Present Status and Impact of Joint Industry — Academia Evaluation on Graduate Engineering Students: An Indian Case Study

V.K. Bansal
Sandeep Grover
Ashok Kumar
Y.M.C.A. University of Science and Technology, Faridabad

Abstract: *Evaluation is one of the key parameters in quality education. In Indian education system industry and academia usually work in isolation. By and large the student's evaluation is being done by the institutional faculty which doesn't possess rich industrial experience. Industrial participation in student's evaluation is either minimal or non-existent. The traditional evaluation system of education needs restructuring. Scope of joint evaluation through industry and academic has been premeditated through industrial survey in areas of setting and evaluation of papers, evaluation of laboratory work, workshop exercises, projects and seminars. The study has also been directed to know industrial views relating to student's basic concepts, research and development capabilities, practical skills, industrial exposure, analytical abilities, managerial skills, soft skills and software applications to have feed back on learner's inventiveness, strength to comprehend fundamentals, their visualization and analyzing power to carry forward research activities and their proficiency in managing man power and to get along with different kinds of people effectively. The recruiter's feed back on institutional weak areas will tend to bridge gap between industrial needs and available institutional outputs.*

1. INTRODUCTION

Quality of education is frequently being questioned by public and business communities (Kashef and Izadi, 1997). Numerous factors are responsible for engineering quality education, such as industry-academia-interface, clear educational goals, matching educational methods, assessment methods, balance between content and process, curriculum loading, use of information technology and application of modern methods of quality assurance. To supplement quality education some of the industry-academia-interaction modes suggested by Bansal et al., (2007) are:

- Industrial Training
- Curriculum Development
- Evaluation
- Seminar/Expert Lectures
- Adjunct Faculty
- Placement
- Personality Development Programs (PDP)

These modes of interaction are also highlighted through Fig. 1.

Out of different industry-academia-interaction modes, evaluation is one important tool to promote quality education. Bi-annual semester system of study

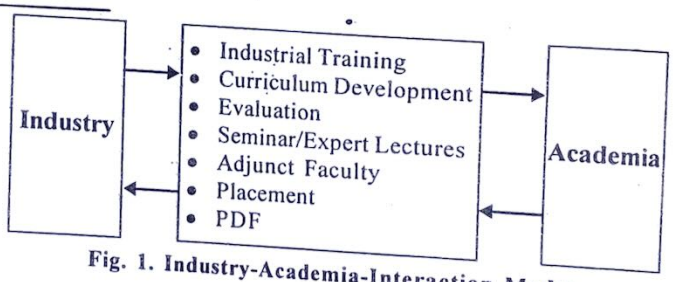

Fig. 1. Industry-Academia-Interaction Modes

is generally prevalent in Indian graduate engineering programs. Two internal assessments and one university evaluation based on subjective questions with around 35% choice is the most commonly adopted method to award marks or grade to promote student to next semester. Good choice availability during examinations tempts students to skip few topics which tney consider tough and possibly they don't attempt hard to learn these topics seriously. Such evaluations need quick readdress. Continuous evaluation is one probable solution to overcome some of these drawbacks. Evaluation must be focused towards creativity and to check comprehensive learning level.

Joint industry-academia evaluation can be looked as another viable quality tool. Memorandum of understanding can be signed between institutions and industries association for joint student's evaluation.

Through student's evaluation, recruiters will have regular interaction with students as well as different faculty members. These interactions will provide better clarity to recruiters about student strengths and weaknesses. Industrial feed back gathered through this mode will help institutions to analyze their curriculum and make necessary changes to improve their educational programs as per industrial demand. Such evaluations can work as an important tool to cut wide gap between industrial needs and acquired student's attributes.

Through this paper, an attempt is made to comprehend current status of industrial involvement in student's evaluation, feed back on present student strengths. Enhancement in student's learning, employability and in getting live projects with joint industry-academia participation in student's evaluation and feed back on industry-academia ratio in evaluation.

