Workshop on Technology-Enhanced Learning

February 28 to March 1, 2019

Workshop report

Organized by

Centre for Educational Technology,

Indian Institute of Technology, Kharagpur

In Association with

Commonwealth Educational Media Centre for Asia (CEMCA) and Shri Gopal Rajgarhia International Programme(SGRIP)

Venue: CET Studio-1, Centre for Educational Technology

Introduction

The Indian Institute of Technology Kharagpur (IIT KGP) is the first of the IITs to be established, and is recognized as an Institute of National Importance by the Government of India. Under IIT KGP, the Centre for Educational Technology (CET) is primarily a research Centre and concentrates mainly on technology and technology infrastructure development and also conducting research in the area of TEL.

Technology Enhanced Learning (TEL) comprises a variety of innovative ICT solutions to deal with numerous evolving educational challenges. These challenges include improving the experience of learners, academics, and institutions; providing an adaptive, effective, and personalized learning to every learner, managing and meeting the users' requirements, to mention but a few. Overcoming these challenges can empower learners and consequently the overall society, and contribute to improving the community quality of life. Utilizing ICT in education, or in another word TEL, can facilitate efficient e-learning models where technology helps learners to build their own advanced critical thinking capabilities.

Objectives

- To develop research collaboration between CET and international institutes
- To develop roadmap for the integration of cutting edge 21st century technologies in education
- To bring together leading academicians, researchers, practitioners, and policy makers
- To discuss and demonstrate how both lifelong learning and technology can indeed be a solution for future educational challenges

Workshop Flow

The two-day "International Workshop on Teaching-Enhance Learning" (IWTEL-2019) was organised by Centre for Educational Technology, started on 28th February and concluded on 1st March 2019. This workshop was supported by Commonwealth of Learning & Commonwealth Educational Media Centre for Asia (CEMCA) and Shri Gopal Rajgarhia International Programme (SGRIP).

The field experts from reputed institutes were invited to attend the workshop, who were asked to introduce various initiatives being taken to improve the teaching-learning process in the current era.

Day-1 (28th Feb 2019)

The program started with the welcome address by Prof.Rajib Mall (HoD, CET) who stated the importance of educational technology and introduced the issues regarding the learning procedure and its complexity. He also pointed out the role of CET, IIT Kharagpur in improving quality of education through pedagogical and technological innovations carried on a regular basis in the centre.

Dr. Anandaroop Bhattacharya, Associate Dean, International Relations, stated the positive reasons that why this type of more workshops should be organized in future and express his eagerness, on behalf of IR to participate in future events in CET.

Dr. Bani Bhattacharya, Associate Professor in CET, IIT Kharagpur, mentioned the concepts of this workshop in the following points:

i) This workshop does not focus on the technological aspects of Educational technology.
ii) Instead, it focuses on the directions, educational fields should take,
iii) How technology can help to reach that goal.

Dr. Kaushal Kumar Bhagat, Assistant Professor in CET, IIT Kharagpur, cordially invited the first speaker of the day, Prof. J. Michael Spector, former AECT President, University of North Texas.

Prof. Spector started his presentation by describing the methods by which technology can be used to improve the reasoning ability of humans. He provided the steps which can be covered to reach the level where a human can critically think "what he is doing?" and "what he knows?". The initial stage of these steps was a collection of data and retrieving information from those data and then using knowledge to analyse and evaluate the information extracted. He concluded his presentation by discussing the question "What would be required in order to plan, implement and evaluate a strategy to improve the average level of intelligence in a large population significantly".

Prof. Ajoy Kumar Ray, IIT Kharagpur, was the next invited speaker. He talked on the manner, how the neurons in brain of students' works while they are in learning process i.e. either during lecture, or in group discussions etc. He ended his talk by stating that visual perception is one of the best way of learning and students can learn in better way by teaching others.

