative Class Workbook.**

Results of 9 questions with 5 Star rating scales (Both English and Kannada medium feedback data).

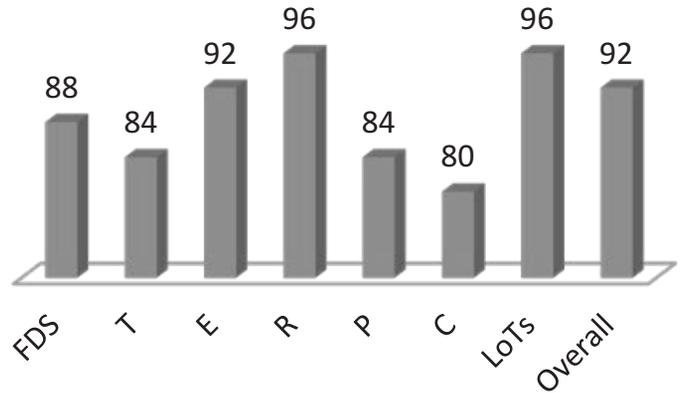


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**Teacher’s Feedback**



FDS - “Fair Day Study”, T- Track, E – Explore, R- Revision , P – Predict, C - Confidence , L - Land of Tiles, T – Training and O – Overall

**Limitations**

As this is a pilot study to know the actual impact of the creative workbook it needs to be studied on a larger student group.

**Conclusion:**

Creative Class workbook enabled students to learn the way which interests them and continues to learn. Essential tracking made teachers to be aware of student's improvements.

**“Focus on organized learning and result will follow itself.”**

**Acknowledgement:**

We thank CEO – S Sasikanth Senthil, I.A.S, Zilla Panchayath Shimoga, BEO – Hala Naik and GPUC High School Teacher's, Shimoga for their extended support in conducting this pilot study.

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- 5: [http://en.wikipedia.org/wiki/Principles\\_of\\_learning](http://en.wikipedia.org/wiki/Principles_of_learning)