2. PURPOSE AND METHODOLOGY OF STUDY

The study aims to identify present status of industrial participation in student's evaluation in terms of setting and evaluation of papers, evaluation of laboratory work, workshop exercises, projects and seminars to have fair idea of student's creativity and skill sets attained at institutional level. The survey was done with a motive to understand the level of institutional inputs imparted to students on basic concepts, practical skills, industrial exposure, analytical abilities, managerial skills, soft skills and software applications to have clarity on students' strength to comprehend fundamentals, their power to analyze and to carry forward research activities, proficiency in managing man power and to get along with different kinds of people effectively apart from information on industry-academia ratio in student's evaluation. Study was also conducted to analyze impact of joint industry-academia evaluation in getting feed back on weak areas and in getting live industrial projects, improvement in student's learning and their employability. The feed back thus gathered can be exploited to refine educational programs.

Industries from different states and union territories such as Delhi, Haryana, Uttar Pradesh, Maharashra, Himachal Pradesh and Chandigarh with diverse business processes were approached to have fair assessment of the study. Surveys were used as tools to obtain information from industries. Based on industrial interaction, literature review and personal experience, 05 questionnaires on student's evaluation were prepared. Questionnaires prepared were sent to 110 industries through post, e-mail and by hand with a request to return the completed questionnaires with in two months. However, the survey was spread over 6 months. Out of 110 approached industries 64 industries responded. Some of the industries answered these questions partly, where as few others provided their own options, which they considered most appropriate. The statements were carefully designed to cover the essential aspects. The respondents were asked to rate on a 5-point scale: 1 (to great extent), 2 (to large extent), 3 (to some extent), 4 (to little extent), and 5 (not at all).

3. PRESENTATION AND ANALYSIS OF STUDY

Technical institutions groom students so that they can carry forward industrial businesses and can suggest innovative techniques to improve business processes. Practical and inventive questions during evaluation develop better critical thinking and analyzing power. Industrial staff which is rich in experience can play fruitful role in evaluation once considered jointly with institute faculty. Through this survey an attempt is made to identify the importance of involving industrial faculty in student's evaluation in achieving set educational goals to bring greater satisfaction to all its stake holders. Data thus obtained was compiled and analyzed. The analysis is presented below as such:

3.1 Propriety of Evaluation through Institute Faculty

Industries look to institutions for their manpower requirements. Feed back through campus interviews indicate that students mostly grasp theoretical knowledge during institutional students to be productive from day one, but they land up with the opinion that most of them are to be retrained before they become an asset to them. Involvement of industrial faculty equipped with strong reasoning power and having rich practical experience along with regular faculty in student's evaluation can play constructive role in transforming students to attain desired proficiency levels. Through this survey, feed back has been collected to understand whether student's evaluation should only be the propriety of the institute faculty.

Results through Fig. 2. indicate that around 17% respondent industries support evaluation as institute propriety; where as the remaining industries believe that student's evaluation only through institute faculty is not an appropriate way to impart education. In the light of this the institutions and industries must understand the importance of being together in developing manpower most suitable to the society as well as to both of them.

3.2 Industrial Participation Status in Students Evaluation

Evaluations are usually done by the faculty who teach them. Students generally believe that evaluation

