



TERNA PUBLIC CHARITABLE TRUST'S
TERNA ENGINEERING COLLEGE

Engineering Product Innovation Center (EPIC)

1. **Title of the practice:** Engineering Product Innovation Center (EPIC)

2. **Objectives of the practice:**

- Create culture of project based learning
- Projects built by students enhances the skills of students and makes them more employable
- Develops a culture of innovation

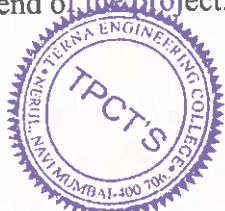
3. **The Context**

The Awareness of EPIC is to enable students to conceptualize their projects. EPIC is envisioned to be an eco-system that incubates required Lab Facility for all projects, dedicated mentoring, online and in person mentoring. The fundamental to design this system was to make sure Students learn and work, by means of rectification recapitulations with mentors, completes the desired tasks of the project. EPIC attached in Industry Collaborations to make this process in Hybrid Mode (Online and Offline) and more feasible to students. "Learning" was an important factor hence relevant courses were given access and relevant in person "Mentor Sessions" were designed for the project Teams.

4. **The Practice**

EPIC Operation was alienated in Cycles spread over 03 Cycles starting from 6th Semester. The first cycle was focused on "Project Selection" and designating Learning Tasks to the Project Teams. The Project list is provided by industry mentors and categorized according to qualification level. Industry Mentors suggested to bifurcate and allow only teams that have certain level of Technical Aptitude to choose difficult project. Hence all teams need to appear in the Technical Aptitude test to qualify for the project. Once The Project selection window is open, Teams with marks above threshold can select the difficult project and all others are open to select moderate and simple level of difficulty.

The Second Cycle begins quickly once the Project Selection is concluded. All teams are assigned the Learning Material and assignments to be submitted. This cycle continues with start of 7th Semester and first Project Day is marked with In Person Industry Mentor meeting with Students, Guide and Project Coordinator. This Meeting outcome is "Tasks List" for complete project. We made use of a portal for project management and communication with students, Guide and Industry Mentors. Each Team need to submit the response to given task on given certain deadlines. A Communication thread is opened to each task that makes Mentor to advice, Coordinator to monitor the progress. Once the Industry Mentor is satisfied with work done in the task, Mentor marks it as resolved. Once all the tasks are completed, Project is considered to be completed. A final Project video is submitted at the end of the project.



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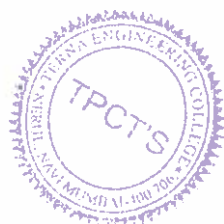
Along with Final Year Projects, EPIC is open for all the teams working on Innovative projects and participating in National and International Level competitions. The EPIC facility is open for all such competitions 24x7. Each Team is funded once they reach on quarter finals or Semi Final level.



Fig. Knee Assist Device

5. Evidence of Success

Team “e-Netra” won 5 Lac INR as Product Development Fund from DST & Texas Instruments Innovation Challenge 2017. E Netra formed a start up and fund was utilized to make Industry grade product. Promising prototypes of “Prosthetic Arm”, Table Tennis training Robot, Epilepsy Seizure Detection System and Knee Assist Device are in process of converting into Industry level product.



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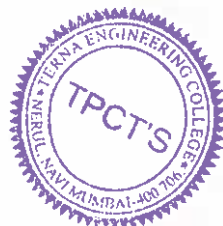
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Fig. Mentor, Mr. Zain A (IIT Kharagpur) in interaction Session with Project Teams



Fig. Mentor, Mr. Pranay Kishore (IIT Kharagpur) conducting Learning Session with Project Teams



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Fig. "e-Netra" Project Prototype

6. Problems encountered and resources required

Time to time, We were required to procure special hardware's in specific projects as requested by Mentors. Few hardware's were expensive and available only at International market. TEC approved these funds once Industry Mentors validated the requirements. Students needed floor assistance in EPIC to help them in trivial issues such as Soldering/Coding issues/Issues with Microcontrollers etc. To resolve this, TEC appointed 03 Floor Engineers to be available in EPIC.