Prof. Souvik Bhattacharya, Vice Chancellor, IIT Kharagpur was the last speaker of the day. He introduced the audience about Work Integrated Learning Programmes (WILP), which aim to provide individuals with the highest quality educational experience relevant to their specialization along with opportunities to upgrade and stay relevant, without having to give up their job. Work Integrated Learning Programmes are as rigorous as any on-campus programme from BITS Pilani and are unlike any Distance learning, eLearning, Part Time, or Correspondence programmes. Since its inception, WILP has helped individuals realise their ambition of gaining a higher education while meeting their career goals.

Day-2 (1st March 2019)

Dr. Bhagat started the fresh day by inviting *Prof. Fang-Ying-Yang*, Director of GISE, National Taiwan Normal University for her talk.

Prof. Yang's talk was mainly focused on measures to increase the scientific literacy in current information era and its importance. She described the PISA Global Competence Framework, which is the assessment of cognitive processes used,

i) to evaluate information, formulate arguments and explain complex situations and problems,
ii) to identify and analyse multiple perspectives and world views,
iii) to understand differences in communication, and
iv) to evaluate actions and consequences.

Dr. Shyamal Kumar Das Mandal, Assistant Professor, IIT Kharagpur was our next speaker. He informed the challenges an individual or organisation of the 21st century is facing in order to improve the teaching-learning process. Some of those were, student engagement, student's attitudes, ensuring lifelong learning, teaching a large class and many more. Further, he described how Outcome Based learning can be useful to face these challenges.

Dr. Das presented framework and guidelines for quality e-content development, this is a project funded by CEMCA. This project is engaged to develop e-content which is operating through an online/blended learning approach to provide a better learning process.

Day-3 (2nd March 2019)
A brainstorming meeting was held to discuss the guidelines for E-content development which was presented by CET research team. This project is funded by CEMCA. Prof. Rajib Mall, Prof. J. Michael Spector, Prof. Fang-Ying Yang, Prof. Bani Bhattacharya, Dr. Kaushal Kumar Bhagat, and Dr. S. K. Das Mandal joined the meeting. First draft of the guideline is the output of this meeting.

The workshop was concluded with thanks note by Dr Kaushal Kumar Bhagat.

Framework and Guidelines for Quality E-content Development

1st Draft

1. Introduction

Institutional Learning is often a complex cognitive skill occurring in a loosely structured, dynamic environment. In the 21st century, learning process has also been influenced by the expansion and evolution of computers, network, and multimedia technologies. These technologies allow the learners to participate in an active and self-paced learning environment. Such technologies do not necessarily change the basic teaching process, but lead to changes in the teaching resources available. They can add interest to the course content and delivery. In the 21stcentury, learners use educational technologies to apply knowledge to new situations, analyze information, collaborate, solve problems, and make decisions.

Twenty-first century education framework should therefore, be outcome based, with certain critical core competencies such as collaboration, digital literacy, critical thinking, problem-solving, and self-learning. The learning framework should incorporate higher order thinking skills, multiple intelligences, technology and multimedia, communication skill and self-learning methodology along with authenticated scientific assessments and evaluation. The teaching-learning framework should provide direction so that students can learn by themselves and work both independently and interdependently.

A Learning framework or curriculum should not be textbook-driven or fragmented syllabus. It should be the set of Specific, Measurable, Appropriate, challenging but Achievable educational objective or Skills (outcome) which students will acquire at the end of the course / programme.

Evaluation of student achievement can be made more valid and reliable if the benchmark of achievements is explicitly stated.

Mere creation of learning resources is not sufficient to address the need of twenty-first century education. There is an urgent need to develop an e-content development frame work which includes outcome based curricula, teaching learning process, learning recourses and valid and reliable assessment, evaluation methods. The proposed framework should support the following objectives:

- It should improve student engagement by promoting self-learning so that within limits, learners are allowed to follow their own pace.
- It should equip student with 21st century attitude and skills i.e. (UG engineering students need to take considerably more responsibility for their own learning than is the case at present). Learning to learn, communication skills, working in groups are to be important learning outcomes in addition to domain specific knowledge.
- Provide adequate learning resources to support different learning styles and learning approaches.

