A Presentation on…

Desired Qualities of a Good Academic Ambience

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Creation of Modern Universities

1850 – 1900: 5 Modern Indian Universities were set up. Location: Calcutta (first university in South Asia), Bombay, Madras, Allahabad and Lahore in the erstwhile undivided Punjab.

1900 – 1947: 16 more universities were added. The notable ones include:

- Benaras Hindu University (1915),
- University of Mysore (1916),
- Osmania University (1918),
- Aligarh Muslim University (1920),
- University of Delhi (1922).
1841 - 1950: 12 Indians were elected Fellow of the Royal Society of London.

A. Cursetjee, Engineer & Shipbuilder
S. Ramanujan, Mathematician
Sir J. C. Bose, Bio-physicist
Sir C. V. Raman, Physicist
Meghnad Saha, Physicist
Birbal Sahni, Palaeo-botanist

Sir K. S. Krishnan, Physicist
Homi J. Bhabha, Physicist
Sir S. S. Bhatnagar, Chemist
S. Chandrasekhar, Astrophysicist
P. C. Mahalanobis, Statistician
D.N. Wadia, Geologist
In 1888, H. Hertz at the University of Karlsruhe, Germany, generated and received electromagnetic waves of wavelength 660 mm and established Maxwell’s electromagnetic theory.

Sometime later, Sir J.C. Bose developed
- A system for wave transmission at 5 mm wavelength.
- Millimeter wave transmission system.
- Point contact Galena detector for the reception of millimeter waves.

Bose demonstrated his work on Hertzian wave radiation at the Royal Institute, London in 1896. He refused to patent his inventions…

His revolutionary experiments on Electrical Response of Living and Nonliving Entities were another paramount contribution to modern science.
Bose-Einstein statistics was introduced for photons in 1923 by S. N. Bose and generalized to atoms by Albert Einstein (Bose-Einstein statistics) in 1924.

- Sir C.V. Raman and K.S. Krishnan conducted path breaking experiments on Spectroscopy and Optics at the Indian Association for Cultivation of Science, discovering the Raman Effect in 1928. He got Nobel Prize in 1930.

- G.N. Ramachandran (1922-2001) FRS and A Jewel in the Crown of the Indian Science was Professor & Head, Molecular Biophysics Unit, IISc, Bangalore.

- 1955: He discovered of the triple helical structure of the connective tissue protein called collagen.
Residential College Model

• Residential Hostel should be a living and learning community comprised of students, scholars and professional.

Christ’s College
Churchill College
Downing College
Jesus College
Kings College
Trinity College

• Our mission will be to provide all students with holistic and wide-ranging education that encompasses knowledge gained within and outside of the classroom.

• At IITG we must heighten student aspirations for high intellectual and professional achievements and simultaneously champion our students to maintain and uphold high ethical and moral standards.
• We must help our students develop lifelong habits for physical, mental and social health, and cultivate their appreciation for the arts, music and nature.

• We need to instill within our students a sense of commitment and devotion to serving society and the world at large.

• Students have to be more responsible. Commitment to *Parents, Society, finally the Country*

• Hostels have to be free of alcoholism and substance addiction.
To achieve these objectives, our system must encourage students to take the initiative in inquiry-based active learning and peer mentoring. Learning from each other should be the main focus of Hostel life.

Faculty members are to be encouraged to interact with the students. The mentors must ask questions, in order to generate original ideas.

Rutherford is best known for his work on the electron.

Through the process of working with others, students will get the opportunity to learn from and teach their peers concurrently.

We believe that these self-organized initiatives may one day lead to new innovations, novel products or even inspire our students to form their own companies.
To bring improvement in the hostel conditions, each faculty member may be encouraged to have the usual dinner at one of the hostels once in a month. It will induce the caterers to be careful about quality of food and hygiene. It will also help the faculty members to understand the problems of the hostellers, and also bring them closer to the student community.

