



An Autonomous Institute
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Best Practice – 1. Title of the Practice: The Tomorrow’s Engineers Club

Objectives: The Tomorrow’s Engineers club is a college affiliated club which provides opportunities for students to interact with other fellow students from various engineering disciplines and develop team spirit, leadership and practical skills. This is a platform for MVJCE students to be successful inside and outside the class room. The Tomorrow’s Engineers club is to take up Engineering studies as a team sport. It is helping to get involved with other fellow students and discover new areas of interest. It is helping our students to think out of the box and enhance problem solving skills. The Tomorrow’s Engineer’s club is developing practical and leadership skills in students. It is having a network with professionals in and around Bangalore.

The Context:

We need more engineers for the betterment of society. For that we need more young students to understand how what they learn at college is used in the real world. Giving young people the chance to talk directly to engineers and engage in hands-on activities that showcase and contextualize engineering is at the heart of the Tomorrows Engineers approach. We have to explore the young engineering ideas, meet engineering researchers and professionals, and work on a hands-on engineering project. Here Interdisciplinary teaching and learning occurs when practitioners from traditional disciplines join together to work on a common question. Interdisciplinary workshops allow for synthesis of ideas and the synthesis of characteristics from many disciplines. At the same time, it addresses students’ individual differences and helps to develop important, transferable skills. These skills, such as critical thinking, communication and analysis are important and continually developing at all stages of life. Educational systems are serving students best if they enable and encourage students to build their own interdisciplinary pathway. This approach is sure to foster a love of learning, ignite a spark of enthusiasm and address learning differences for students.

The Practice:

The Tomorrow’s Engineers program brings together the engineering community in a collective drive to build the future generation of engineers needed by the industry. In MVJCE, every semester one workshop is organized by the Tomorrow’s Engineer’s club so that the students are getting an opportunity to think out of box. The Tomorrows Engineers club conducted a workshop on “The Problem solves skills –An innovative and creative approach”. In that three-day workshop the student participants had an insight of 1. What is engineering? And marvels in

engineering field. 2. Importance of problem solving skills, creativity and innovation in engineering. 3. A systematic approach towards problem solving. For inspiring and encouraging the students in the Tomorrow's Engineer's club, faculties from different departments are giving talk on different topics like, creativity and innovation, real time examples of creativity and innovation etc. Teams are presenting their ideas on the chosen open-ended problems. All the presentations by the students on open ended problems are having a societal impact. Student presentation on problems and the stakeholders are also involved in a problem. The "Tomorrows Engineers" Club organized a three-day workshop on "Societal Concerns and contribution to solve societal problems "under the workshop series on "Problem Solving skills –An innovative and Creative approach". In the series of Tomorrow's Engineer's club workshops, the participants understood the importance of problem solving skills and the role of engineer in society. Teams (with interdisciplinary participants) were formed and open ended problems were given to the teams. The participants had an insight on systematic approach to solve a problem. The teams were asked to find the solution for the open ended problem they chose. Then the teams presented their solutions to the jury. Finally the importance of stake holders in problem solving was made clear to the participants. The teams had to choose their own problem and identify stake holders for that problem. The challenges of sustainability and responding to climatic change define the careers of 21st century engineers. This workshop gave a platform to a new conception of engineers in order to meet these challenges. The open ended problems discussed in the 2018 workshops were.

