

# Integrative Learning: Integrating a Course on Human Values with Technology Education

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**Abstract-** A lot of importance is given to training students in technical subjects so that they can get a science or engineering degree leading to a job that provides financial security. There is no doubt that such an effort will succeed in preparing technologically proficient students who may be successful in obtaining jobs with handsome salaries. However, as educators and human beings, we must broaden our view of teaching objectives and educate our students to cultivate their minds to look at the whole picture or totality of life, to develop awareness and sensitivity to the environment around them and a deeper understanding of the problems and issues that they face in their lives.

This paper provides details on EnhanceEdu team's efforts to design and teach a "Human values" course to engineering college teachers in a teacher training program (TTP) along with technical courses on subjects related to computer science and engineering. EnhanceEdu, a joint initiative of Ministry of Communications (MCIT) and IIIT-H (International Institute of Information Technology - Hyderabad) works towards empowering individuals and communities by enhancing the quality of education. The purpose of such a program is to foster integrative learning across several disciplines and to empower teachers to impart similar training to engineering students at the respective colleges they are employed with.

EnhanceEdu adopts a sound pedagogical model called "Learning by Doing" (LBD) for all the courses designed and developed as part of its curriculum: technical courses, human values course as well as additional soft skills that include topics such as time management, active listening and personality development. Through the integrative learning process, teacher-mentors who receive the training are able to connect skills and knowledge gained from multiple sources along with their own life experiences and actively apply concepts of human values into their daily lives. This model of integrative learning could provide an innovative example to other educational institutions that currently focus on providing technical education but appreciate the value of training students to evolve into not just graduates with sound technology skills but into self-aware, caring and sensitive citizens who make meaningful contributions to society on the basis of their education and talents.

**Keywords-** Human Values, Integrative Learning, Technology Education, ADDIE instructional model, Learning By Doing

## I. INTRODUCTION

In the current times, the main focus at engineering colleges is in teaching students popular technical courses such as programming with Java or electronic devices and circuits. Teachers concentrate on imparting technical education to their students so that the increasing needs of the information technology (IT) industry are met with sufficient manpower resources. Success is perceived in terms of equipping students with scientific and technical knowledge rather than in developing human beings who possess in addition to technical skills, a sound understanding of good human values.

Education is not just about learning skills (how to) but also about the ability to decide on what (what to do?) and why (why to do?). It should lead to the development of critical ability in students towards distinguishing between essence and form, or between what is of value and what is superficial, in life. It should develop their understanding which is a pre-requisite for a movement from a rule based society to a relationship based society [1].

Developing the right understanding about oneself and the rest of reality through self exploration and realization of the inherent co-existence, harmony and self-regulation at various levels of existence is seen to be the real basis of imbibing universal human values and ethical human conduct. This is what will affect transformation towards a holistic worldview (human consciousness) which happens to be the prime purpose of value education [2].

IIIT-Hyderabad was among the first few educational institutions in India that understood the need to create a mandatory course on human values for first year engineering students and to integrate it with existing technology curriculum. By definition, Integrative learning is an understanding and a disposition that a student builds across the curriculum and co-curriculum, from making simple connections among ideas and experiences to synthesizing and transferring learning to new,

complex situations within and beyond the campus.[3] Currently 34 mentors from several divisions across IIT-H including 20 faculty members actively mentor groups consisting of 15 to 18 students per group.

To train students on importance of good human values, educational institutions need good teachers and mentors who can serve as role models. Training of teachers is an extremely important prerequisite for implementation of any value education program in any institution. Just as for a course on engineering design, it is important that the teacher himself should be a good designer, it is even more important that a teacher involved in value education is himself/herself a value driven person. Teachers of value education have necessarily to be role models for their students, since they are unlikely to easily find such role models elsewhere [4].

EnhanceEdu, the Outreach Education division of IIT-H, works towards training faculty members of engineering colleges using a pedagogical model called Learning by Doing (LbD). To ensure that the mentors in EnhanceEdu themselves are practitioners of good human values, the division consisting of 28 employees have participated in orientation programs and workshops that involve discussions about human values such as honesty, trust, respect and dealing with issues like judging people, peer pressure and handling anger among other topics. One of the authors of the paper, the Director of EnhanceEdu, has participated as practitioner and mentor and then assumed the role of integrative course designer, creator, implementer and supporter of human values course in EnhanceEdu and in Outreach Education. EnhanceEdu team members have actively integrated concepts discussed in human values workshops such as being non-judgmental, cultivating qualities of honesty and integrity, cultivating productive relationships with colleagues and developing a capacity to show empathy towards members of the larger society. Since the focus is on small acts that we do every day, people are clear about the fact that this is applicable in their daily lives and make sincere efforts to practice. This has led to the formation of a healthy work environment and culture within EnhanceEdu.

