

# Report on TEQIP-III Sponsored

## Pedagogy Workshop on Effective Teaching, June 03 - 07, 2019

TEQIP-III sponsored Pedagogy Workshop on Effective Teaching was inaugurated on 3<sup>rd</sup> June, 2019 with the objective of making "teaching-learning process" more effective by emphasizing on innovative practices. This first-of-a-kind workshop was organized by department of computer science and engineering in collaboration with Knowledge Incubation Cell for TEQIP, IIT Guwahati. Dr. John Jose, the course Coordinator had planned various lecture sessions, case studies, panel discussions and group activity in this 5-day workshop. Total 38 participants from various institutes of around 10 states were segregated into four groups for the panel discussion and group activity.

### **Learning from nature by Prof. S. B. Nair, Professor**

1<sup>st</sup> session of the workshop was delivered by Prof. S. B. Nair, Professor, IIT Guwahati on the topic "learning from nature". This session was quite interesting as live examples from Mother Nature were given so as to suggest better solutions for solving real-time problems. "Bio-inspiration" has always answered quality solutions to research-based problems in minimal time. "Nature is the best Teacher" as one can always learn from one or another activity of nature and can become intelligent enough. Ant colony optimization (ACO), Particle Swarm Optimization (PSO), Genetic Algorithm (GA), Firefly Algorithm (FA) etc. are few examples..

### **Pedagogy in Engineering Education by Prof. Ratnajit Bhattacharjee**

Next session on "Pedagogy in Engineering Education" was delivered by Prof. Ratnajit Bhattacharjee, IITG where various learning styles like Kolb's theory (4 stage), Bernice McCarthy (4MAT), flipped classroom were elaborated. Teaching theories like transfer, broadcast, shaping, traveling etc. were also the point of discussion. ADDIE model having 5 phases i.e. Analysis, Design, Development, Implementation, Evaluation can make knowledge acquisition more effective and efficient. Engineering Pedagogy emphasizes more on learner-centered approaches and further on Outcome Based Education (OBE). Teaching Aids, methodology and MOOCs initiatives were also summarized.

Last session of the first day conveyed few ideas for being self-reflective teacher. 'right mental attitude' and 'professional development journal (PDJ)' are the steps towards reflective practices. Problem based learning (PBL) along with its need and characteristics was discussed. PBL is basically a teaching methodology where students in the form of a group, are given problems and are required to apply knowledge and skills to develop a solution for defined problem.

### **Psychological Aspects of Teaching by Nachiketa Tripathi**

The speaker delivered the talk on Psychological Aspects of Teaching starting with the difference between 'teaching and effective teaching'. As per the speaker, knowledge is always there in the world but when it was

Some person then only it is known to world and how to apply the knowledge (what, how, why, wisdom of the user. So teacher's main aim is to inculcate the such things in student that their could be enhanced to apply the knowledge. Then the speaker talked about the learning process. and teaching are parts of one general unit process. Superior teaching rests in part on a clear vision of the learning process. The learning process can be divided in to three parts a) Comprehension, b) Recall, and c) Creative thinking. Comprehension is absorption of idea, where a successful comprehension is motivation and desire to learn. Recall is process of remembering. In a restricted but useful functional sense, we mean by the word "knowledge" only the power of volitional recall of comprehended material. Creative thinking is creative use of knowledge. The highest type of teaching involves helping the student to acquire the ability to apply his knowledge to new situations – that is, to think. Then after the speaker talked about the communication process which consist of sender through channel to receiver, all that process is incomplete without feedback process. The resource person intends to focus on the relationship between student and teacher, understanding student in term of his/her background, level, culture, program requirements and interest can make the teaching learning process effective as the student will feel more comfortable and focus more on the study. Some reinforcement techniques like punishment, reward, omission, shaping can be implemented for better delivery of the course.

### **Teaching as a Profession: Challenges and Opportunities by John Jose**

The speaker (coordinator of the workshop) delivered a talk on teaching as a profession and challenges & opportunities associated with it. The speaker starts the session with a quick self reflection survey for audience and himself about the teaching as career. The speaker empathized on the inputs and output of the teaching learning process. 'Preparation is the key' this slogan implies to before during and after the class activity to deliver the things properly. Being energetic and active in the class will be helpful to attract the class towards your lecture. To make the consistent interest in class of the students, try to connect the study with suitable stories and examples. Use of technology in teaching style and innovative assessment methods will make the difference in traditional teaching learning process. Encourage and involve the students in classroom activity for effective teaching learning process. Appreciation in public and correct in private theme will make a difference. The speaker discussed that sometime teachers need to build a team for some works. He discussed that how to manage the team and be a good manager. The speaker discussed about to empower and enable the teachers, public relation management and use of local democratic bodies as opportunities.

### **How the Teacher in You can make the Country Proud? by John Jose**

The speaker (coordinator of the workshop) delivered a talk on how the teacher can make the country proud. The speaker starts the presentation with some amazing facts about India which brought laurels to it's dignity. The speaker showed some famed Indian faces of different fields, and played one game about guessing their names. Then speaker discussed the real facts of current scenario engineering in India like lack of interest of student in engineering and its reasons. The speaker talked about the teaching as noble profession, and teacher's duty to maintain the serenity of the statement. The speaker empathized on the use of new practices in



ing process for the better teaching learning process. Most of the session was equipped with in by the motivational quotes by famous persons.