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LynxE Virtual Learning

1. Title of the practice: LynxE Virtual Learning

2. Objectives of the practice:

- To enhance the Teaching Learning process
- To aid students with 24x7 learning beyond academic engagement as well
- To provide students with Virtual Labs and latest smart hybrid teaching learning technology
- To aid teachers with latest virtual labs to enhance the quality of the labs

3. The Context

The use of LynxE was the step towards enhancing the student engagement and imparting quality content and specialized Virtual Labs under LynxE from First Year to Final Year Engineering students across all the Departments. The Idea is to give students different dimension to learn other than Classroom Learning. The blend of LynxE offerings were well suited for overall growth of the students.

4. The Practice

Virtual Learning has been one of the aspects that has been brought in focus since last 01 year. TEC has envisioned to make the Virtual Learning as an essential part of the education being imparted to its student.

The introduction to the LynxE LMS by TEC Management has marked the stone going beyond the regular approaches in LMS. The LynxE LMS has features such as Simplified Content which contains the 3D Visualized concepts. Every Concept is explained in a manner to make sure it it's well perceived. Second is Instructor Led Training, A recorded session of each Unit becomes a handy one in order to learn it from Instructor. This supports and clears out any doubt of students. Students can watch 3D concepts and Recorded Instructor Lead Videos any number of times.

Next is Numerical Assist; Numerical Assist consist of all important types of Numerical solved by Instructor stored in form of recorded videos. E-Books in form of flip book in order to help student write up in the exam. Before Exams, Last Minute Revision (LMR) is conducted for each subject by the individual Instructors.

LynxE Integrated Virtual Labs are having the significant impact in Institutes Virtual Learning and to overall Teaching Learning Process. **LynxE Virtual Programming lab** recorded 90 thousand submissions across our both Institutes (TEC- Nerul Campus and COE, Osmanabad Campus). We conducted 28 real Labs in our LynxE Virtual Programming Lab across all departments. It Covered major programming languages from C Programming, Java, DBMS, PHP to ruby rails etc. **Circuit Simulation Lab** was popular as it gives a multiple outputs and waveforms that helps students to check for waveform



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output on the go and Ability to clear all the concepts of basic electronics and Digital Electronics. We covered around 20 Electronics related Labs. **Remote Electronic Hardware Lab** was integrated with LynxEto provide access remotely placed Lab Setup in Australia to our students. This lab is a real lab connected when required by students. For Mechanical Engineering students, TEC made the High Configuration Lab Computers available for them. This helped students to work on the software that are too heavy to be installed on their laptops/Desktop at Home. **MATLAB Grader** and Machine Design Online virtual Labs enabled students for better learning.

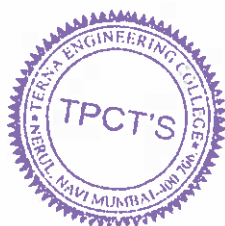
Terna Interactive Zybooks (By Wiley India) are a unique offering in LynxE integrated services. The Zybooks for each technical domain have interactive online book. It have animations and quizzes to make sure student is learning and perceiving the concepts. The whole experience of having the Virtual Learning at are our disposal greatly enhance the opportunity to learn at self-pace and not to miss out on anything in academics.

5. Evidence of Success

We have seen the utilization go high on regular interval. Students have utilized the Virtual Labs beyond academic hours. We have the analytics feature that shows the daily utilization report in LMS. LynxE Virtual Programming lab recorded 90 thousand submissions across our both Institutes (TEC- Nerul Campus and COE, Osmanabad Campus). Circuit Simulation Lab was also popular and its utilization was also good. Remote Electronic Hardware Lab is a real lab connected when required by students. MATLAB Grader also helped student to submit assignment online. Following are the utilization and feedback. We have observed the utilization of Virtual Labs starting from 8 pm, peaks around 10 pm and observed traffic till 5 am in the morning.

6. Problems encountered and resources required

Adaption was a challenge initially but once it started professors were comfortable. Adaption of Virtual labs was a challenge for students as well but later, it was comfortable. Constant orientation and assistance in using it helped students to use it effectively.



