

Entrepreneurship & Innovation

Journey from Innovation to Entrepreneurship at Atharva

Dr. Anupama Deshpande, Ex-Principal & HOD

Department of Electrical Engineering
Atharva College of Engineering
Mumbai, India
mangala.d.2000@gmail.com

Pratik Lotia and Brijesh Maurya

Student(s), Dept. of Electronics and Telecommunication
Atharva College of Engineering
Mumbai, India
pratiklotia@yahoo.in and brijeshmaurya1992@gmail.com

Abstract— This effort depicts the journey of few students of Atharva college of Engineering under the mentorship of Dr. Anupama Deshpande from Innovation to Entrepreneurship. The team started with innovative design of Vertical Axis Wind Mill for IEDC project and later they ventured into several entrepreneurial activities possible in the college campus only. During this journey, they won several awards for various achievements and ultimately, the team launched their company called Ven-Tech.

Keywords— *Entrepreneurship, Innovation, National Award Windmill, Sstartup; Technopreneur*

I. INNOVATION

Atharva students had tried making a conventional wind mill model during 2009-10. However, it was not a full success and our team decided to improvise the design. So we presented this as one of the prospective projects for IEDC (Innovation & Entrepreneurship Development Centre) selection. The team modified the design as per the following improvements for presenting it before the IEDC selection committee.

- i. Area required for operation
- ii. Start-up speed
- iii. Installation process
- iv. Cost and time required
- v. Feasibility in urban areas.

It was finalized to work on Vertical Axis Wind Mill and our project was selected for funding.

II. WINDMILL

The students, as a part of industrial visit, went to Ohm Green Renewable Energy (OGRE), a Vertical Axis Wind Mill manufacturer – supplier in Ahmedabad. There, they learnt about

- i. Electricity generation process in detail
- ii. Maintenance of wind mill
- iii. How to design a control system for wind mill.

- iv. Brake system in windmill to prevent damage at high speeds of wind.
- v. Managing the Electronics OFF grid system

The team saw the 5 KW wind mill farm installed there (Ahmedabad). The engineer explained them about the working and other technical details. This discussion enabled students to choose 'Lift' type of wind mill compared to 'Drag' type of Wind mill.

The team visited IIT Bombay and learnt certain aspects while discussing with Prof Milind Rane and Prof. C. Amarnath. They emphasized that

- i. Area swept by blades and
- ii. Resulting torque

are important parameters in design of Wind mill.

A thorough research helped the team to make aerodynamic design of the blades. The research included theoretical calculations to ensure better contact of blades with the wind and maximum efficiency of rotation. The team tried 2-3 prototype designs to finalize the best design. Blades were designed using glass fiber material & the final fabrication of blades took place in the college workshop.

Efforts were also taken to make a viable & vibration free prototype to light a bulb.

A. Land Survey:

The terrace of the tallest installation was selected.



Fig.1: Wind Mill at Atharva college terrace – E'Week 2012

The team also surveyed the terrace for available wind velocity at different times of the day (24 hrs) to determine correct positioning. An Anemometer was used to measure the speed.

The generated power was around 25-30 watts per hour. A proper care was taken about mounting structure, joints etc.

B. Technical Execution:

The power was generated using small gear (gear details) system & later using an Alternator of rating ----. The material used for rods & joints of blades was aluminum since it is light weight & has considerable strength to bear the wind load. The diameter of our Wind mill was 3 meters and the height of 10 feet. The final model had around 35-40 rpm speed and directly powered a 100 W tungsten filament bulb with it.

With an intention of making a commercial venture, we decided the following improvements ---

- i. Greater contact area of blades with wind
- ii. Should work at low altitude places also
- iii. Independent of direction of wind
- iv. Require less space for installation
- v. Require low start-up speed.
- vi. Better efficiency 30-33%
- vii. Easy to install & transport
- viii. Simple maintenance
- ix. Sturdy & vibration free
- x. No danger to birds
- xi. Less opposing torque to rotation

III. SOLAR PROJECT

In Solar Adverts with regenerative Street Lights, the main idea was to drive a solar street light supporting a digital advertisement board. The students working on this IEDC project couldn't complete it due to their busy schedule and our team got an opportunity to complete this project also.