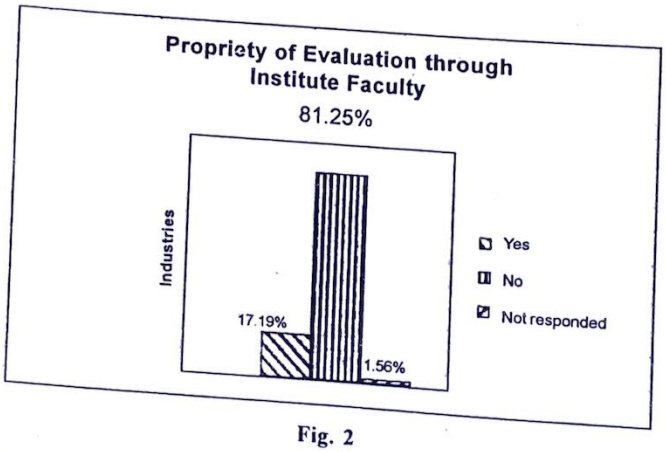

Fig. 2

is on the pattern, on which they have been taught. Subjective and straight questions are predominant during student's evaluation. Student doesn't bother to dig more. Such evaluations try to retard innovative thinking. Involvement of industrial faculty in student's evaluation, which is highly experienced and developed on application front, can enhance innovative power. The feed back collected through survey on industrial participation in setting and evaluation of question papers, evaluation of laboratory and workshop exercises, evaluation of student seminars and projects were analyzed. Observation through Table 1 profess that 1.56% respondent industries in paper setting, none in paper evaluation, 4.68% in lab evaluation, 7.81% in workshop evaluation, 14.07% in seminar evaluation and 15.62% in project evaluation are connected with student's academia from large to great extent. Feed back indicates the industrial participation status in student's evaluation is quite gloomy in areas of paper setting, paper evaluation, and laboratory and workshop evaluation. The participation appears to be slightly better in student's seminar and project evaluation.

4. INDUSTRIAL FEEDBACK ON STUDENT'S STRENGTH

Often people talk on various forums, conferences and national workshops about wide gap prevalent between industrial needs and available student strengths. Much has been recommended and implemented to effectively improvise engineering education. The traditional structure of engineering education still prevails, even though the current exigencies require fundamental restructuring. The educational gaps play important performance related insinuation to both the business organizations and the educational institutions. Though survey feedback is collected on student's industrial exposure and acquired attributes to understand various skill sets attained during study at institutional level.

Table 1

Activity	Participation Level %age				
	To Great Extent	To Large Extent	To Small Extent	To Little Extent	Not at All
Paper Setting	0.00	1.56	9.38	7.81	81.25
Paper Evaluation	0.00	0.00	10.94	6.25	82.81
Lab Evaluation	3.12	1.56	6.25	9.38	79.69
Workshop Evaluation	1.56	6.25	9.38	12.50	70.31
Seminar Evaluation	4.69	9.38	21.87	17.19	46.87
Project Evaluation	3.12	12.50	12.50	12.50	59.38

4.1 Feedback on Basic Concepts

Business houses lay greater emphasis on basic concepts. Their evaluation is generally oriented towards comprehensive learning. The purpose of study is to understand industrial views about acquired student's knowledge on basic concepts in order to have clarity on their strength to comprehend fundamentals. Fig. 3 reveals that around 16% respondent industries believe that students acquire strong basic concepts from large to great extent; where as the remaining industries advocate that institutions must evolve strategy to improve conceptualization.

4.2 Feedback on Practical Skills

Academic program of any institute is based on the syllabus approved by their affiliating university which is unarguable. Industries usually emphasize more on practice based training as they believe that theoretical based learning is less receptive. Practice based training improves visualization which acts as a catalyst to develop better understanding and boost learner's confidence. Fig. 4 points out that 21.88% respondent industry believes that students acquire good practical skills; where as majority of industries are of the opinion that institutions must exert more to impart better practical skills.

4.3 Feedback on Industrial Exposure

Industrial visits update people on current technologies. Visualization strengthens concepts. A