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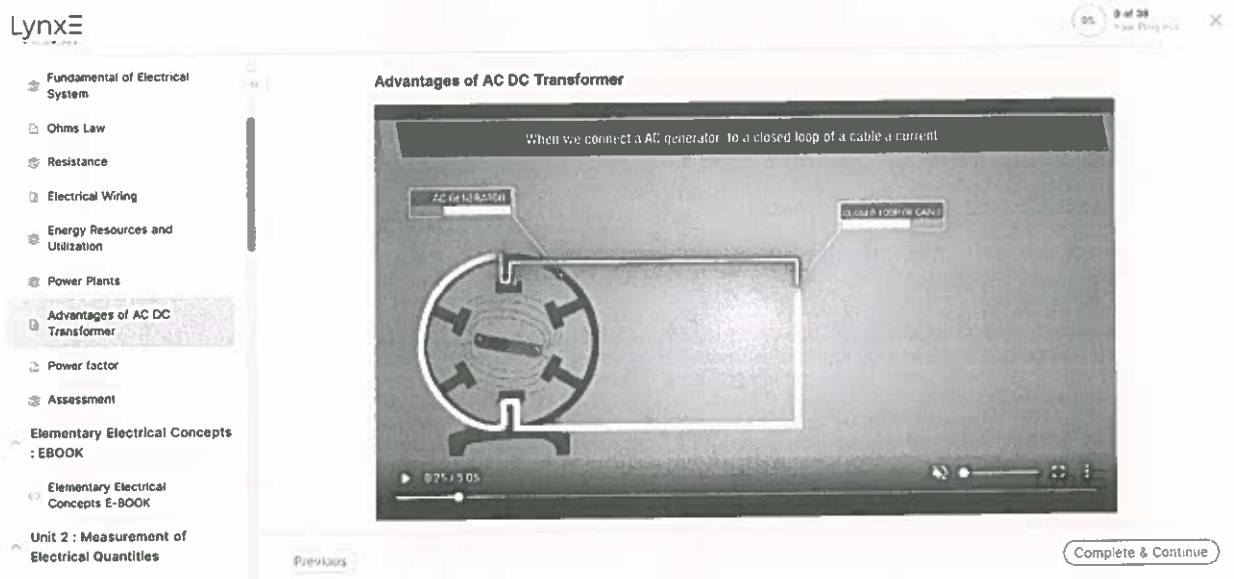


Fig. 3D Visualized Concepts

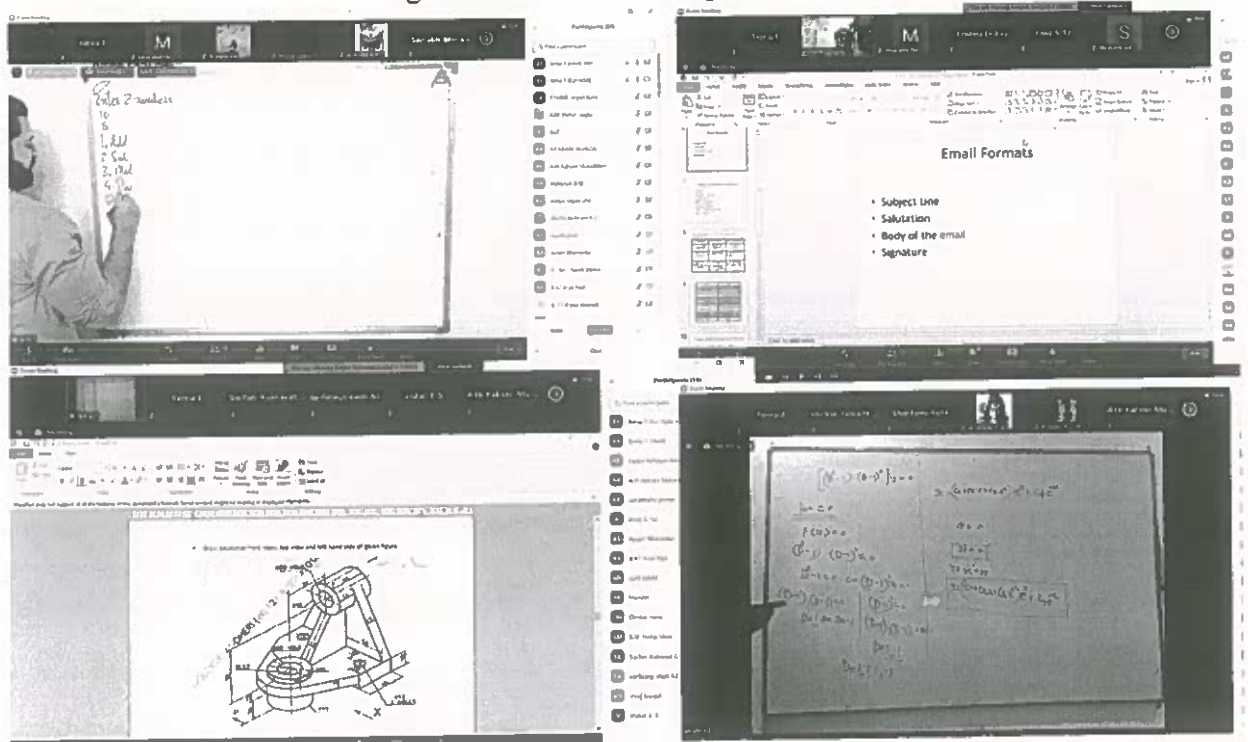
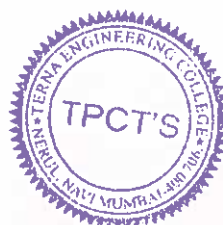


