Curriculum design of Soft skills in engineering education

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Abstract: Change in workplace scenario requires fresh recruits to be equipped with not only technical skills but also with adequate soft skills. Today’s education does not pay much heed to the need of the hour and that is specific training to prepare the youth for employment. Though most institution make an attempt at training, there is no specific evidence of specific training provided. This paper discusses at length the need of such training and also the success model that has been followed in the institution that stands testimony to the need of such training.

Key words: engineering education, soft skills.

INTRODUCTION

Globalization has brought about great change in all spheres of society like Industry, Economy and the Educational system to cite a few examples. Technological advancement is one of the main reasons that paved way for the successful transition and speeding up of the impact of Globalization. This has also impacted the workplace culture in a big way. As early as early as 1980s and in the 90s the US Secretary of Labour appointed a group called the Secretary’s Commission on Achieving Necessary Skills (SCANS), which looked into the necessary skills required for success in jobs. Empirical study by Organisation for Economic Cooperation and Development (OECD) has clearly linked performance in jobs to basic level of numeracy and literacy skills. OECD’s project DeSeCo has clearly come out with key competencies required for success in globalized context. According to the report key competencies go beyond mere textual knowledge and look at practical application along with creative ability, attitude, motivation and values. In today’s context these competencies have come to be known by various names like generic skill, life skills, and soft skills and of course employability skills.

The scenario in India

Over the last two decades India has become a force to reckon with in the global context. Population explosion which had been a matter of setback for India in the past proves to be a major advantage in the current scenario with the maximum population in the working age group. A report released by NASSCOM titled ‘Perspective 2020: Transform Business, transform India’ shows that India has the highest population in the working age group – about 750 million people, this would go up to 920 million by 2020. It is this major group which contributes to the steady growth of India. But if this growth has to sustain it is possible only if education provides the right support in the required field. The National Knowledge Commission (NKC) in its report has clearly outlined the need for developing the education system in India. Among the many recommendations given one important factor is to enhance the skills of the graduates in view of their employment.

Engineering Education in India

The number of Engineering Institutions awarding Under graduate degree has seen phenomenal growth with 1512 institutions in the year 2007-08. The trend is that higher number of students enroll for Computer science and I.T. But if this growth has to sustain there has to be an effective means to ensure quality at the higher education level. Also there has to evolve a very meaningful interaction between Industry and the academia to emphasize the importance of practical application alongside with the theoretical knowledge of the students.

Engineering education has seen a sea of change considering the constant demand that arises from the industry side. The change is very tremendous to the extent that the young engineers today would have a job offer even before they complete their engineering course. This has been a matter of great concern and contention. The transition from institution to industry brings to the forefront the lack of generic skill, workplace skill etc in the young engineers of today.

The Technical universities and Engineering education undoubtedly provides the best minds to the industry. But, this is at stake when there is a gap between the education provided by the Institution and the expertise required by the Industry. The Mackinsey report and the Nasscom (National Association of Software and Services Companies) report points at the fact that though the number of graduates coming out of technical universities are large in number their employability levels are relatively low. Efforts are made by Nasscom to introduce the finishing school concept where the final year engineering graduates are given specific trainings on computing skills and soft skills. While computing skill is quantifiable through exams and certification soft skill is not quantifiable. Psychometric
assessment is one way to assess individuals’ traits, attitude and approach.

Employability Skill training in Engineering Education:

Employability skill training has not really found a place in the engineering curriculum which is true of most engineering institutions until recently. The curriculum of first two semesters in most technical universities are common to all branches and deal with basic Engineering, Science and Mathematics. Technical English too is provided in the first two semesters which helps in enhancing basic oral and written communication in the technical context. Anna University has introduced the communication lab in the pre-final year to enhance the employability level.

Industry perspective on Employability Skill

With the boom in the IT and ITES sector employers are looking at students who can be Industry ready. Most companies recruit students and then put them through a training phase based on their specific industry need. This would refer to the technical knowledge required for specific projects. But on the other hand recruiters look for students with the right attitude, those who have the willingness to learn, ability to adapt, be a team player, be creative and focused. Confidence and communication skills are the bottom line in any interview process which helps student succeeds. These have to be inculcated in all graduates who seek employment and are in the current scenario referred to as Employability skill, Generic skill, and Soft skill and so on. Whatever be the name by which they are referred to, they are indeed the need of the hour.