Team I - Heart Attack detection System

Team II – Waste management

Team III - Smart Helmet

Team IV - Smart Vehicle safety system

Team V - Braille Book

Team VI - Solar amphibious vehicle

Team VII - Kid E-track

Team VIII - Smart Farming

Team IX - Blind man's walking stick

Team X - Organic sensor

Team XI - Smog detection and removal, using drone

Team XII - Smartect automation and security, using IoT

Team XIII - AI based segmentation and classification of brain tumour

With the idea of making MVJCE as a “Hub of Innovation”, the college organized a three day intensive technical workshop on “Tomorrows Engineers” from from 23.8.2018 to 25.8.2018. About 85 students and 15 faculties of MVJ College of Engineering participated in the workshop. Recognizing the need for problem solving capability in the engineers of tomorrow, the Tomorrow’s Engineers Club of MVJCE organized a 3-day Workshop on ‘Creative Thinking, Innovation and Problem Solving’, from 11th to 13th March, 2019. The workshop was inaugurated by the honorable Chief Guest Dr. B N Suresh, Chancellor and Founder Director, IIST, Thiruvananthapuram (Past President, INAE, Delhi, and Former Director, VSSC, Thiruvananthapuram), also chairman of Governing Council, MVJCE and the esteemed Resource Speaker Dr. K Sudhakar, Professor (Retd.), Department of Aerospace Engineering, IIT Bombay, on 11th March 2019, at 10:30am, in Smt. Rajalakshmi Jayaraman Seminar Hall, MVJCE.

Evidence of Success:

The ‘Tomorrow’s Engineers’ workshop is organizing for student participants from various streams of engineering so that they are allowed to learn by making connections between ideas and concepts across different disciplinary boundaries. The participants gained a good understanding of the societal / industrial problems they intend to solve, what the available solutions are, and how to approach the solution in a systematic, efficient and sustainable manner. The guests coming for workshops advised our budding engineers to design high-tech solutions in a low cost environment to meet Indian and global challenges. Regarding this approach, we are getting a very good feedback from the MVJCE student community. The Tomorrow’s Engineer’s club is enabling the students to develop complex and innovative thinking skills so that they can solve various open ended societal problems and finally framing them as entrepreneurs. The Tomorrow’s Engineer’s club is enabling the students to work in a team and it is improving the leadership quality of students. Such interaction is in support of the constructivist paradigm which allows for new knowledge construction and a deeper understanding of ideas than disciplinary study. Few problems that were selected in the workshops are already implemented. Critical thinking skills are used and developed as students look across disciplinary boundaries to consider other viewpoints and also begin to compare and contrast concepts across subject areas. Such interaction has been shown to promote constructivist learning, problem solving and innovative thinking so that our institution is reaching its vision.

One innovative project from Tomorrow’s Engineer’s Club has been turned to a business idea. The Final year students of ECE department have developed a “Smart Helmet”. The project was devised, keeping in mind the increased number of casualties on roads, mining sites and construction sites. The smart helmet has an integrated accident detecting and alert system, along with this a GPS system. The basic function of the helmet is that whenever the wearer meets with an accident the helmet detects the accident with its location, this information is sent to the emergency personnel to ensure that help is provided on time. It has a physical switch which acts

as an SOS (save our souls) button that they can use in case of other emergencies. It is also incorporated with helmet and gas detection (alcohol/toxic gas) technologies which ensure that the helmet is worn in a stable condition otherwise an alert is sent. The outer hard shell is made of a hard, sturdy, durable and light weight material. The helmets have MIPS (multi impact protection system) technology for better protection. To track, control and feed the helmet wirelessly a mobile application is developed. Helmets are connected to other external modules of application to enhance the functionality. This project was featured in Deccan Herald, New Indian Express and Drive Spark.

Problems Encountered: NIL.

Resources Required: Dedicated students who have creative ideas and faculties from different department to inspire, encourage and to support students in all ways.

Future plans: Changing more projects into innovative business ideas by its implementation in MVJCE campus.

Best Practice – 2 Title of the Practice: Tinkering Lab in MVJCE

Objectives:

MVJ College of Engineering had organized the inaugural function of Tinkering, Innovation and Entrepreneurship Ecosystem on Sep 24, 2016. The aim of installing and inaugurating tinkering lab is to promote innovation and entrepreneurship among students. The Tinkering Lab is established in MVJCE for encouraging students to innovate and discover the joy of creation. It is enabling the students to build large engineering devices, develop complex systems and represent MVJCE at various national and international competitions. It is helping the inventors and entrepreneurs to build prototypes of their ideas and generally “tinker” around.