Fig.2: Solar street light displayed at E-Week 2013

The team studied various available street models of companies like Vikram Solar, Waaree Energy Pvt. Ltd., etc. and improvised the design in following aspects:

- i. Using convex surface solar panel
- ii. Liquid solution to make panel dust resistant.
- iii. Used Sun tracking design

Our final product using 80W solar panel is shown in figure above. The solar energy was recovered through inverter and 12V, 10Amp-hr (i.e. 120 Watt hour) Lead Acid tubular battery was used as storage device. It could power following appliances simultaneously --

- i. 9 W LED luminary
- ii. 45 W Display board
- iii. 15 W DVD player

We also designed a charge controller circuitry for regulating the voltage obtained from solar panel.

The team then repaired the solar street light installed in the college campus. The problem was in the charge controller circuitry & the battery was damaged. Required changes were made to make the system work properly again.

The team further decided to do a market survey to find out the amount of revenue incurable through solar powered lights & advertisement. The survey estimated the return on investment (ROI) period as one month only, since the revenue generated from advertisement industry is very high.

The team was now ready for commercial venture with ready designs for the following solar applications by tapping solar energy after graduation --

- i. Solar Lantern with Mobile charger
- ii. Solar Water pumps
- iii. Solar Rooftop system
- iv. Solar Farming – Grid tied system
- v. Solar Off-grid system
- vi. Solar utility products.

IV. PROJECTS IN COLLEGE TECHNICAL FEST

The above two projects namely Vertical Axis Wind Mill and Solar Street Lights inspired & encouraged the team to make live demonstration of various technical projects in Entrepreneurship Week and Techithon festivals of college as listed below:

- i. Lie Detector
- ii. FM transmitter
- iii. Mobile Detector
- iv. DC Transformer
- v. Laser + IR Transmitter & Receiver.

V. TECHNICAL VENTURE

The team then planned to start a small technical venture in the campus only in the name of 'Techno-world' for giving the junior students hands on practice through mini-projects & circuit designs. It contained use of electronic instruments like Solder Gun, Bread-board, Multi-meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope, Function Generator, PCB etching, etc.

The students were taught testing of different components in circuitry & build interesting mini-projects. They also implemented circuitry of Smart Street Lights project. This venture gave our team a very good experience of running a venture on small scale as record 80 students were enthusiastic to learn. We conducted 8 to 10 sessions over a period of 4 months.

The feedback of participants was very positive. They wanted more such events and some of them wanted to get involved in organization. Also, some basic utility kits including Soldering Iron, Multimeter etc. were provided to students at cost effective prices.

At Ember Entrepreneurship Cell, we also had other commercial ventures such as Book Bazaar, Calculators, Engineering Drawing kits, Electrokitz, etc.

VI. EMBER ENTREPRENEURSHIP CELL

Ember, E-Cell of Atharva showed enthusiasm in Entrepreneurial activities mainly from July 2011 to March 2012. The students then got actively involved in organizing & management of Entrepreneurship-week (E-Week) 2012, which won a national level competition through NEN having participation of over 600 colleges, with support of Dr. Deshpande.



Fig.3: Nilima Rovshen – Innovation & Creativity Award won in E-Week 2012.

The team displayed a special project using brightness detecting sensors for automatic switching of street lights during E-Week.

Generally, street lights have sodium vapor lamps which consume high electricity as compared to mercury vapor lamps, LEDs, etc. This results in high wastage of electricity and high cost.

So to curb this issue, the team worked on the project named Smart Street Light so that the sensor senses the brightness of environment and accordingly switches on or off the street light. A statistical report was made which showed that this can help in saving crores of rupees each year in Mumbai alone.

The presentation of the project in the E-Week and were awarded the Nilima Rovshen Innovation & Creativity award in E Week'12. The award ceremony took place in Bangalore & the college also won Honor roll award in recognition of

overall efforts. The ceremony in Bangalore helped in getting reviews & networking.

