

Annexure-iv

Best Practice - I

Activity based learning

1. Introduction

In the era of rapid application development and out of box innovative solution deployment it is imperative to switch to agile teaching methodologies which shall rise up the students to perform well under such demanding situations. However, the traditional methods cannot be done away with and are to be still carried out, but at the other had the demands of the current production environments are to be met.

This challenging situation forced us to see beyond the traditional methodologies and bring in “activity based learning” in the portals of Karunya University.

The following are few methodologies which are followed to ensure that the students have understood the subjects and are able to deploy them in real-time problems:

- i) Mini-projects for each subject
- ii) Presentation
- iii) Quiz
- iv) E-Record and submission of laboratory exercises through video mode
- v) Internships
- vi) Seminars and hands-on workshops

2. Objectives of the Practice

Objectives

1. To ensure that all students have understood the subjects they have learned
2. The students will be able to judge and implement the concepts in the real-time situations.

Intended Outcome

- The ultimate objective of joining the University is accomplished.
- The student understands the real-time implementation of the concepts learned and gets a real feel of how job environments are going to be.

Underlying Principles / Concepts of this practice

- By carrying out projects/internships, application oriented learning is inculcated.

- Technological updates are at a very high pace and the students are to be kept updated with the current scenario.

3. The context

The field of engineering and technology is witnessing a drastic change currently. The need of on-demand solutions are highly demanding. The industries do not have the time to train the students who are recruited due to the challenging demand to deliver the products. This sudden demand in the global production environment has forced the industries to train the students while they are in the University.

The University has taken it as a mandate to introduce “Activity Based Learning” a methodology which ensures that the student is well equipped to join a real time production environment seamlessly.

4. Practice

For each subject various components are decided by the faculty member. The activities are given to students who are divided in groups. Having the students in groups give them the effect of working in the real time scenario.

5. Evidence of Success

The Evidence of success is evident with each batch walking out from the portal of the department. Some of the key highlights are listed below:

- Students are enjoying the class
- Creating their own videos
- Doing Mini-projects in the Centre of excellence which are established in the University Campus.
- Students are able to get internships / jobs in world renowned companies.

6. Problems encountered and Resources required

- Financial constraints
- Technological demands

Best Practice II

1. Title of the Practice

Solid Waste Management in Karunya University Campus

2. Objectives of the Practice

- a) To give a total solution for waste handling by implementing viable projects and to make Karunya a 'Green & Zero Garbage Campus';
- b) To divert biodegradable waste from the main waste stream so that the biodegradable wastes can be converted into 'organic compost', a commercial product (Waste into Wealth).
- c) Production of Bio-gas using the food waste and night soil to reduce the consumption of LPG and subsequent cost savings;
- d) Minimize waste that needs to be disposed in centralized landfills;
- e) To comply with the statutory requirements of Government bodies on environment and pollution control;
- f) Maintain pure surface, ground water, healthy soils, and clean air;
- g) To create awareness on waste handling among the residents of Karunya University in order to ensure a healthy livelihood;

3. The Context

Waste Management is the "generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes". Being an Educational Institutional Campus, Karunya University houses around 10,000 residents in campus. So a huge waste of all kinds is generated. Accumulation of uncollected mixed garbage paves way for the spread of perilous diseases and contamination of natural resources such as water, air and land. Hence it is imperative that the waste generated has to be handled in a professional way in order to ensure an environmental friendly residential campus. Implementation of an effective solid waste management project shows a way to 'Zero Garbage Zone' and prevents us from the ill effects of garbage.

4. The Practice

A) Segregation & Collection of Wastes:

For the purpose of segregation of waste at source and collecting the same, "Waste Bins' are kept at designated locations in the University, Residences and Quarters.