- Framework should provide facilities to continuously improve and update the curricula (learning outcome) by incorporating better educational resources from industry and domain experts.
- Framework should also Include adequate number of nontrivial practice problems, assignments etc. matching with every learning outcome to allow students to test their learning achievement.

2. The Proposed framework and guideline

The proposed framework is a collaborative web based tool for developing, monitoring, sharing and administering Outcome-based Learning with 21st century needs and it includes considerable guidance on the concepts of outcome-based learning and principles of self-learning pedagogy.

Figure-1 describes the structure for e-content development

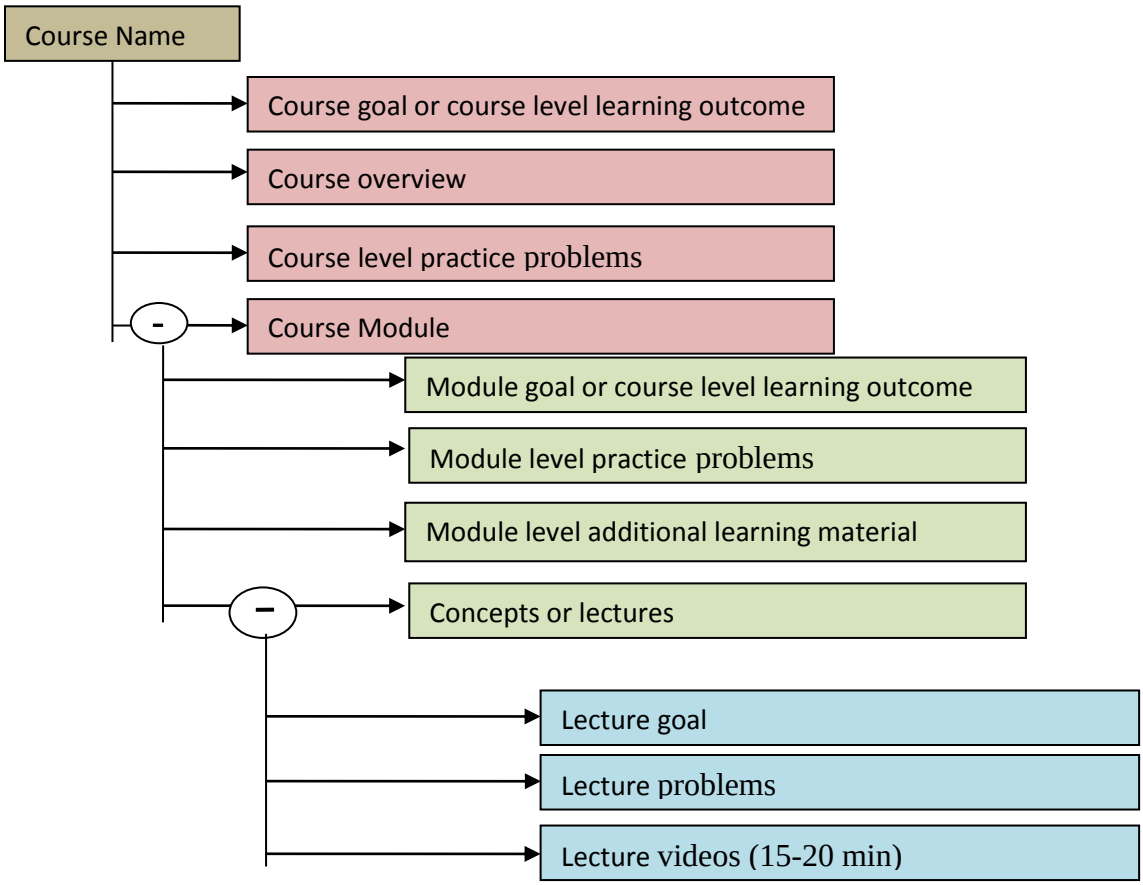

Figure-1: Course structure for e-content development

Course and duration: Identify the area or topic with appropriate name and develop the above structure of the course. A course can be divided into appropriate number of modules and the duration of the modules depends on the duration of the course. If the course is developed for short duration (4-5 week) and 15-20 hours of learner learning time, then each of the modules will be for one week.