Once a month, there may be a special dinner in the hostels. The Warden, the Associate Wardens and the Ombudsmen will participate in the dinner.
• The team of wardens and ombudsmen will deliver talks in hostel premises once a month.
• These talks may be academic or motivational.
• One aspect of academic talks may be to give the larger picture rather than the nitty-gritty details in a particular field and how that is linked with the existing curriculum of the institute.
• Faculty members from within IIT and outside may be invited to give talks in the Hostels. A token honorarium may be linked to each talk.
• Perhaps the first year students should be the main focus.
• It has been observed that they sometime lack the motivation for some core-courses as it is not made obvious to them how it is linked to their own branch or to the real world or in their future career options.
Supramental Gnosis: The connection between mathematics and spiritual realization not esoteric.

- Evolving soul (psychic being) Supramental existence
- Philosophy of social evolution
- Integral Analysis of Indian culture
- Interpretation of the Vedas

The manifestation of the Supramental upon earth is no more a promise but a living fact: 29 February 1956
“The true teachers help us to think for ourselves in the new situations which arise. We would be unworthy disciples if we do not question and criticize them. They try to widen our knowledge and help us to see clearly. The true teacher is like Lord Krishna in the Bhagavadgita, who advises Arjuna to think for himself and do as he chooses: yatha (as you) icchôsi (you like) tatha (that) kuru (perform).”
• A teacher needs to help students learn. With a good teacher, students learn something new at the end of every lecture. The teaching-learning processes should be a matter of **pleasure for the students as well as for the teachers.**

• A teacher needs to monitor the objective of every lecture before he starts his lecture. **He should prepare a lesson plan for the lecture before every lecture.**

• The lecture should not be a set of instructions only. A good teacher should put effort in "connecting" with students.
It is important to provide interactive activities that involve all students in small groups. The quote “Tell me and I will forget, Show me and I will remember, Involve me and I will understand” describes this in a short and memorable way. Additionally, I encourage participation in the classroom by frequent questions and I call quiet students directly to answer some of them. I also try to create a relaxed environment, where embarrassment (for, example, because of wrong answers) is avoided.
A teacher has to ask himself/herself whether the students are learning.

A teacher has to invent variety of strategies, if somebody is not learning and failing to perform.

A teacher has to keep in mind that some students tackle plenty of obstacles. Some students find it more difficult to learn than others, some have social problems (including broken homes, financial stresses). A few suffer from economic problems! Some of them have lost confidence.
A good teacher will always give the students an opportunity to discuss and air their thoughts.

The teachers must have a passion for their subject and teaching. A good teacher must be excited about imparting knowledge to the students.

The teacher has to identify the difficulties of the deficient students. Finally it is his/her responsibility to make the students learn the subject.
A good teacher is expected to be concerned with the overall development of the student. Indeed a good teacher makes everybody feel good, comfortable and confident.

However, just being kind would not work, teachers need to be strict as well, even if it is a pretension. Otherwise the class would be too disruptive. Too much of freedom might lead to pandemonium!

The teacher should make sure that everyone has the “freedom of speech” when the time is right. There have to be some rules but the rules do not have to be irrelevant.
Too many tests are sometimes scary and counterproductive.

Students must develop confidence for self education and ability for life-long learning.

Thought-provoking work can inspire students to learn.
The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires. **Engage students in learning from each other as much as possible (Peer Learning).**

However, the most successful teacher makes himself progressively unnecessary leading to a learning paradigm where he/she learns from the student.
Even bad questions should not be discouraged. Often those are indicators of the level of understanding.
Understanding the way students think is one of the hardest skills that a teacher needs to acquire.

In order to do this, a teacher must like his/ her students at the first place.

An ideal teacher probably always adopts the corrective measures. A teacher will do a very good job, if once in a while, he/ she collects the class notes from the students and analyzes it critically.

Being organized and punctual is important. For any lecture, “board work” is the most important component. The impact of board work is far more effective than other means of communication. Board work should not be clumsy.
Teachers are role models so they have to set a fine example. They should avoid impolite language. Formal language can make a teacher more friendly.

