CHAPTER 4 – RESULTS AND DISCUSSIONS

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CHAPTER 4 – RESULTS AND DISCUSSIONS

The Results of the research are being discussed hereunder each of the Research Questions that were posed for the purpose of clarity.

4.1 Research Question 1 (Validating employability)\textsuperscript{18}

To validate if the employability of graduating Engineers in the country is actually around 35%.

It is observed from the Research that the employability scenario across the country indeed is in the 35% range. This poses a serious threat to the TSC. With the growth in the IT industry expected to be at 25% per annum and the margins coming under huge pressure because of the rupee appreciation and the average annual salary cost increase being around 12%, Management of many large IT exporters are keen to absorb increasing number of fresh graduates. However, if their employability is under question, this can lead to a breaking of the supply chain affecting the profitability and survival of these Organizations.

Either these Organizations will have to recruit these fresh candidates and invest in extended training of a year or so to make them employable or they will have to go for lateral recruits from other companies at an increased cost. Training fresh recruits for an extended period is not only expensive but also very de-motivating for the students as they have already invested 4 years of their life in going through Engineering Education.

\textsuperscript{18} Methodology, contra Chapter 3, p. 118.
Non-employability also brings about a lot of social pressure as the parents have invested all their savings in the education of their children hoping that they will be settled in comfortable jobs but they get dashed when reality strikes them.

Non-employability is also a National Waste as the young society which has invested 4 years of their youth in studying a discipline suddenly discovers that the Industry does not acknowledge their efforts.

4.2 Research Question 2 (Identifying employability skills)

Identify skills that are crucial for employability of fresh graduating Engineers.

It is a known fact that Academic Scores constitute a key aspect of employability. However, there are enough examples where brilliant students with high academic scores do not make it to a job while someone who has been an average student in the class gets an offer. This irony only validates the common belief that Academics is not everything. While it is an important elimination criteria, having it does not guarantee a job. So, what then are those aspects that one should nurture to be assured of employability?

The Research which is more of a 360 degree view as it takes the opinions of Placement Officers and the Recruiters provides a peek into the selection process wherein the four key skills of Analytical, Communication, Interpersonal and Intra-personal come into play while molding a fresh candidate as employable.

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19 Methodology, contra Chapter 3, p. 127.
These are interesting dimensions as they are sought after by the Recruiters with a view of what sort of roles these young Engineers would be shouldering in the immediate future. Clearly, Recruiters are not looking for programming skills. They are looking at someone who can express well, who can be a team player, who can solve problems and who is very confident.

These characteristics are very critical in making a manager out of an Engineer and clearly employability of a fresh graduating engineer is today in the IT Industry seen as a passport to becoming a manager in a short span of time – 5 years, whereas it used to take 10 years + in yester years or in a conventional Industry even today.

Hence, the employability and the TSC are very much dependant on individuals nurturing the four skills identified for bettering their employability. Academia and the Industry should be aware of this need.

In the literature survey and background research, Gardner’s Multiple Intelligence framework (Figure 4-1) came out as a strong approach which highlighted that every individual has multiple different intelligences and that some of them have one or two of the intelligences more prominent than the others.
These intelligences are manifested in the form of skills and eight of such skills are what we have narrowed down as employability enhancing skills. Hence, Gardner’s Multiple Intelligence framework was used to map the eight skills to specific Intelligences.

The mapping of details is as given in Table 4-1.
Table 4-1  Mapping skills and intelligences

<table>
<thead>
<tr>
<th>Skills</th>
<th>Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop oral communication skills</td>
<td>Verbal</td>
</tr>
<tr>
<td>Stimulate critical thinking and helps students clarify idea through</td>
<td>Analytical</td>
</tr>
<tr>
<td>discussions</td>
<td></td>
</tr>
<tr>
<td>Use a team approach to problem solving while maintaining individual</td>
<td>Interpersonal</td>
</tr>
<tr>
<td>accountability</td>
<td></td>
</tr>
<tr>
<td>Promote a positive attitude towards the subject matter</td>
<td>Intrapersonal</td>
</tr>
<tr>
<td>Develop higher level of thinking skills</td>
<td>Analytical</td>
</tr>
<tr>
<td>Encourage students responsibility for learning</td>
<td>Intrapersonal</td>
</tr>
<tr>
<td>Build Self esteem in students</td>
<td>Intrapersonal</td>
</tr>
<tr>
<td>Promote Student - Faculty Interaction and familiarity</td>
<td>Interpersonal</td>
</tr>
</tbody>
</table>