Fig. Instructor Led Sessions



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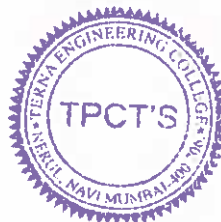
Virtual Programming Lab (CodeZinger)- Progress

Data Structure Lab	Semester III	Computer Engineering	SE (COMPUTER)	A: 67	Mr. Dayanoba K. Chitre	Mr. Pravin B. Hole	Total 130+ problems assigned, completion rate 68 %
				B: 70	Mr. Pravin B. Hole	Mr. Gaurav S Deshmukh	Total 116 problems assigned, completion rate is 74%
				C: 65	Mr. Pravin B. Hole	Mr. Dayanoba K. Chitre	Total 66 problems assigned, completion rate 83 %
Object Oriented Programming with Java	Semester III	Computer Engineering	SE (COMPUTER)	A: 87	Mrs. Ujjwala V. Gaikwad	Mr. Vishwaji B. Gaikwad	Total 200+ problems assigned, 81 % completion rate
				B: 70	Dr. Sandeep Raskar	Nilesh Kulkarni	Total 200+ problems assigned, 80 % completion rate
				C: 65	Mr. Vishwaji B. Gaikwad	Nilesh Kulkarni	Total 200+ problems assigned, 78 % completion rate
Still Lab: C++ and Java Programming	Semester III	EXTC	SE(EXTC)	A	Mr. Kishor Salunke	Mr. Kishor Salunke	Total 64 problems assigned, 64 % completion rate
				B	Mr. Kishor Salunke	Mr. Kishor Salunke	Total 64 problems assigned, 65 % completion rate
Data Structure Lab	Semester III	IT	SE(IT)	72	Prof. Smita S.	Prof. Smita Deshmukh	Total 26 problems assigned, completion rate is 81 %
SQL Lab	Semester III	IT	SE(IT)	72	Prof. Smita Deshmukh	Jayesh Sarwade	Not yet started due to syllabus coverage
Computer Programming Paradigm Lab	Semester III	IT	SE(IT)	72	Prof. Dipika Deshmukh	Prof. Smita Pai	Total 42 problem have been assigned, completion rate is 69%
Java Lab (SBL)	Semester III	IT	SE(IT)	72	Mr. S. Bolechode	Prof. Smita S.	Total 38 problems assigned, 76 % completion rate
Intelligence System Lab	Semester VII	IT	BE(IT)		Dr. VIJAYALAXMI	Prof. BHAYA KADU Prof. BHAYANANDAN	Total 116 problems assigned, almost 66 % completion rate
Still Virtual Lab	Semester III	Electronics	SE(ELEX)	Electronics	Dr. Sandeep Raskar	Mr. Vishwaji B. Gaikwad	Total 18 problems assigned, below 45 % completion rate, Low activation
Data Structure Lab	Semester III	Mechatronics	SE(MTRX)	Mechatronics	Mr. Gaurav S Deshmukh	Saylee Narkhede	Total 28 problems assigned, completion rate is 73 %

Fig. Virtual Programming Lab Progress

code* zinger			Lynx® - Activity Report for period Oct 19, 2021 - Oct 20, 2021		
Total New Submissions		Requiring Manual Grading		Automated Grading	
64033		719		63314	
Last week: 85		Last week: 0		Last week: 85	

Fig. Virtual Programming Lab Submissions



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