B) Paper recycling plant

- A typical Business Office or Educational Institution office generates about 600 gm of wastepaper per employee per day.
- Financial businesses generate over 1.0 kg per employee per day.
- Nearly half of typical office paper waste is comprised of high grade office paper for which there is strong recycling demand.
- Eliminating office paper from waste stream can cut waste bill by 50% or more
- Every recycled ton of paper saves approximately 17 trees.
- Also it saves approximately 462 gallons of oil.
- Recycling paper reduces the air and water pollution from paper manufacturing unit
- Handmade paper from recycled materials is one of the dreams of our father of nation Mahatma Gandhi. And it is our duty to join hands to make his dream come true.

The quantity of waste paper generated in the Karunya Campus as given by M/s Hand in Hand is around 200 - 250 kg/day (6,00,000 - 7,50,000 kg for 300 days in a year) (Karunya University campus, Karunya Residences and Schools). Making use of the above quantity of waste paper, a **Paper Recycling Plant** is under installation process for producing some

value added products like files, office covers, etc. which will enable more revenue generation/savings to the University than selling them to scrap vendors.

C) Bio gas project

Currently, around 30% of the night soil and 20 % of the food waste generated in the hostel zones (both ladies and gents) of Karunya Campus are treated by existing biogas plant of 120 m³ capacity in JMR. The treated effluent from biogas plant is diverted to Bethany STP for storage and utilized for irrigation/gardening. The gas generated is utilized for cooking purpose. Also, the sludge obtained from STP is disposed of on the land, which can be utilized as bio-fertilizer after composting.

With this background, three biogas plants are under operation to treat the organic waste generated from kitchen and toilets in all Ladies hostels and Gents hostels (Hebzipha&Angelina, FDR and Bethany).

d) Vermicomposting

- By practicing vermicomposting, **we comply with the statutory requirements of Government bodies** on environment and pollution control;
- As a **corporate and socially responsible organization** by practicing vermicomposting we go for “**sustainable practice**” i.e. to preserve and protect our environment for the needs of present and future generations, which includes, use of resources, reduction at source, reuse, recycling and resource recovery.
- A total solution is given for degradable waste handling by implementing vermicomposting projects and make Karunya a ‘**Green & Zero Garbage Campus**’;
- Substantial quantity of wealth is generated **out of this waste** and can have a sustainable income from this waste, by adopting vermicomposting.
- Valuable and **economically important organic agricultural products can be produced** by adopting the vermiculture and vermin-composting of these organic solid wastes.
- Successful practice of vermicomposting and vermiculture in Karunya University campus **creates awareness on waste handling and ensure a healthy livelihood** among the residents of the University.
- **Karunya University as a socially responsible organization** by implementing/standardizing this vermin-composting project in our campus, on a later date this can be replicated in the **neighbourhoods as awareness camps and as Consultancy projects.**

e. Evidence of Success

- Green and clean campus
- Improved hygiene and environmental health
- Biofertilizer from sludge and reuse of treated effluent for gardening
- Less operational and maintenance cost of STP
- Reduction in CO₂ Emission

f. Problems Encountered and Resources Required

- Creating awareness
- Training the personnel adopting to traditional methods
- Initial investments

g. A Novel Volume Measurement Method for Automotive Fuel Tanks

With a plethora of integrated, Electronic Control Units (ECU) throughout the car, There is virtually no area of a modern car that has not benefited in some way from these advances. Except for maybe the Fuel gauge.

The ordinary fuel gauge continues to give you -- at best -- a vague estimate of how much fuel you have in the tank.

- * Volume of fuel added to the tank cannot be measured with reasonable accuracy.
- * Fuel siphoning can be detected.

In the developed volume measurement system, fuel in the fuel tank can be measured with an accuracy of less than 5% accuracy (in the lab proto-type). The Main advantage being the measurement system can be connected to the existing impedance based float level sensors. The volume indication output is corrected for any tilt in the tank, as encountered in the automobile fuel tank.

- The nonlinear curve fitting is done using *Artificial Intelligence Algorithm*.
- *Kalman filter* is used to reduce the noise induced measurement error.

Experimental set up of The Volume indicator for an irregular shaped tank.

