

Academic Excellence through Industry Institute Collaboration

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Abstract:

This paper discusses a new strategy to enhance the industry institute collaboration to achieve academic excellence. It is an eight point program to be equally implemented both by the industry and the institute in coordination. Each point is carefully listed after a survey from the stake holders. It started with the teachers being deputed to the industry of their choice, they will work there as part of the program apart from the regular teaching load. The exposure to industrial working environment will help them to acquire new skill sets. This is an exchange program and the local industries are involved to connect easily and avoid travelling during pandemic. This approach helped the faculty to understand the industry setup and personally interact with them. During the interaction it was also noticed that the lower technical cadre of the industry lacked theoretical know how and required the involvement of the academicians. The approach eventually upgraded to the beginning of an exchange program and was well appreciated. The paper discusses the methodology in detail which can be adopted for benefit at large.

Keywords: Interaction strategy, Best practices, Partnerships, Combined growth, Syllabus framing, student development.

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Introduction:

Institute and industry share a symbiotic relationship. Institutes produce learned man power and the industries absorb them to gain and grow. The research activities at the institutes must be taken up by the industry and converted to products and services. Academia is an excellent source of new ideas; both academicians and industrialists should come forward to organize workshops or specialist meetings for knowledge exchange and potential research ideas. The resistance is now reducing and research collaborations are beginning to happen but is limited to large players like the IIT's and IT industries. These developments must reach every one, then only flagship ideas like Digital India, Atmanirbhar India can happen and five trillion economy can be achieved. Industry sponsored start-ups in academia is a good way to learn and implement. Sponsorships in the form of finance and infrastructure can collaboratively happen.

1. PROGRAM STRATEGY

The exchange program strategy was based on the best practices followed both in the institutes and the industries. These points can be further used to measure the outcome of the program.

A. Academia

- Faculty deputation
- Industry aligned electives
- Theory classes for ITI employees
- Solutions to concerns

B. Industry

- Funding for projects
- Placements and internships
- Conduct of workshops
- Long term partnership projects

C. Pre implementation survey and the outcomes

In order to have a structured and systematic approach to the strategy, it was essential to take the opinion of the stake holders. A pre implementation survey was conducted. The stake holders were from all walks of life like industrialists, parents, alumni entrepreneurs, faculty members and students. The survey details are shown in Table 1.

TABLE 1. STAKE HOLDER SURVEY

Questions.	Strongly Agree	Agree
Should Industry play a major role to achieve academic excellence at institutes	100	0
Faculty deputation to industry is required to leverage interaction	50	50
Industry should participate in the electives syllabus framing	50	50
Enhance theoretical knowledge base of the industry workers through technical sessions	63	27
Find solutions to industry queries-research based	56	44
Funding of student projects by industry	88	12
Collaborate for placements and internships	100	0
Conduct workshop for knowledge exchange	88	12
Long term partnership projects for benefit of the society	100	0

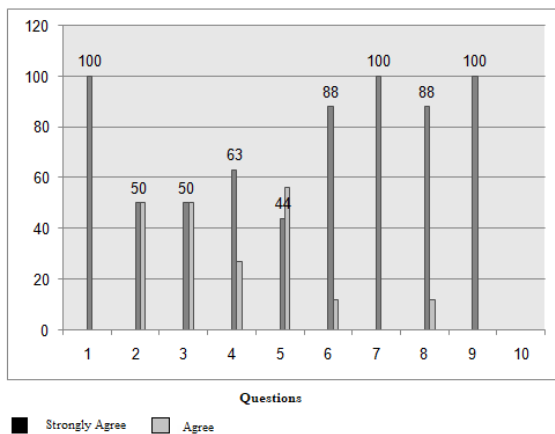


Fig1. Bar graph for the data in Table 1

The results of the survey shown in Fig1 were synchronizing with our thought process and the literature survey which carried out on the same lines confirmed that the strategy is beneficial to the students and the teaching fraternity.

2. LITERATURE SURVEY

The literature survey conducted to access the impact shows that industrial interaction is important but there is a need to establish a sustainable model and it

should be based on the expected outcomes.