EnhanceEdu has taken the efforts to partner engineering colleges by engaging key stakeholders such as members of management, heads of departments (HODs), teachers and students through 1-4 day and 4-8 day long *Jeevan Vidya (JV) shivirs* (workshops) held at college locations around Andhra Pradesh. Engineering college faculty members attending annual 8-week long summer residential teacher training program (TTP) and 4-week long winter residential TTPs at IIT-H campus have also participated in JV shivirs that have addressed topics that deal with understanding

self, family, society, nature and existence. Over 200+ teachers over the past three years, (2009, 2010, and 2011) have taken back concepts on human values to their students at their respective engineering colleges. Table 1 shows numbers of orientations, shivirs, short and long workshops conducted in-house, at professional organizations and engineering colleges in Andhra Pradesh, India.

TABLE I  
Jeevan Vidya(JV) Orientations and Workshops

EnhanceEdu's in-house short JV shivirs during employee orientation	5 shivirs
EnhanceEdu's JV orientation at professional organizations	2 presentations
EnhanceEdu's outreach in training faculty at engineering colleges(1-3 day workshop)	14 workshops
EnhanceEdu's outreach in training faculty at engineering colleges (4-8 day workshop)	24 workshops

## II. COURSE DESIGN

In designing the course on Human values, EnhanceEdu has followed the well known ADDIE method of instructional design that includes the Analysis, Design, Development, Implementation and Evaluation phases. Engineering college teachers who attend the TTP, study engineering subjects and attend a human values workshop. Content is developed to be of relevance to society and to be of lasting importance and value.

### A. Analysis phase

This phase involves self-assessment by the participant of his/her personal life-goals, his/her understanding of concepts such as

- what is valuable to a human being
- what brings true happiness
- improvement of their relationships with other humans and also with their environment
- attitudes towards learning
- responsibility towards education and profession

### B. Design Phase

EnhanceEdu's pedagogical Butterfly Model (refer fig 1) is depicted below. Butterflies symbolize change. In ancient mythology, the butterfly was a symbol of wisdom and everlasting knowledge. Our model's blending of the different learning styles of the learners and their higher order thinking skills makes us believe that this model will result in a metamorphosis in the way students learn [5].

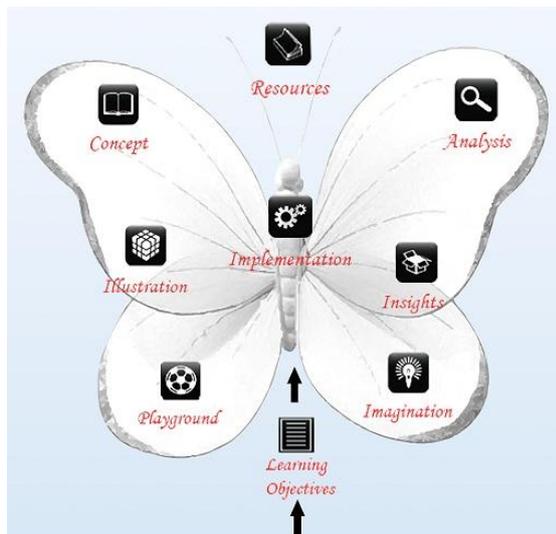


Fig 1: Butterfly model

First and foremost, learning objectives are defined. Concepts are presented in the form of lecture/discussion. Illustrations are in the form of artwork/posters. Playground involves working with tools to create scenarios. The heart of the exercise lies in the implementation phase. Analysis, Insights and Imagination are developed as a result of exercising higher order thinking skills.

1) *Objective:* Objective of the Human Values course is to help participants explore their individual ideas of what gives them a feeling of happiness and prosperity, in defining life goals, in improving relationships with people and the environment around them, in developing the right attitude to learning and feeling responsibility towards their profession.

2) *Concept:* Concept is presented mainly in the form of class discussions, lectures, and powerpoint presentations. For example, extensive discussions in class deal with the topic of self exploration. Participants ask themselves what their basic aspirations are and the process by which they fulfill their aspirations.