For long duration courses (10-14 week) calling for 30-40 hours of learner learning time, the module duration will be 2-3 weeks. Each of the modules will be divided into number of lectures. There will be 3-4 lectures in every week. Each of the lectures will consist of video content of about 15-20 mins.

Course goal or course level learning outcome: Course goals are major domain specific outcomes based on Instructional System Design (ISD) principles which are specific, measurable and can be demonstrated by learner on completion of the course. The cognitive level and complexity of the course goal depends on the academic level for which course is targeted. The number of course goals depends on the duration of the course and learner learning times. Generally, for short duration (4-5 week) course, course goals could be around 3, with a learner learning time of15-20 hours.

Table-1

Course duration	learner learning time	Numbers of course goals
4-5 week	15-20 hours	2-3
10-14 week	30-40 hours	5-6

Course overview: One paragraph write-up on course coverage and one paragraph write-up on how this course fits into the learner requirement (with real life example).

Course overview should not exceed one page.

Course level practice problems: Practice problems/case studies related to course goals. Learner will use these problems for self-assessment purpose. At least one problem per course goal must be included in the course.

Course Module: Each course divided into appropriate number of modules.

Table-2 shows the duration distribution for the module.

Table-2

Course duration	learner learning time	Module duration
4-5 weeks	15-20 hours	1 week
10-14 weeks	30-40 hours	2-3 weeks

Module goal or course level learning outcome: The major skill/concepts students have to achieve for that module. It should be written according to ISD principles and be - specific, measurable and achievable after completion of the module.

Module level practice problems: Practice problems/case studies related to Module goal. Learner will use these problems for self-assessment purposes. At least one problem per course goal must be included in the course.

Module level additional learning material: For every module, a self-study guide is to be prepared. Details of page nos. / chapters of text books, most relevant journals, most relevant websites, simulation tools, other videos as applicable, to enable students to learn on their own, either individually or as members of small collaborative groups. The references are expected to be precise to reduce learning time. The text books and journals suggested are expected to be easily available.

Concepts or lectures: Each lecture must be consistent with lecture goals, lecture problems, link with goals, and lecture related videos. The length of a lecture video must be 15-20mins in duration and be very specific to the lecture goal. Videos should explain the concepts covered in the lecture with concrete real-life examples.

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Workshop Schedule

Day-1(28/02/2019)	
9:00AM- 9:30 AM	Registration
9:30 AM-10:00 AM	Opening remarks
10:00 AM-10:30 AM	**Tea break**
10:30 AM -12:00 PM	**Speaker 1:** Prof. J. Michael Spector, Former AECT President, University of North Texas
12:00 PM-1:00 PM	**Speaker 2:** Prof. Ajoy Kumar Ray, IIT Kharagpur
1:00 PM- 2:00 PM	**Lunch (Technology Guest House)**
2:00 PM – 3:00 PM	**Speaker 3:** Prof. Souvik Bhattacharya, Vice Chancellor, BITS Pilani
3:00 PM- 3:30 PM	**Tea break**
End of Day-1	
Day-2 (01/03/2019)	
9:30 AM -11 AM	**Speaker 4:** Prof. Fang-Ying Yang, Director GISE, National Taiwan Normal University
11:00 AM -11:30 AM	**Tea break**
11:30 AM -12:30 PM	**Speaker 5:**Dr. S. K. Das Mandal
12:30 PM-1:00 PM	Closing ceremony
End of Day-2	
Day-3 (02/03/2019) : **Closed room discussion** ***(10:00 AM- 2:00 PM)***	

Workshop Photos