### **Challenges in Implementing Problem Based Learning and Outcome Based Learning” by Dr. Moumita**

4<sup>th</sup> day of the course kicked off with a panel discussion on “Challenges in Implementing Problem Based Learning and Outcome Based Learning”. Dr. Moumita Patra, Assistant Professor- CSE supervised this session. The participants were divided into four groups and one participant from each group represented his/her team in the panel. After having detailed discussion on the challenges, the panel members picked a few barriers in implementing Problem Based Learning(PBL) and Outcome Based Learning(OBL) in engineering courses. As discussed, the major problem in implementing PBL is unpreparedness of students and teachers. The students do not have prerequisite knowledge to understand the problem, ability to work in the groups and willingness to put efforts. On the other side, the teacher may not be open to adapt to new teaching practices as PBL changes the role of a teacher from content deliverer to solution facilitator. Another major challenge is the assessment of students. For example, students working in a team may have varying contribution. On the achievement of the outcome or solution of the problem, how will a teacher grade the contribution of the students remains a big challenge. Moreover, for Institutions, it may be challenging to change educational philosophy that currently involves lecturing. Need of staff development and infrastructure development can also be major obstacle, if the institutes have limited funds.

### **Essentials and Desirables to Excel as a Good Teacher by Prof. P.K. Das**

The first resource person of the day, Prof. P.K. Das, Professor- CSE delivered talk on “Essentials and Desirables to Excel as a Good Teacher”. The opening slides of the presentation were about the glory of IIT, Guwahati leading to the conclusion that we all need to feel proud of our respective institutes. He, then, emphasized on the importance of Pre-Lecture Preparation and Post-Lecture Review. Highlighting the points what makes a teacher, an excellent teacher, he discussed the importance of meticulous observation of students’ non-verbal communication. For example, rather than analyzing the feedback given by the students at the end of the semester, observe how they respond to you during each class. According to him, encouraging the students to ask questions and creating humor in the class is very helpful to make sure that students do not hesitate to ask the question. He also discussed the problem most teachers face is how to prepare to deal with students of different comprehension levels followed by proposing some implementable solutions.

### **Need for Problem Solving Approach to Face Competitive Exams by Dr. T. Venkatesh**

The next session of the day was on “Need for Problem Solving Approach to Face Competitive Exams”. The resource person, Dr. T. Venkatesh, Associate Professor- CSE, explained the pattern of GATE exam and shared some shocking statistics on the performance of engineering students in GATE exam. The focus of the talk was to discuss how to prepare the students to perform well in this exam. Discussing the qualifying criteria of GATE exam, Dr. T. Venkatesh mentioned that sum of mean and standard deviation of marks is taken as minimum qualifying marks. But since these cut off marks are very low due to poor performance of candidates,

his exam challenging, 25 marks(out of 100) is chosen as cutoff marks. However, for OBC (NCL) and ST/PwD, 0.9 times GEN qualifying marks and 2/3 times GEN qualifying marks are cutoff marks respectively. He further went on to explaining the types of questions asked in GATE exam. The first category "All" questions test long term memory skills and are based on facts, principles, formulae or laws of the discipline. The next types of questions are designed to test candidate's understanding of the fundamentals and are in the category of "Comprehension" questions. The difficult level is set moderate to test if the candidates can draw simple conclusions from fundamental ideas and perform short and simple computations applying some formulae. The "Application" level questions assess candidates' ability to apply knowledge either through computation or by logical reasoning. The last, "Analysis and Synthesis" are the most difficult and require careful analysis before answering. Synthesis question requires comparison of two or more pieces of information and recognize unstated assumptions or separate useful information from irrelevant one. Keeping these in mind, a teacher should plan his course such a way that he can make the course content fit in this hierarchy of concepts. He emphasized on preparing students to solve complex problem, design experiments, make predictions and check solutions. Apart from that, the teaching process should instill curiosity in students to question where formulae come from, what is the purpose of design, what to do if problem is difficult.

### **Sensitivity, Sustainability & Selfless Evolution: Traditional Plus Modern Approach in Pedagogy by Prof. Sunil Khijwania**

Prof. Sunil Khijwania, Professor-Physics took the last session on "Sensitivity, Sustainability & Selfless Evolution: Traditional Plus Modern Approach in Pedagogy". He discussed various teachings from the religious books and their significance in modern education. He emphasized on continuous learning, encouraging the students to ask the questions and answering them with right attitude.

On 7<sup>th</sup> June i.e. last day of the course, few significant topics were covered: (i) "AICTE exam reforms" by Dr. Hemangee Kapoor where the role of Bloom's revised taxonomy in analyzing various levels of knowledge i.e. factual, conceptual, procedural and metacognitive was discussed. (ii) "Role of ICT tools for effective teaching" by Dr. Samit Bhattacharya, Professor, IITG where technologies like interactive smart board, augmented reality, virtual reality, intelligent tutoring system were detailed. Online course management systems like Moodle, ATutor, Cogno etc.; digital devices for classroom interaction like Socrative, Poll Everywhere etc.; Blended learning platform like Bring Your Own Device (BYOD) were discussed. Information on "Avabodhaka" smarter classroom at IITG was also shared which is useful in case of large classes and students can put their queries to the teacher online.

Group discussion on "How we can create role model teachers and inspire more people to consider teaching as career option" was conducted where feasible solutions were suggested by all the group members.

In the concluding session of this workshop, participants shared their "takeaways" from this course and were motivated enough to become best facilitators for the future generation of this country. Thus, course ended on a positive note.