3) *Illustrations:* Illustrations are presented in the form of posters/artwork. For example, Fig 2 below shows an illustration that describes the process of self exploration [2]. A learner-centric approach is adopted in this exercise.

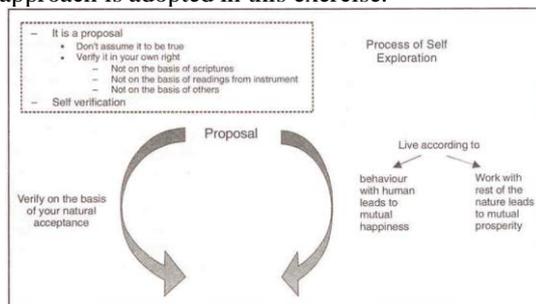


Fig 2: Process of Self Exploration

4) *Playground:* Playground is where skits involving role-play in imaginary/hypothetical scenarios are enacted. For example, in the context of topic of respecting colleagues, a skit involved enactment by participants showing a contrast between an employee getting upset about his desk not being cleaned by housekeeper and the anger carrying forward and affecting interactions with other fellow employees vs. an employee feeling upset about his desk not being clean but communicating the feeling by requesting the housekeeper to clean the desk and the resulting carryover of a positive feeling in interactions with other fellow-employees during the day.

5) *Supplemental Resources:* Supplemental resources such as extra reading material and hands-on exercises led to developing higher order skills conforming to Bloom's taxonomy such as imagination, insights and analysis. Generating a comprehensive list of personal desires, writing them down and prioritizing them in order of importance, reflecting on what would happen if one had made different choices is an example of how a hands-on-exercise leads to higher order thinking skills of analyzing and developing insights.

### C. Development phase

A variety of instructional materials have been developed for the purpose of reaching an audience that consists of students with varying learning styles. Some students prefer learning by reading, some like to express themselves through artistic pursuits, some like audio-visual content and some like working outside, doing field work.

- Written material : Textbooks and relevant articles from newspapers and magazines
- Suitable videos and movies: Examples included feature films and documentaries on the subject of caring for the environment such as "Inconvenient Truth" or "How Stuff Works".
- Field work: Defining projects in and around IIIT-H campus where an individual can make a positive difference to environment or society.

### D. Implementation phase

EnhanceEdu uses Learning by Doing (LbD) model. The LbD methodology [6] fosters skill development and the learning of factual information in the context of how it will be used [7] and aims at giving a hands-on fulfilling experience which helps the students understand the practical implementation aspects and the concepts associated. In this methodology, mentors assist the students in their course work by "providing hints and not solutions".

Through a process of self-exploration and group-exploration, participants of JV workshops developed a better understanding of workings of inner self. Participants engage in detailed discussions on a wide range of topics such as

- Education
- Reality
- Happiness
- Success
- Aspirations

They also practice soft skills such as active listening, effective time management with an intent to integrate learning across disciplines.

At one of the EnhanceEdu TTPs, there was an incident that revolved around sending grades as per an old rubric (pass/fail) as opposed to (mastery/not achieve mastery yet) to teachers of engineering colleges. Teachers felt upset and organized a group agitation at the IIIT-Hyderabad campus. Members of EnhanceEdu team were able to diffuse the situation by engaging in talks to the teachers in a calm manner, by exercising patience and through group exploration of the problem. Teachers came around and pledged to renew their commitment to learning.

To understand their existence as members of a larger society that needs their empathy and understanding, teachers visited an orphanage in Telecom Nagar, Hyderabad and distributed notebooks and stationery supplies. They also taught them various academic subjects. At another instance, they distributed blankets and food packets to needy people in greater Hyderabad region.

#### E. Evaluation phase

The focus of the course is in having participants ruminate, think, discover, analyze and synthesize aspects of good human values so that they internalize values as opposed to traditional format of delivering instruction through lectures and evaluation of intellectual understanding of values.

Observation of how learning through discussion facilitates internalization of values in participants is the approach used to help learners. This is in contrast to methods of traditional evaluation in the form of quizzes and exams. This is done because of the understanding that intellectual understanding of issues is not enough, but that actual practice is important.

An example of formative evaluation, assessing participant's progress in internalizing, involved re-visiting topics related to self-growth from time to time and providing space and time for reflection. It also involved observing the behavior of participants. Observations here showed that participants may still encounter problems, but they

were now equipped with skills to quickly resolve them.