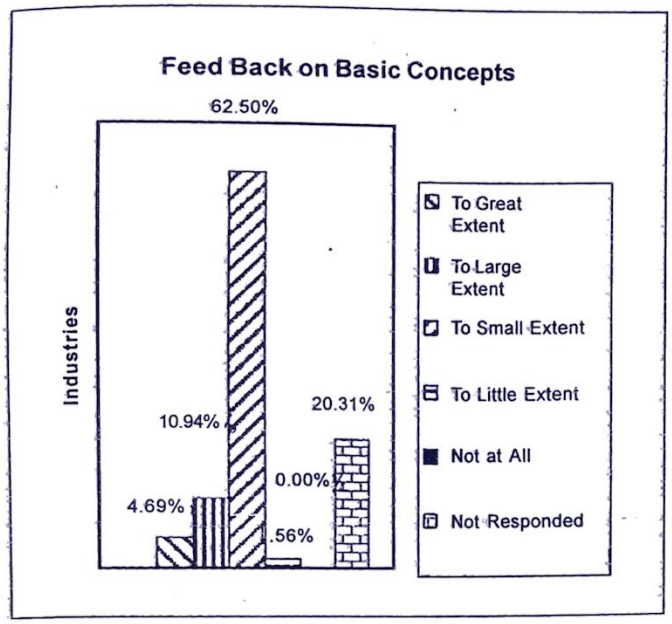

Fig. 3

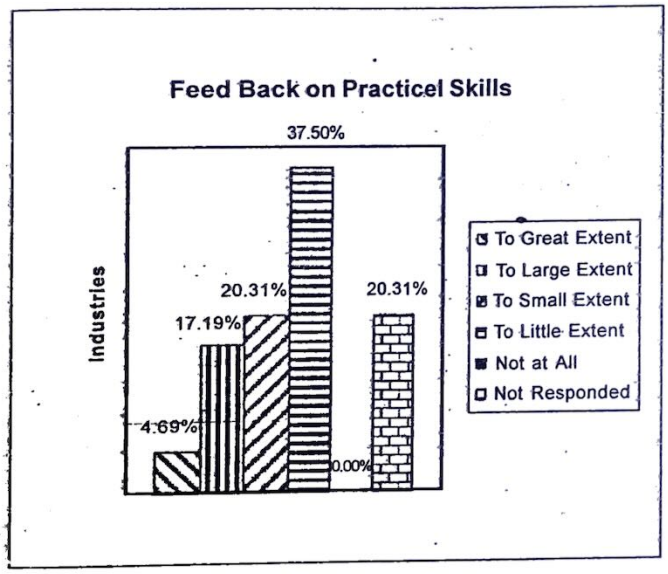

Fig. 4

teacher with industrial exposure can add significant value to technical education with live practical issues through his industrial experience (Murthy, 2002).

Industrial visits improve industry-academia interaction, student's placement and enhance opportunities in getting live projects during industrial training. In industrialized countries engineering teachers can hardly survive or grow professionally without industry interaction. Fig. 5 signifies that 15.62% respondent industries are of the opinion that student get good industrial exposure, where as majority of industries stress for more industrial visits.

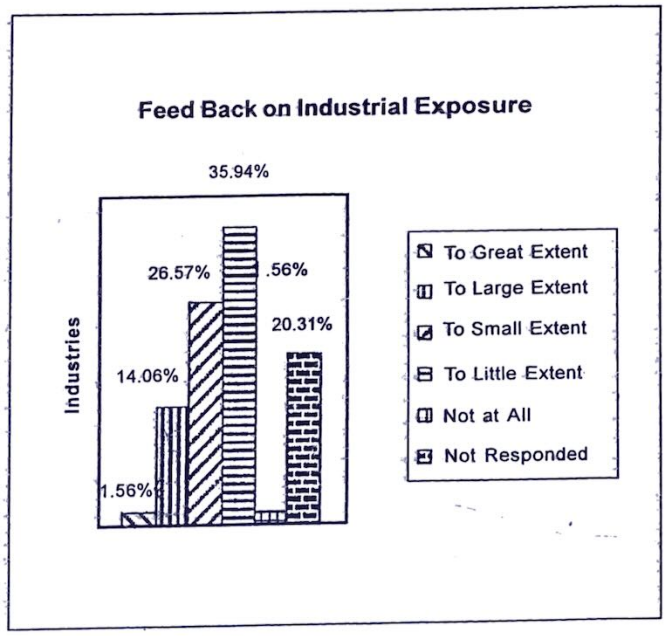

Fig. 5

4.4 Feedback on Analytical Abilities

It is a process of reasoning to solutions using more than simple application of previously learned procedures. Industries look for engineering graduates who possess good analytical and critical reasoning skills apart from good technical kowledge. With good analytical ability one is able to analyze problem in right perspective so that optimum solution is found out. Fig. 6 signifies that 25% respondent industries are of the opinion that students have good analytical abilities, which seems to be quite low. Institutions must augment means to strengthen student's analytical skills, which is one of the most sought skills these days in the industrial arena.