The Context:

The mission and vision of engineering education should continuously change its focus to satisfy customers' requirements - the industry and the students as future employees. The students should create something new, the institution should provide the space for innovating and providing solutions for problems faced by individuals and communities. The terms ‘hands-on’, ‘minds-on’ learning are used in connection with student-centered or active learning, and also for educational activities that are dynamic, relevant, and applied. These types of hands-on activities contribute to students’ engagement and will better prepare engineering graduates to compete in a demanding market. The hands-on activities can foster in students, the development of knowledge and skills in both the cognitive and affective domains: design, creativity, communication, models and team work.

The Practice:

The Tinkering Lab is a dedicated space on campus that enables students to explore ideas and experience the process of creation of technology, from ideation to prototyping. The Lab provides basic machinery, materials, tools and instruments for students to bring form to their imagination. The Tinkering Lab is open to students across all departments of MVJCE, to access at their convenience. The Lab also helps students in learning to work with a team, as it is an essential skill for any career. It provides networking opportunities through student-meetings across various programs of the college. It is a good platform for interdisciplinary research and development. The Tinkering Lab organizes programs, events, and meetings throughout the academic year and it is open to all students from every Engineering discipline. A one-day Workshop on 'Readying Students for Industry 4.0' was held at MVJ College of Engineering on 24th August 2019, to mark the 'College Academia-Industry Day'. The Chief Guest An Autonomous Institute for the Workshop was Dr. Anil D Sahasrabudhe, Chairman – All India Council for Technical Education (AICTE). Dr. BN Suresh, Chairman – Governing Council of MVJCE, presided over the Workshop. Many eminent speakers from academia and industry addressed the gathering comprising guests from Industries, DRDO Labs, PSUs, ISRO, CSIR Labs, invitees from statutory bodies, VGST, VTU etc., Alumni, parents of current students and the students of the college. Around 60 teams from various departments participated in the event and developed prototype models addressing real-life problems. Students from various departments and faculty members visited the Exhibition Stalls. Braille book, Low-cost biotic semi permeable membrane using fruit peel waste, Smart Helmet and Boco.aid were among the significant projects that were exhibited.

Evidence of Success: Four provisional patents have been applied, for some innovative ideas that were born out of Tinkering Lab projects. Our students have presented and published these projects in various conferences and journals. Many student innovations were featured in newspapers, too. List of completed projects 2019-20:

1. Design and development of robotic arm with camera for crack detection, using image processing
2. Design and development of automatic pneumatic car bumper
3. Foldable camping hammock to travel light and easy set up
4. Design and fabrication of methanol extraction plant
5. Multi-functional AI assisted drone, for emergencies
6. 3-axis pneumatic Tiller
7. Alternative fuels using plastics

8. Design and fabrication of dirt bike
9. Pedal operated power generator
10. Fuel tank impact safety system
11. Hydraulic chair
12. Waste separation using smart dustbin
13. Cleaning machine
14. Hybrid motor cycle
15. Hydraulic parking using scissor lift mechanism
16. Road Hump and pothole detection, by using ultrasonic sensors
17. Smart Shelves
18. Smart, wearable reading assistance system
19. Automatic number plate recognition, using Machine Learning
20. Voice-based notice board using Android
21. Snake robot for all-terrain surveillance
22. LIDAR embedded hexacopter
23. IOT monitored hydroponics system
24. Rainfall detection in City
25. Malware Detection Using Machine Learning
26. Selection of University based on the student's performance, by using Deep Learning and Tensor flow Artificial Intelligence Engine
27. Gesture-controlled Computing and Recognition
28. Electoral Voting System using Block Chain Technology
29. Dynamic bus scheduling and routing system
30. Detection of driver drowsiness or alcohol intoxication, and blind curve alert system using Raspberry pi
31. Design and Implementation of a Camouflage Army Robot

32. Deep Learning approaches for cyber security in detection of Network intrusion

33. Campus Spy - Attendance Management System using Face Recognition

Problems Encountered: NIL Resources

Required: Dedicated students who have creative ideas and share new developments in various technical fields to discover the joy of creation. A team of faculty members from different departments for promoting technical awareness among engineering students, to produce better quality engineers, facilitating the overall growth of engineers. They are helping the students in each and every stage of their project. Physical infrastructure such as laboratory and workshop facilities, computer lab with internet, and machinery, materials, tools and instruments that will enable students to bring form to their creativity.