It is hard for the teachers to be ideal all the time and in all these different ways. But some can be achieved through practice and setting up a personal philosophy.
Students learn a lot from a inspiring teacher

- handwriting
- board-work
- his/ her statements
- his/ her mannerism
  (in Hindi, Takia Kalam)
- his/ her thoughts and writing style (language)
- his/ her ideas about the topic of interest
Creation of Academic Ambience is the Challenge. Favorable Ambience is needed even for a Genius................

Ambience is extremely important

Desirable Qualities of a Good Academic Ambience

Galileo Galilei

Sir Humphry Davy

Michael Faraday

David Hilbert

Wilhelm Weber

Carl Friedrich Gauss
During CV Raman’s time- Young scientists were empowered with highest responsibilities….

Homi J Bhabha, Vikram Sarabhai, GN Ramachandran and Max Born were invited to be at IISc

There is need to catch them young and nurture them for future leadership in Science for India.

Qualities of future leadership

- Expert in specific domain area.
- Broad base understanding of multi-disciplinary areas.
- Ability to integrate concepts from various disciplines.
- Vision of the future.
- With strong desire to solve problems.
- Should have less appetite for incremental science.
Purpose of teaching is:

To convey the results of many years of scientific development to students within a span of ~ 2-4 years.

Desirable Qualities of a Good Academic Ambience

Gauss... Weber... Reimann... Plank... Hilbert... Heisenberg......

Galileo... Newton... Laplace... Maxwell... Einstein... Bohr... Dirac... Fermi... Feynman...

Charles... Boyle... Dalton... Mendeleev... Faraday... Haber... Fischer... Hahn... Sanger...

Such minds have taken years to develop some concepts. These cannot all be re-discovered from the beginning.

Purpose of teaching is:

To convey the results of many years of scientific development to students within a span of ~ 2-4 years.
One important function of a teacher is to read many documents and feed the collected information to the students in an simpler form.

Imaginative Science Teaching: The purpose is to ensure a deeper understanding of Science and its uses. The approach described by GJ and KE, is designed to show that science can be an extension of, and can enhance, the pleasures and power of our minds.

It is a need to bring faculty and students from different departments together to tackle interesting needs and innovations. These collaborations will enable us to mine deeper than individual disciplines can alone.

Gillian Judson    Kieran Egan
Six progressive stages of cognitive thinking, known as Bloom’s taxonomy, are:


Cognitive learning is demonstrated by knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem-solving and evaluating ideas or actions.
IIT Guwahati has grown extremely well. The Institute is very well established in academic parlance.

Faculty members, staff and the students have done a commendable job.

IIT Guwahati has to be strategic in order to enter next orbit of excellence.

We require to be more visible in research arena.
Faculty:

Awards Honors: Swarnajayanti, Bhatnagar Prize, Fellows of Indian National Academy of Engineering, National Academy of Sciences India (Allahabad), Indian Academy of Sciences (Bangalore), Indian National Science Academy

Involving UG students more in research.

Attempting some heretofore unsolved problems.

PhD students should be groomed as future faculty. Promoting International Mobility (Joint PhD programmes with the Universities abroad)
Can these be used more and more for the research interaction with the International peer groups?

Asking a crowd for work and only providing compensation to the chosen entries. Commonly seen in design sites.

Creating open-source portals for interactions. Contributing for newer products/ newer drugs/ newer sensors/ novel actuators
There is nothing training cannot do. Nothing is above its reach. It can turn bad morals to good; it can destroy bad principles and recreate good ones; it can lift men to angelship

-MARK TWAIN
Finally in Tagore’s tune......

Where the mind is without fear and head is held high; where knowledge is free; where the world has not broken up into fragments by narrow domestic walls; where words come out from the depth of truth; where tireless striving stretches its arms towards perfection.....................

Is the temple of knowledge, is the Institute where we would love to be..............