This chapter highlights introspection of industry-academia-interface, reasons of its low initiation, misapprehension and domains of industry-academia-interface, role of academia stake holders and critical success factors of industry-academia-interface.

3.1 Introduction
The importance of industry-academia interface has been realized from decades, but it is a still burning issue for people who are either connected or responsible for managing quality education. It is a beautiful union if exploited properly can make countries self reliant and people can look for multi-directional growth. Necessity of industry-institute interaction has been stressed as an integral part of engineering education (Bhansali, 1994). Before framing problem introspection was carried out about present industry-academia-interaction status, reasons of low industry-academia-interface, misconceptions and domains of industry-academia-interface, role of stake holders and critical success factors of industry-academia-interface.

3.2 Present Status of Industry-Academia-Interface
Perhaps no other topic related to technical education has been discussed so widely and regularly with negligible outcome as industry academia interface. Even during the best of times industry interest in general to interact with institute has been unenthusiastic. Successful implementation has been an unrelenting problem. Stake holder’s personal interests seem to be more predominant and people fail to understand each other’s constraints. As a result a wide gap looms large between industrial expectations and what an institute is able to offer to them. The technical institutions operate in isolation from the world of work and the
curriculum is almost devoid of content relating to work. Even 1986 National Policy on Education for better industry-academia-relationship could not draw encouraging results. Recently some of the collaborations between leading software providers and reputed institutes are taking shape where as collaborations on other segments have drawn blank. Plenty of students are still having perennial problem in getting industrial training/projects. Industrials participation in student evaluation is still a rare phenomenon. Top institutes like Indian Institute of Technologies are seen being more involved in consultancy instead of research. Although people from research lab and institute are seen frequently writing and publishing papers for journals and conferences, but acquiring patent and its implementation in real life has still to make a mark.

3.3 Reasons of Low Industry-Academia-Interface

Industry and academia understands the importance of each other, but it is unfortunate that they still work in seclusion. Industrial participation in student academic programs is missing on account of immediate gains and it has distanced industry from academia. Academia theoretical background is also responsible for lack of industrial research and consultancy.

Number of barriers which hinders productive industry-academia-interface is as such:

- Industry is only concerned about day to day problems and do not look for long term innovative solutions.
- Industry resists change and believes in principle why to disturb theory till everything is fine.
- Good work done at educational institutions is not propagated and academia doesn’t know how to market their know-how.
- Industry is mostly unaware of what institutions can deliver and how they can be helpful to them.
- Industries look for quick solutions, where as faculty take longer time to address their issues.
- High industrial confidentiality in certain cases hinders interaction.
- Majority of the faculty being theoretical hesitates to interact with industry because of getting exposed due to ignorance about practical matters.
- Institute does not hold their faculty accountable for their product not being absorbed.
Large scale industry believed in bought out technologies, whereas medium and small scale industry in general avoid spending money on research and development work (Gupta Adesh, 2007).

No special weight age is given to industry-academia-interface during faculty selection and promotion process, nor any good work done by any industrial staff have any recognition in industrial sector.

Majority of industries treat training as a burden.

Evaluation has become academia proprietary and industrial participation is practically non-existent.

Academic curriculums are outdated, more theory based and devoid of industry-academia interaction.

Resource sharing is practically non-existent.

Memorandum of understanding between academia and confederation of industries is missing.

Industry believe that to supply trained manpower is the responsibility of trainer viz. academia, so why they should waste their productive time.

3.4 Misconception about Industry-Academia-Interface

It is perceived that some people have misconception about industry-academia-interaction. Just delivering lecture or offering seat to industry to become member of institute academic council or their governing body doesn’t make the interaction real worthwhile. We must understand that this is an only initial step towards greater involvement and in many cases the interaction get stopped with this step, giving an impression that industry-academia interaction produces no great results (Suganthi L., Samuel Anand A., 1999). Industry-academia interaction is a two way process to help each other and real effectiveness can be professed when such interactions bring sizeable change in the student skills leading to improvement in industrial working with significant impact on economy.

3.5 Domains of Industry-Academia-Interaction

Industry-academia-interaction is an evolutionary process. There is a dire need for the trainer and the user i.e. academia and the industry to develop strong relationship, sign memorandum
of understanding and look for collaboration to sustain in the globally competitive world. Different domains of industry-academia-interaction identified are as such:

3.5.1 Industrial Training
Status of industrial training in general seems to be satisfactory. Number of industries is quite open to student for industrial training and even offer good stipend to lure best student. Lot of other industries too are involved in providing industrial training, this may be on account of their own interest, government by laws, high up officials pressure and their own employee’s pressure, but in most of cases industrial involvement seems to be missing from core of their heart. Such student’s are left unattended and in due course of time they loose interest and become unworthy for an organization. The greatest barrier in industry-academia interaction through industrial training seems to be lack of industrial interest, student non seriousness and the academia casual attitude in student industrial activities.

3.5.2 Campus Recruitment
Campus recruitment is a platform through which vigorous interaction is possible between industry and academia. Industry gets a chance to meet academia through campus recruitment and is considered as a strong base to assimilate institute strength and weaknesses. With concept of joint campus in student recruitment, the interaction level is getting somewhat reduced particularly in software industries and much difference has not been experienced in small recruiters.