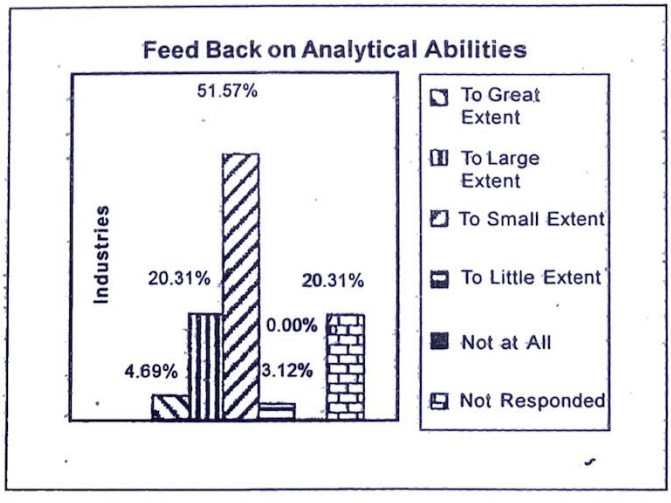

Fig. 6

4.5 Feedback on Managerial Skills

With the entire world as a market and national borders becoming increasingly irrelevant, the potential for organization to grow expands dramatically. There are considerable challenges in managing global as well as internal businesses. Managers must deal with economic, political and cultural differences. The purpose here is to understand trainer's role in preparing students equipped with these skills. Fig. 7 signifies that managerial skills at engineering graduation level are not up to the expected levels, except small number of industries which think contrary to this.

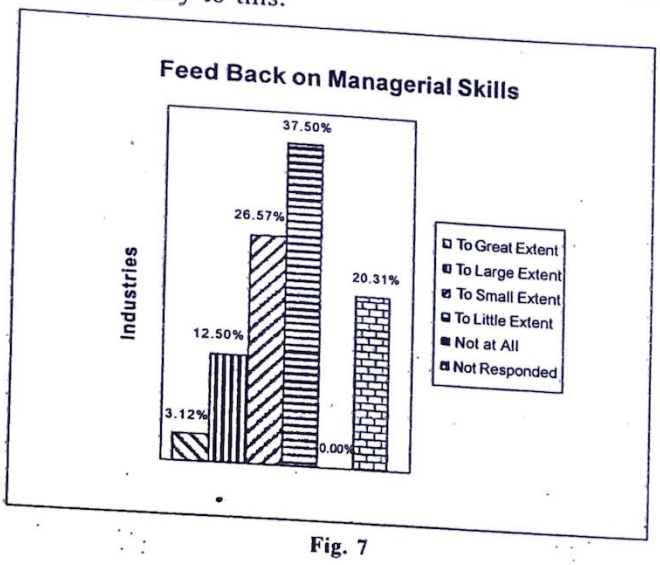

Fig. 7

4.6 Feedback on Research and Development Skills

Large industries have developed their own research and development centers. These industries look for people who can design, analyze and interpret so that a recognized and specific need for production of useful materials, devices, systems or improvement in prototypes and new processes can be met through development. Fig. 8 signifies that majority of industries feel that students have little research and development skills. Around 18% respondent industries are of the opinion that students posses good research and development skills to carry forward developmental activities.

4.7 Regarding Software Applications

These days software usage is quite extensive in industries. Few years back, designing, simulation and analysis was done manually. It has made work simpler and enhanced perfromance, visualization and analyzing strength. Industries feel that software's are the need of an hour and every engineer must have sufficient proficiency in his respective field of software's as well