Note: Foster and develop interpersonal relationships = same as Use team approach

The mapping brought out that four specific Intelligences are important for employability, namely.

1. **Verbal (ability to communicate)**
2. **Analytical (ability to solve problems)**
3. **Inter-personal (ability to work with people in teams)**
4. **Intra-personal (ability that provides self confidence)**

Though this appears as validating the obvious, this is an important step in the research as it ratifies the common approach taken by recruiters during interviews on what they look for from graduating Engineers beyond academic performance.
4.3 Research Question 3 (Understanding behavioral programs)\textsuperscript{20}

Understand the nature of programs conducted in the Engineering Campuses to hone behavioral skills of their students

It is apparent that most Institutes conduct some sort of Behavioral or soft skills programs. Many of them focus on communication skills and some on Personality Development. While these are good, since it is taught mostly by internal faculty who voluntarily do these programs, the effectiveness is not adequate. Moreover, Behavior can never be transformed through individual training programs. They need a long term sustained effort to change.

4.4 Research Question 4 (Understanding academic performance)\textsuperscript{21}

To get a deeper understanding of the academic performance of engineering students.

From the data analysis of Research question 3 and 4, it becomes obvious that the Learning Outcome that is expected will have the following 8 clear deliverables. Having them will have a deep and significant impact on the TSC.

1. Remember
2. Understand
3. Apply
4. Analyze

\textsuperscript{20} Methodology, \textit{contra} Chapter 3, p. 131.
\textsuperscript{21} Methodology, \textit{contra} Chapter 3, p. 141.
5. Verbal
6. Analytical
7. Intra-personal
8. Inter-personal

This list is a combination of Intelligence and knowledge. As we are aware from the literature survey and background research, Intelligence and knowledge in individuals is developed through the process of learning and hence it makes a sound case for looking at alternative learning approaches that will lead to improving the employable skills.

As the Engineering curriculum is designed and developed by the various Universities, instead of teaching additional Soft Skill titles as separate subjects, it is better to employ alternative methods of teaching a few subjects over the 2\textsuperscript{nd} and 3\textsuperscript{rd} year that will inculcate the additional skills needed.

This also is a better way of changing behavior as it is not something that can be changed by attending a training program – Behavioral changes take time as it has been imbibed from birth and needs several months or years to bring about even a small change to be noticed by recruiters in the country.

It is indeed a revelation that as high as 35\% of the questions that are asked in exams pertain to the Higher Order thinking skills. This is where the non congruence between teaching and assessing styles come into play. Most of the teaching is focused and contended when students in the class understand what is being taught which is at a lower level thinking skill.
The application of the concepts and the comparison with other theories is never dealt with in detail. When these are asked as questions, the natural phenomena of students are to brand them as “Tough” questions. These tough questions are mostly attempted by the average students as they know something but not completely.

If more students have to cross over the Higher Level thinking skills questions, it is important that the classroom teaching helps them achieve these and not stop at making them just understand.

4.5 Research Question 5 (Appreciating pedagogical approaches)

To appreciate the current pedagogical approaches which are prevalent in Engineering colleges.

Chalk and Talk is still the most prevalent method of classroom teaching. A classroom session is mostly called as a lecture – which signifies that someone is going to be talking. It is not seen as a learning platform as the faculty typically goes in with the approach of how to complete the lecture without being questioned.

There is a large component of self study and also assessments where again learning happens around the remembering dimension. Overall, the student participation in the learning process is minimal and is restricted to asking questions at the end or to take part in some group activities.