Recruitment process in Engineering Institution:

In Tamil Nadu around 1.5 lakh engineering students graduate every year. The number is always on the rise. In spite of the recession in 2009, economy has bounced back and so has also the industry.

A look at the recruitment process would clearly reveal what is expected of any engineering graduate. At any point of time in the recruitments process a student has to be ready with the following. The diagrammatic representation emphasizes the equal importance of all the four aspects.

<table>
<thead>
<tr>
<th>Technical Knowledge</th>
<th>C, C++</th>
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<tbody>
<tr>
<td>Quantitative &amp; Verbal Aptitude</td>
<td>Interview &amp; P I</td>
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</table>

Technical know-how (based on a student’s core subject)
- Basic computing skills C, C++
- Problem solving, logical reasoning, verbal comprehension (Quantitative & verbal aptitude)
- Communication skills (Group Discussion & Personal Interview Skills)

Though the process of recruitment is unique to each company or industry, being ready on all the above four fronts, would definitely ensure the students success.

Employability skill training in SRM University

While looking at how different educational institutions approach the training process SRM University has a very unique process where holistic training is provided to develop students. Career Development Centre is a unique feature of SRM university where grooming of all Engineering students is done from the First year onwards. The course entitled Personality Development is a credit based course which is done for the first three years of the Engineering course. In the first year, for the first two semesters, a soft skills program is conducted in a practical manner to enhance the confidence and communication skills of the students. It is a pass/fail course where students follow a fifteen module book in which personal management skill, social skill, team skill etc., are dealt with in a practical manner. The content of the book entitled ‘Insight’ definitely provides insight to the student about himself and to the teachers on areas where the student needs to improve. The contents of the book are in the form of a work book. Each topic has a particular objective and outcome which is clearly stated in the following table. The contents are designed in such a way that it gives lot of scope for the teacher to discuss and make students share their experiences. Most sessions are interactive and very effective. Evaluation is based on observation and students participation in activities. Being a non credit but compulsory course students participate in various activities and enhance their communication, build confidence and thus improve their overall personality. The topics are covered over a period of two semesters giving excellent scope for teachers to get to understand the students better.

Design and development of Personality Development course curriculum

The content of the course is developed keeping in mind the holistic development of the students. The contents are broadly divided into four major areas such as Personal skills, People skills, Thinking Skills and Work skills.

**Personal skill:** These refer to the skill that individual need to develop in order to be successful both in their personal and professional life. The exercise gives them an opportunity to understand themselves and overcome their setbacks. It also helps them to understand and manage change, stress and balance emotions. As far as employers are concerned they look for individuals with high self confidence and high self esteem.

**People skill:** The topics provide excellent scope for students to learn the art of being and working in a team. They learn
what it is to be tolerant and solve issues. Today workplace is all about teamwork and Project management which requires such skills.

**Thinking skill:** Success in any field depends on one’s way of thinking. Clear perspective and innovation leads one to success. Creativity and out of the box thinking has become the order of day in most organizations.

**Work skill:** The basic qualities that help one find success are motivation, goal setting, time management and decision making. The blend of exercises helps students to introspect and develop the right skills.

**Conclusion:** The opportunity to develop curriculum for a course personality development helped us explore possibilities of incorporating unique ways of designing the workbook and also customized it to the suit the requirement of changing times. Being a pass fail course the methodology helps teachers to adapt ways that would suit the level of students. The focus is on enhancing the thought process, building confidence and help students in developing their communication. These qualities in the long run ensure a holistic development of the student.

Though one would not really look at employability skills training and soft skills as a very important factor in engineering education, it undoubtedly plays a major role in the success or failure not just of individuals but even certain major projects at times. The KSA factor of Knowledge, Skill and Attitude is what finally ensures completeness in any individual irrespective of the field of his or her work. SRM university provides not only the right kind of Knowledge and Skill but ensures it develops the right Attitude is all its graduates.