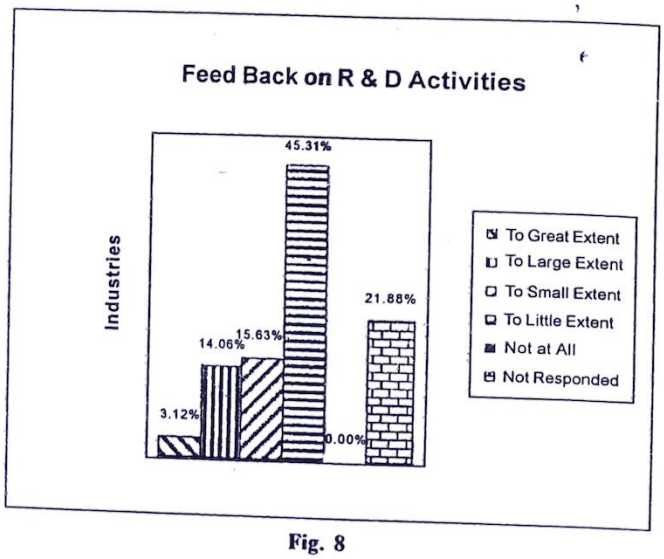

Fig. 8

as in general software applications. Fig. 9 signifies that around 40% respondent industries are of the opinion that students understand software usage and applications to large extent, which seems to be reasonably good.

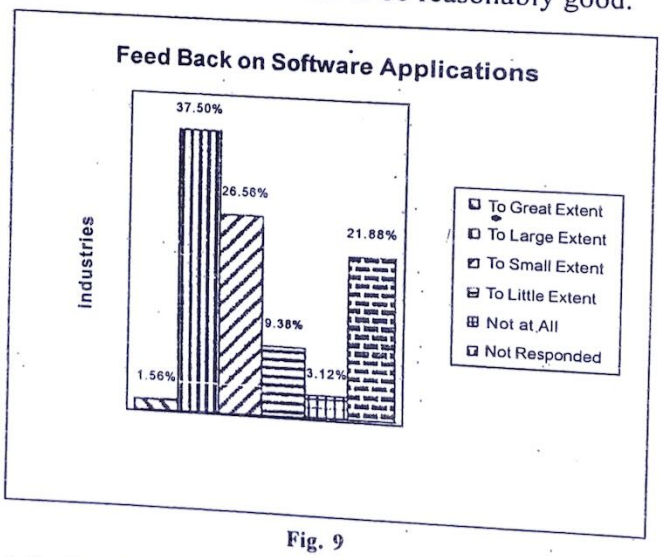

Fig. 9

4.8 Feedback on Soft Skills

With changing educational trends, versatility in educational courses, availability of masses of qualified personnel, the completion for job acquisition and job sustainability is becoming tougher. The soft skills have become important in today's corporate scenario and it has taken an edge over hard skills. Most employers these days want to hire, retain and promote persons who are dependable, resourceful, ethical, and self directed, having effective communication, willing to work and learn and have positive attitude. The study tries to understand the awareness, need and importance of soft skills during studies. Fig. 10 signifies that around 18% respondent industries are of the opinion that students

have sufficiently developed soft skills, where as majority of industries recommends that soft skill imparting needs greater attention.

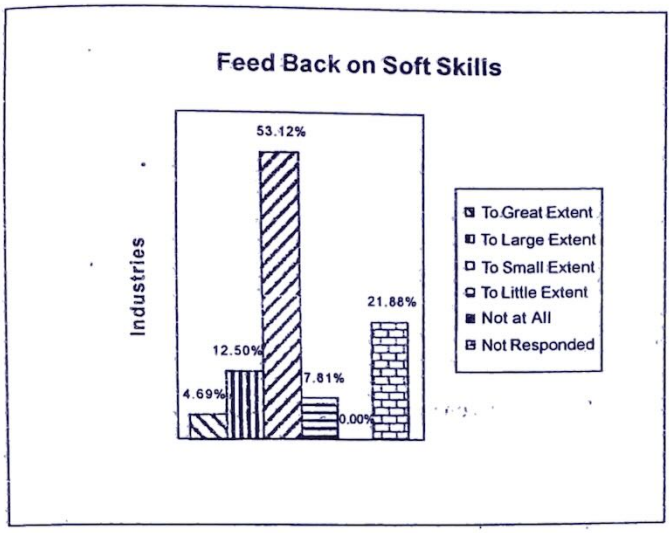

Fig. 10

5. IMPACT OF INDUSTRIAL EVALUATION

The centrality of knowledge and reduced shell life of competencies raise the importance of bringing innovation in learning and human capital development. Learning will be more effective when there is careful sequencing of learning activities in a learning workflow (Koper et al., 2002). One method of creating learning effectiveness is studied through industrial evaluation. From Table 2, it appears that from large to great extent 75% believe that it sharpens student's knowledge and improves learning quality, 34.37% think it generates employment and 63.5% believe that it enhances opportunities for live projects for students during industrial training. Statistics indicate that improvement through industrial evaluation seems to be quite encouraging.