22 Methodology, contra Chapter 3, p. 146.
4.6 Research Question 6 (Arriving at a new model) 23

To arrive at a new model of teaching and learning that would enhance employability

The new model is unique as it provides 6 practices that can be tried out by faculty in the classroom. These practices are not subject specific and have a high level of student involvement. These practices are graded in the learning process of Explain, Examine, Encapsulate and Enrich. It follows the Constructivist approach of building on the existing knowledge. These practices have been validated to give the desired outcome of learning as well as have been ratified to be practical to implement.

A tool is also developed along with which is called as the Notes Page. While Notes Taking is a routine affair in the colleges, there is no single uniform method. Moreover what is to be taken as notes is never understood. Hence, this structured tool helps encapsulate knowledge at each of the levels of Bloom’s taxonomy.

4.7 Research Question 7 (Implementing and testing the model) 24

To implement and test the new model and understand the impact of it on enhancing employability

The new model is proved to be more effective in enhancing employability. What is more important is that it outlines 6 practices that are easy to understand and implement along with a student clutch which increases the engagement in the learning process.

23 Methodology, contra Chapter 3, p. 153.
24 Methodology, contra Chapter 3, p. 169.
Why would a IT firm be interested in this new approach. Typically IT firms have about 75 to 100 identified campuses in the country where they go for recruitment. The normal selection ratio in these campuses is about 1 student for every 4 that they interview.

If their requirement is not fulfilled in this manner, they go for consortium based recruitment where 4 or 5 campuses have a job fair and IT firms participate in it. The typical selection ratio would be 1 for every 25 students interviewed. If even after this the requirement is not fulfilled, they go for off-campus interviews where the selection ratio is as high as 1 for every 50 students interviewed.

The amount of energy, time and money spent by IT firms in identifying and recruiting their requirement year on year is so huge in this manner that it is only a reflection of the poor employability of the graduating students. With so much of energy being drained, many of the IT firms do not go beyond 250 campuses to look for their requirement. That means that there are 1000 other Engineering campuses in the country where there are bright students who do not even get exposed to the recruitment process.

IT firms therefore can see it as a solution to one of their key management problems on the Talent Supply Chain where if they are able to invest in the campuses to change the learning process that would lead to enhanced employability, it would only help them save on the huge recruitment costs that are involved.

The second dimension of this Management problem is the cost of training the new recruits where organizations spend as much as Rs.10,000 on an average for each new recruit to get them to speed. Various studies show that good academic performance and learning on the job have a direct positive correlation. Hence, Organizations can cut down
on their training costs by getting academically brighter students – which in turn would mean that they would have to invest in the adoption of the new learning model in the campuses.

In a larger context, it is to be noted that societies have been formed and developed based on employability. Even in the modern world, knowledge based societies are the crux of social and economic development. A knowledge based society like Bangalore had its roots in employability that was generated through large Public Sector Organizations like Indian Telephone Industries (ITI), Hindustan Aeronautics Limited (HAL), Indian Space Research Organization (ISRO), Defense Research and Development Organization (DRDO) etc. Employment opportunities attract people to move to those areas that provide them. Academic Institutions like the Indian Institute of Science (IISc) in Bangalore have nurtured employable higher education graduates that are needed by these Industries and the society at large has been able to flourish.

In the current context when Academia is able to generate only 35% of their output to be employable and there is a big disconnect that happens therefore between the employer and the Academia, the biggest impact happens on the society at large only. Hence, addressing this problem of employability for the remaining 65% of the graduating Engineers has a much larger socio economic perspective which this Research is trying to address.
4.8 Summing up

In order to make this new model be adopted by the academia there needs to be a positive and enterprising academia that is outwardly focused on the needs of the industry and also have a fertile ground that is characterized by some of the following conditions.

- There is a favorable response from faculty to learn new teaching paradigms.
- The management of the Institutes supports the introduction of new learning methods.
- The Management of the Institutes encourages faculty in their development efforts to become facilitators of learning.
- Faculties are able to spend adequate time in creating resources to support the new learning model.
- The students are able to appreciate the new learning model and benefit from them.