If managing time effectively was a challenge for a participant, he/she was asked to think in terms of classifying needs related to themselves (desires) / their body (health) / their family and society (relationships), and tasks were prioritized into four quadrants[8] as shown below in Fig 3.

1. Very Important and Very Urgent,
2. Less Urgent but Very Important
3. Less Urgent and Less Important,
4. Less Important but Very Urgent

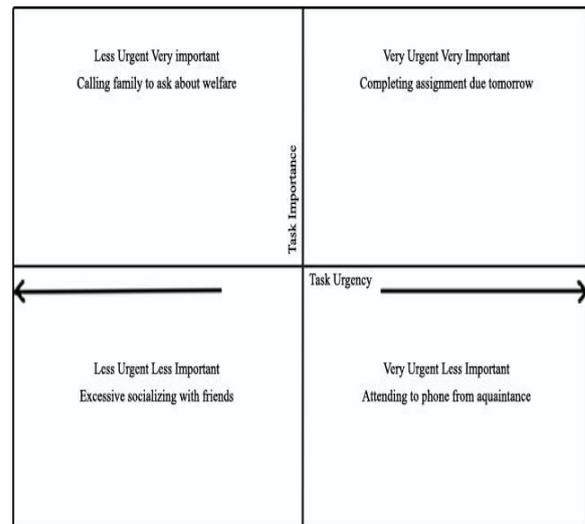


Fig 3: Prioritization of tasks for time management

Then, attending to tasks in the order of importance and urgency, along with re-prioritization was practiced actively during a defined period of time. Adding the dimensions of health and family allowed a conscious planning of time with family and for society as opposed to simply doing work related task management.

Since the entire environment was created to be supportive, non-evaluative and non-threatening, people felt more comfortable opening up with their issues and got to reflect and resolve them.

Class participation, reflection essays and course summarization in the form of discussion sharing by participants on what they have gained from the course counted towards the summative process. There was no grade for the Human Values class other than Pass or Incomplete if they have not done all the activities.

### III.IMPACT

One of the participants who attended the TTP in 2009 uses his learning in human values actively in his life by writing very relevant motivational quotes on his blackboard for each of his engineering classes. This is a small instance of positive impact of integration of the course on Human Values with technical courses and the

change it brought about in the teacher's interaction with his students. Teachers provided feedback to EnhanceEdu team that they felt an increased commitment to responsibility towards students and an improvement in relationship with them.

#### IV. CONCLUSION AND FUTURE WORK

The overall purpose of education is to enable a human being to live a fulfilling life in harmony with oneself and with family, society, nature and existence. EnhanceEdu's teacher training on human values course is integrated with other technical courses so that in addition to equipping students with solid technical expertise, educators can give them a firm foundation in human values and professional ethics so as to prepare them to become first and foremost, good human beings and then responsible professionals living in a society. The integrative learning process enabled participants to build competencies resulting in behavior modifications due to right understanding and building right relationships. This process can result in the stakeholders being motivated to work on benefiting society due to the right relationships that get established. Future work includes creating good ways of scaling this integrative learning reaching out to all colleges, and also measuring the impact in more systematic ways.

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#### REFERENCES

- [1] Pradeep Kumar, Rajeev Sangal, Abhijit Mitra, Navjyoti Singh, Kamalakar Karlapalem "An experiment on Introducing Human Values Course in Undergraduate Curriculum of Engineering Education"(2009).
- [2] A foundation course in Human Values and Professional Ethics - Gaur, Sangal and Bagaria(2010).
- [3] <http://www.aacu.org/value/rubrics/pdf/integrativelearning.pdf>
- [4] P.L Dhar "Producing value driven engineers: nurturing lotuses in a swamp!"(NASEE 2009)
- [5] Surya Kiran Reddy K, Sandhya Kode "Butterfly Model: An innovative way to deliver and personalize content in the Learning by Doing methodology"(T4E2011)
- [6] Surya Kiran Reddy K., Sandhya Kode Certificate in Information Technology(CIT) - "A program to enhance the quality of IT education of engineering colleges."(T4E2010)
- [7] Instructional-design Theories and Models: A new paradigm of instructional theory - Charles M. Reigeluth (Chapter 8: Learning by Doing Roger C Shank, Tamara R Berman and Kimberli A Macpherson, Institute of learning sciences at Northwestern University)
- [8] Seven habits of highly effective people: - Stephen Covey(1989)