6. INSTITUTE VS INDUSTRIAL EVALUATION RATIO

For effective evaluation, industries views were gathered on industry-academia ratio for joint evaluation. Analysis indicates that number of industries suggested different ratio, but 2:1 is the most recommended ratio by majority of respondent industries. Fig. 11 provides overall views of respondents industries about institute-industrial faculty ratio in student's evaluation.

7. CONCLUSIONS

The work has highlighted present status in student's evaluation. Industrial views were gathered on various student skills. Study has been conducted to have

Table 2

Activity	Industrial Evaluation Impact %age				
	To Great Extent	To Large Extent	To Small Extent	To Little Extent	Not at All
Feedback on weak areas	12.50	62.50	20.31	1.56	0.00
Sharpens student's knowledge and quality	1.56	48.44	45.31	1.56	0.0
Improves employability	7.81	26.56	59.38	3.12	0.0
Enhances opportunities for industrial live projects	6.25	56.25	32.81	1.56	0.0

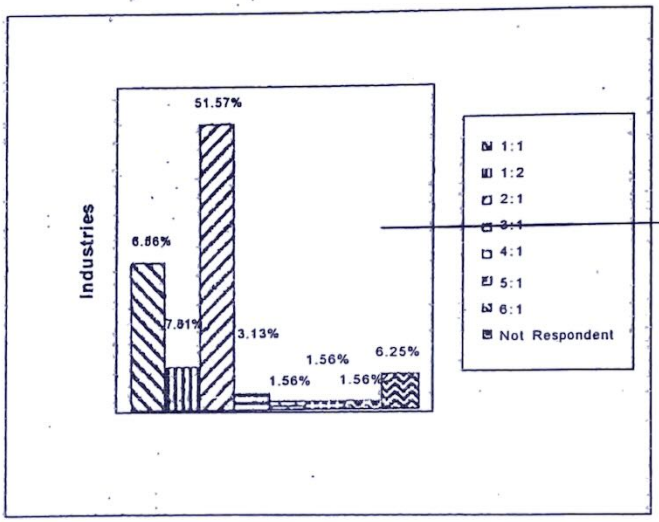

Fig. 11

feedback on weak areas and to understand improvements in student knowledge, employability and availability of industrial projects with the help of joint evaluation. Effective institute-industry ratio was also analyzed for evaluation. Based on survey analysis following conclusions may be drawn:

- Student's evaluation should not be the propriety of institutional faculty.
- Industrial participation in paper setting, evaluation of answer sheets, laboratory and workshop evaluation is from minimal to zero. Industrial participation in student's seminar and project evaluation is somewhat better.

- Students need greater industrial exposure. Feedback on student's strengths signals that institutions should exert more to enhance student's basic fundamentals, practical, managerial, analytical and soft skills. More reinforcement is desired to develop capabilities towards research and development.
- Students seem to be well versed with software applications and its use age.
- Industrial evaluation appears to be:
  - Very effective in getting information on weak areas.
  - Quite encouraging in obtaining industrial projects for students.
  - Effective in sharpening student's knowledge to large extent.
  - Effective in improving employability to small extent.
- 2:1 is the most recommended academia-industry ratio for student's joint evaluation.

A well-designed and conducted industry survey is an opportunity to periodically understand the evolving needs of the industry and managing unrealistic expectations. Short comings uncovered by surveys should receive prompt attention. Armed with current information from industries, institutions should strategically plan academic reforms to involve industries in joint evaluation with a view to prepare students to matching industrial needs and expectations.

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