3.5.3 Curriculum Development
There is a strong need of involvement of visionary people from industry to devise student curriculum to meet present and future challenges. Industry most of time does not turn up in spite of showing interest. Many times on paper academia complete formalities of industrial participation by inviting easily accessible industrial persons, but such participation sometimes does not create the required impact. The curriculums may be designed keeping long terms goals in mind through wide top level industry-academia participation in order to make designed programs more responsive to industrial needs.

3.5.4 Student Evaluation
Academic output of an institute is one of an important input of an industry out of 3M’s viz. man, material and machinery. Industrial participation in student evaluation can be seen as significant parameter to enhance education quality. So far student evaluation has remained
only faculty proprietary, but through industrial participation people will get better ideas about amalgamation of theory with practice. The feed back received through this mode will be quite useful in effectively transferring knowledge and aligning academic programs as per industrial requirements

3.5.5 Resource Sharing
Concept of resource sharing is quite dismal and has not picked up in Indian scenario although it is viewed as a strongest tool to check initial cost through better utilization of resources. It can avoid unnecessary duplication and the saved money can be utilized to procure other important resources. The present resource sharing status between industry and academia seems to be limited to use of institute play ground, auditorium etc and need to be extended to other major areas.

3.5.6 Seminars
Industry-academia-interface through seminars is comparatively more popular mode of interaction. Seminars are essential not only for student, but are equally important for academia and industrial staff to remain up dated. Academic planners do stress for good number of seminars during each semester, but lack of provision for seminars in academic schedule greatly affects the seminars holding frequency. Many times it has been seen that even none of the industrial seminars are being arranged for students in a semester.

3.5.7 Research and Development
Most of the academic research is dumped in journals and have yet to see the light. Academia involvement in industrial research seems to be quite low and is restricted to only few renowned institutes. Country has not seen many patents through academia. Larger industry earlier believed in bought out technologies which is no more a profitable business these days as borrowing industry has to pay hefty price in terms of heavy cost or they have to shed a part of their share. There is a need to strengthen research and development activity to sustain in highly competitive market.

3.5.8 Adjunct Faculty
The concept of adjunct faculty picked up momentum in recent years due to shortage of academic faculty on account of privatization of professional qualification. The present status about most of adjunct faculty working in institute is either fresh engineers or retired academic faculty. The purpose of using industrial adjunct faculty is to supplement academic
theory through live examples, to strengthen student concept and to broaden sphere of their understanding, but the least participation is seen from industrial arena. There is a strong need for industry to come forward to depute adjunct faculty to promote quality education. Academia should be flexible in providing academic slot as per industrial requirements.

3.5.9 Collaborations

Memorandum of understanding is essential between confederation of industries and academia or between industry and academia to promote industry-academia interface. This will prop up student industrial projects, industrial training, faculty exchange programs, academic evaluation, resource sharing, industrial consultancy, industrial visits, curriculum development, seminars, campus recruitment, soft skills and issues related to academic excellence. Such memorandum of understanding is practically missing in our education system, but in last few years few software industries have tied up with institute to set up software laboratories in institute premises to impart technologies being used at their place. They have also come up with ideas of faculty and industrial staff development programs, student industrial projects, joint conferences, awards to meritorious students etc.

3.5.10 Personality Development Programs

Personality development programs have gained incredible popularity in last one decade. Many leading industries have top notch human resource personnel who are amongst the best personality developers. Renowned management institute invite such people to their campus for student-faculty interaction. Somehow such interaction is quite low at graduate level and that too particularly in government institutes. There is a strong need to develop student personality to remain on winning fling.

3.5.11 Continuing Education

There is a need to grow with changing demands. Academic faculty and industrial staff both needs up gradation from time to time. Presently most of academic programs are full time programs and much interest of industry has not been taken in to cognizance to up grade their knowledge. The academia must devise programs to accommodate industrial staff for continuing education and industry should be open to provide practical exposure to academic faculty who has only theoretical background.
3.5.12 Industrial Consultancy

Large number of organized and non organized sectors doesn’t have sufficient competent manpower to unravel their teething problems and they largely depend on others to solve their day to day problems to maintain their sustainability through required quality output at reasonably low cost. Renowned academic institute remain quite involved in such activity but down the line many other institutes are yet to take a start. This mode of interaction is quite powerful to bring industry-academia together.

The industry academia interaction domains which has been considered in present study are listed in Fig.3.1

![Fig. 3.1 Industry-Academia Interaction Domains](image)

3.6 Role of Stake Holders

Introspection of professional education stake holders was carried out to understand their role in promoting quality education. The important stake holders of professional education are:

- Faculty
- Industry
- Student
- Government

3.6.1 Role of Faculty

The role of academic faculty is to act as a good facilitator who coaches, trains, mentors, assists and supports students to succeed in their objectives and exercise goal settings, self evaluation, self reinforcement, self motivation and critical thinking to help students to learn
complex concepts (Kashef and Izadi, 1997). Faculty is always main asset of any institution and a well developed dedicated and devoted faculty in its pursuits of excellence in education; students get automatically developed and achieve high standards (Mittal, 1996). To ensure students achieve required skills and efficacy faculty remain involved in class room teaching, in imparting practice based skills, in developing concepts through laboratories, in guiding projects, in effective curriculum planning, in arranging industrial visits, industrial training and supervising industrial projects, in evaluating students, in delivering seminars, in undertaking industrial consultancy and conducting research, in arranging placement, counseling and updating industry through continuing education along with other academic and administrative work as per industry-academia needs.