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### ANNEXURE

#### SELF ANALYSIS

**Objective**
- To develop an ability to understand oneself
- Identify strength & overcome weakness
- Improve self esteem

**Methodology & Background discussion**
- Interaction on why is it important to know oneself?
- The need to analyze one’s qualities.
- The perception about oneself- self esteem

**Focus of the module**
- There are three sub modules in the topic Self Analysis.
- Based on the background discussions the students are made to introspect and understand themselves better in ‘Who am I?’
- In ‘Self Analysis’ there are specific attributes which they need to identify themselves with and this gives scope for them to understand their qualities
- ‘Feel Good Factor’ creates an awareness of how they can feel good about themselves and continue to feel better if they do better things and thus enhance their self esteem.

**Outcome**
- Students understand themselves better.
- Realize areas they need to improve
- Develop confidence to face facts about themselves
- Understand the need to have a high self esteem

#### CHANGE MANAGEMENT

**Objective**
- Ability to understand Change and develop qualities to face it

**Methodology & Background discussion**
- Discussion to share experiences about the recent changes in their lives
- Do you enjoy change?
- What are the major changes you have faced in your life?
- Recent changes and the challenges or opportunities that come along with it.

**Focus of the module**
- Enabling students to understand change & help them to realize what it is to move out of comfort zone in ‘Exploring Challenges’
- ‘Managing Change’ helps students to learn how to face change.
- The worksheet helps them to think on various avenues and also on how they can make a difference by bringing about a change.

**Outcome**
- Students accept the fact that change is inevitable.
- Students realize change is for good and that one needs to face it positively.
- One can be a driver of good change around you.

#### STRESS MANAGEMENT

**Objective**
- Understand stress, what causes stress and ways to handle it

**Methodology & Background discussion**
- Brain storm on causes of stress.
- How stress affects life style and how to overcome it?
  - “Does everyone undergo stress?”
  - “How often do we get stressed?”

**Focus of the module**
- ‘What is Stress?’ helps in understanding stress, causes and whether it is positive or negative.
- ‘How to manage Stress’ helps students to recall their experiences on how they have managed stress, could it have been different?
- ‘Circles of Control’ clearly outline to what extent one can control and overcome stress and how one need to gear up to face facts beyond control.
- ‘Stress Busters’ help students identify their unique way to handle stress.

**Outcome**
- Understanding stress and ways and means to overcome it
- Students realize how certain things are within control and for others be prepared to face it
- Develops an awareness and mind set to manage stress

#### EMOTIONAL INTELLIGENCE

**Objective**
- To help students understand their emotions better
- Realize the importance of emotional intelligence

**Methodology & Background discussion**
- Discussions on what is IQ and EQ.
- How are they different and the importance of EQ in today’s world
- The need to manage one’s emotion

**Focus of the module**
- ‘Emotional Intelligence’ is more of facts which students read and comprehend.
- ‘Emotion Scale’ seems to be a very basic meter to check their emotions on any given day, which helps them realize the play of emotion in our daily lives.
- ‘Managing your Emotions’ lists and helps one realize best and simple ways to manage emotions.