This circuitry was immediately implemented in a neighboring residential apartment called Asmita Jyoti on pilot basis as a start to off-campus entrepreneurship. The project received positive response from the managing committee of that building.

A visit of 50 students was organized to Vigyan Ashram in Pabal near Pune which has a Fabrication Laboratory (Fab Lab). This visit of an Institute admitting only Non-Matric students exposed the students to

- i. Aquaponics
- ii. Soil-less farming
- iii. Concentrated solar reflected (Schaffler design)
- iv. Earthquake-proof houses
- v. Better ways for cattle grazing,
- vi. 3D printing
- vii. Simple yet innovative mechanical utility products
- viii. Water purifiers

As Entrepreneurship requires mastering the art of selling also, we organized a public-street-selling event called Ember Bazaar. After getting permissions from local police of municipal authorities, students sold LED diyas, screwdriver sets, digital counter, festival lightings, etc to the general public near Borivali station (w). This experience turned out to be very encouraging for students.



Fig.4: Ember Bazaar (Students Selling Ember Products)

VII. Entrepreneurship Course

The event started with Panel discussion. The team designed a 5 day entrepreneurship course for students named Innovation-Creator where topics like Idea Generation, Start-up ideas, Investments, Business plans, B-models were lectured by faculties from MBA background. The Course was organized during our E-Week 2013 for the purpose to impart Entrepreneurship skills in students. Hence, this workshop & the discussions with different groups about the feasibility of their projects were the main flagship of this event. The overall conduction of the program got applause from viewers. This activity brought us much closer to the Runners up Award.

This led to the college winning Runners Up award at E-Week2013 also. The award ceremony in Bangalore helped establish Atharva's name in the community of NEN.



Entrepreneurship Course

VIII. INDIA INNOVATION GROWTH PROGRAM – AWARD

A new opportunity was spotted by the leader and the students participated in India Innovation Growth Program (IIGP), supported by Government of India, DST, Federation of Indian Commerce and Chamber Industry (FICCI), Indo us science and technology forum (IUSSTF), Stanford Graduate School of Business, Lockheed martin and IC2-Texas. After several rounds of screening, the team got selected in the Top 50 Innovators of India.

IX. START-UP

With this experience, they formed a startup named VenTech (Venture Technical). They started as dealers of laptops & computers, accessories, security & audio systems, etc. to bootstrap and get some funds for running the startup.

After gathering sufficient funds the team ventured in Solar PV energy business. The wind mill is yet to be commercialized since it requires additional funds for working on electrical generation part.

X. VENTECH – UV LED CURING

The mercury based UV lamps have lots of disadvantages such as high power consumption, uneven curing, fluctuation in intensity & danger due to mercury spillage, etc. To overcome such problems we have also designed a UV Curing system using LEDs which emit UV light & shall consume very low power. This system consists of LEDs, water cooler heat sink system, control panels, etc. The whole system will be powered from Solar PV panels.

The main advantages are:

- i. Energy Efficiency
- ii. High production speed
- iii. Better quality of processed goods
- iv. No danger to environment

X. AWARDS

The awards/achievements of the team are as follows:

1. Selected in Top 50 Innovators in IIGP by Govt of India and other organizations..

2. Selected in Top 25 entrepreneurs of India by Tata group.
3. Got Business mentoring from Stanford Graduate School of Business.
4. Awarded Innovation & Creativity Award in 2012 for Smart Street Light from NEN
5. Exhibited at Bombay Convention Centre, NESCO; EDI-Ahmedabad, Bangalore, etc
6. Integral in getting Runners Up award twice in entrepreneurship fest.
7. Tie-ups with various International companies from China, Taiwan, Korea, etc



Honor Roll Award 2012



Runners Up Award 2014



Runners Up Award - 2013

This is how we became actual entrepreneurs. Despite problems in our journey, we are enjoying the venture since the challenges are taking us to new heights of achievement.

Acknowledgment

We specially thank our founder secretary of Atharva Educational Trust Shri Sunil ji Rane sir, the whole management at Atharva Educational Trust, Atharva College of Engineering, Department of Science & Technology, Govt. of India, Mr. Uday Wankawala, National Entrepreneurship Network Consultant.