3.6.2 Role of Industry

Industry is the largest recruiter of academic manpower. Its role is to extend facility to academic institute to prepare manpower to suit its stake holders. The major role of an industry is to conduct recruitment to plan manpower, to provide structured training to students and to assign and supervise live projects in order to exploit student potential and prepare them for future assignments. Their role can be seen in devising academic curriculum, in student evaluation, to abreast academia on present and future technological needs, to transform student to achieve pleasing personality, to interact with academia for joint conferences, workshops and to carry forward research and development activities, industrial consultancy and staff continuing education.

3.6.3 Role of Student

Students are the backbone of industry academia relations. The future of any organization or nation can be predicted through quality of available students. Their role is to acquire necessary skills with strong analytical power, aptitude and right attitude through broad based education. They are expected to be quite flexible with positive bent of mind and having good ability for capacity to change with changing scenario.

3.6.4 Role of Government

The role of government is to devise policies to promote education, open new centers, to encourage research and development, to bring excellence in education, to frame policies for student industrial internship, faculty development programs, faculty exchange, fund management, industry-academia collaboration, better employment opportunities, to up grade
skills to cope up with changing technologies, to check unscrupulous education centers, to enhance industrial production and better product quality etc.

3.7 Critical Success Factors
Critical success factors have been identified for industry-academia interaction. These have been grouped into three different domains viz.

- Institute Attributes
- Industry Attributes
- Student Attributes

to understand importance of individual attribute in propping industry academia interface.

3.7.1 Institute Attributes
The role of the faculty is to act as a good facilitator who coaches, trains, mentors, assists and supports students to succeed in their objectives and to exercise self motivation and critical thinking to help students to learn complex concepts (Kashef Ali E., and Izadi Mahyar, 1997). All institutions must do an extensive market research to determine the needs of probable employers and attributes, which they look in the students, in a scenario of day to day changing technologies. All necessary attributes must be imparted in order to make them strong and confident to face new challenges. The following institute attributes have been identified to improve industry academia interface:

- Involve industrial staff in designing, updating institute curriculum.
- Fuse technologies and replace old technologies.
- Be computer savvy.
- Incorporate industrial projects in student curriculum through joint industry-academia supervision.
- Provide extensive workshop input to students in the institute.
- Arrange frequent industrial visits to improve conceptualization.
- Arrange frequent industrial seminars on current practices.
- Provide more thrust on industrial research and development projects.
- Do continuous monitoring of industrial training and involve senior faculty for student assessment and interaction with industrial staff.
- Involve industrial staff in student evaluation.
• Update institute infrastructure viz. laboratories, workshops, library, computer student ratio, internet facility etc.
• Do bench marking (Suganthing et al, 1997).
• Improve interpersonal skills, build positive attitudes and make student customer oriented.
• Establish proper training and placement cell in an institute and provide sufficient staff and infrastructure.

3.7.2 Industry Attributes
Industry plays a significant role in transforming student to an effective engineer. Industry is a platform where a student learns the art to muster and practice the use of multifaceted skills about which he has learnt at an institute level. Active industrial participation is essential to produce right type of an output from an institute, which is mainly trained for industrial use. Some of the industrial attributes, which can turn a student in to an effective engineer and can promote industry-academia-interaction, are as such:

• Provide structured industrial training with suitable stipend to enhance student interest.
• Involve institute faculty and student in research and development projects.
• Participate actively in institute curriculum development program.
• Participate in student evaluation to make academia understand about industrial requirements.
• Deliver seminars on current practices to update student and faculty.
• Allow institutes to use industrial testing facilities.
• Instill human values and inculcate team spirit through participation in student academic programs.
• Provide feedback on institute strengths and shortcomings through industrial training and recruitment process.

3.7.3 Student Attributes
Institute try to inculcate certain values in students but desire to learn has to come from inside. Clarity in goals, positive attitudes and desire to excel are few attributes which can keep students at the forefront. Some of the attributes which can transform student to a successful professional and help to build better industry-academia interface are as such:

• Work to develop strong basics
- Co-relate theory with practice.
- Muster knowledge from neighboring disciplines.
- Remain committed to sustainable development.
- Provoke self for innovative thoughts.
- Develop analytical and design abilities, problem solving skills, decision-making skills and management skills.
- Do self-assessment; look at your strength and weaknesses and work to overpower shortcomings.
- Develop positive skills; respect other's feelings, be flexible, responsible, optimistic, disciplined, punctual and humorous.
- Work on good communication skills and show work ethic.
- Have clarity about your goal and work whole heartedly for success of your goal.
- Participate effectively in faculty evaluation to promote quality education.