**Outcome**
- The importance of understanding emotions and how to handle them
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<thead>
<tr>
<th>Module</th>
<th>Objective</th>
<th>Methodology &amp; Background discussion</th>
<th>Focus of the module</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>MOTIVATION</td>
<td>Understand the importance of Motivation and the need for Self motivation</td>
<td>Brain storm on various factors that motivate people</td>
<td>‘What motivates me’ clearly helps students list in order of importance factors that motive them</td>
<td>‘I Can ..I Will’ helps them develop self motivation</td>
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<td></td>
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<td>Discuss importance of self talk and the power of will to achieve</td>
<td>‘Self Motivation’ worksheet helps them trace the need to develop self motivation</td>
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<td>Discuss real life situation to understand how intrinsic and extrinsic motivation works</td>
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<td>GOAL SETTING</td>
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<td>‘What motivates me’ clearly helps students list in order of importance factors that motive them</td>
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<td>TIME MANAGEMENT</td>
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<td>‘Value of time’ helps students understand the importance of time</td>
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<td>‘Diagnosing your Time’ is an assessment on one’s Time Management skills.</td>
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<td>The worksheet helps in identifying idle time and how each minute of day is spent</td>
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<td>‘To Do’ helps in creating a schedule and teaches students to prioritize work and be successful.</td>
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<td>DECISION MAKING</td>
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<td>‘Decision Making’ deals with the process and struggles of decision making</td>
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<td>‘To Decide on..’ is a real time situation that the student needs to ponder on and thus learn how to make a wise decision.</td>
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<td>ATTITUDE</td>
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<td>‘Attitude is Everything’ discuss the three most important factor that influences attitude</td>
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<td>The worksheet helps students recall how attitude made a difference in their lives in different situation</td>
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<td>CREATIVITY</td>
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| Focus of the module               | ‘Think differently’ discusses the facts of creativity and what it is all about  
                                    | ‘Creative story writing’ gives an excellent scope to let their imagination take flight |
|-----------------------------------|---------------------------------------------------------------------------------|
| Outcome                           | Help students understand and develop the art of out of the box thinking         |

**INTERPERSONAL SKILL**

<table>
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<tr>
<th>Objective</th>
<th>Understand people around and how to network and be in a group</th>
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| Methodology & Background discussion | Comprehend the concept of dependence, independence and interdependence          
                                    | Ability to manage groups and situations                                         |
| Focus of the module                 | Facets of Interpersonal skills such as Leadership, Networking and Teamwork are discussed  
                                    | An assessment sheet clearly helps one understand their levels of Interpersonal Skills  
                                    | Recalling situations and how students handled it helps them understand the need of such skills |
| Outcome                             | Develop and practice interpersonal skills                                         
                                    | Realize the need & importance of interpersonal skill in today’s world           |

**TEAM WORK**

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<th>Objective</th>
<th>To foster a sense of team spirit</th>
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| Methodology & Background discussion | Brainstorm situation wherein students work in teams                            
                                    | Discuss their experiences in Cultural and Tech fest.                           
                                    | The need and success of team work                                              |
| Focus of the module                 | Understanding the role of ‘Team work’ in overall development of students        
                                    | NASA worksheet helps them realize what individual differences are and the strength and need for team work in any situation |
| Outcome                             | Develop and practice interpersonal skills                                        
                                    | Realize the need & importance of interpersonal skill in today’s world           |

**LEADERSHIP SKILL**

| Objective                           | Realize the importance of Leadership qualities                                   
                                    | Learn to be a Leader                                                             |
|-------------------------------------|---------------------------------------------------------------------------------|
| Methodology                         | Individually students think about qualities essential to be a leader.             
                                    | As a team they discuss on their choice of a leader and present it to the class   |
| Background discussion               |                                                                                |
| Focus of the module                 | ‘A True Leader’ gives scope for students to practically understand the qualities of a leader. Working as a team they identify a leader and his qualities  
                                    | ‘Lead the way’ helps them assess themselves                                        |
| Outcome                             | Group work enable them to come to a common decision and one emerges a leader    
                                    | Identifying leaders and discussing their qualities creates an awareness and need for such qualities |

**CONFLICT RESOLUTION**

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<th>Objective</th>
<th>To resolve and reach out to those around</th>
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<tr>
<td>Methodology &amp; Background discussion</td>
<td>General talk on reasons for conflict- with whom, why, when etc.Understand situations and reason for conflict</td>
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</table>
| Focus of the module                 | ‘Resolve and Evolve’ talks of how to overcome conflict                            
                                    | ‘Case study’ gives scope to identify a situation and understand how to resolve conflict  
                                    | ‘Solve to Gain’ is an excellent opportunity to identify one’s approach to solving conflict and see where one can change for the better. |
| Outcome                             | To understand conflict and what causes it                                          
                                    | Adapting different approaches to solving conflict                                 |