Academic institutions and industry are required to work hand in hand. The focus of interaction should be need based, interactive and mutually beneficial. The research involves the study of the interaction between industry and institutes, its objectives, initiatives, problems and the measures for making this interaction fruitful [1]. A good and vibrant industry institute interaction is always required by both sides and some objectives like Bridging the gap between Industry and Institute, Promotion and co-ordination of consultancy services, Use of resources from industries and the institute for benefit of industries, students and society are essential[2]. Industry-Academia interaction is an important process to be included mainly in engineering curriculum as it can provide necessary inputs to the academic institute to build the competencies required by faculty and students [3]. Industries spend tremendous amount of time and money in converting a fresh graduate to a workable employee due to the gap between academic curriculum and industry needs. There is a growing demand for creating employable man power at university level by suitably augmenting the university curriculum. Organizations like CII, NASSCOM, National Skill Council of India, and AICTE are stressing the need of imparting industry needed skills to engineering students in campus [4]. A good curriculum must adapt its education activities and services to serve a dynamic community. In our case Industry is the community where the student will be working after successful completion of his course. Industry is dynamic in nature. It has evolving needs in terms of technological, communication and personal and other skills [5].

3. DETAILED STRATEGY

The industry institute collaboration was based on the best practises followed both by industry and institute. Alike. It was important to see that the collaboration was beneficial to all the participants. Success will definitely take us a long way.

A. Academia

1. Faculty deputation: The Survey results showed that 50 % strongly agreed and 50% agreed that faculty deputation is a must for proper interaction. The faculty of different departments were explained about the deputation program and they could volunteer for taking up the task. Once they agreed, the next task was to interact with the local industries and convince at least one of them to participate in the program .The faculty did an excellent job because it

was a first time experience. Later they had to visit the industry a couple of times to finalize the area of interaction and schedule. In order to have uniformity across departments, the faculty had to do the following

- a. Finalise the area of interaction
- b. Acquire skill sets
- c. Chose a set of students to be part of the task
- d. Develop a model to be used for benefit of students.

2. Industry aligned electives: This is setback for affiliated institutes because they do not participate in syllabus framing. But electives do offer some flexibility. If industries can participate in selecting the electives and framing the syllabus, is it possible to make the students industry ready? The skill gap analysis is required to choose the appropriate electives. The analysis of student placement record showed that there is definitely an advantage.

Majority of the students feel that their education is complete only when they get through campus placements. Therefore, placements play a vital role in every student's life. Generally, most of the engineering institutions invite various companies to conduct placements at their organization. The relation between institute and industry plays a key role in providing better placements at the institute. After employing the graduates, industries took no time to comment that students are not industry ready. Industry thinking needs a paradigm shift. They must invest in students much early and mould them according to the requirement. Training them for required skill sets through appropriate elective has proved to be one of the best methods. Hence it was made as an integral part of the exchange program.

3. Theory classes for the ITI employees: Core industries would like to employ people with hardware skill sets like machining, assembling, drilling and so on. ITI trained people are specialists in this regard and are gainfully employed. During the interaction with the industrialists they expressed that these employees lack theoretical know how. They are masters of doing the task but are not aware of the theory behind. There was request from the industrialist asking us to teach core subjects and enhance their ability. So eventually it became part of the exchange program. A schedule was prepared and the faculty members were deputed to do the needful. This actually converted into a consultancy; faculty with subject expertise started visiting the industry leading to new understanding and approaches. New ideas were born leading to innovations and product development. The theoretical skill enhancement of the ITI employees was assessed through simple written examination.

4. Solutions to the concern: Effective and continuous participation in Research and Development activity is very important for both institute and industry. They cannot have a sustainable life without it. Every industry has its own research enclave but it is also known that majority of research activities happen at the institute. This is because students with innovative thinking develop new technologies. Industries and Institutes should jointly contribute for research which will help the industries to come up with better and innovative products. This strategy was adapted with a slight change. The industry is expected to come up to the institutes for solutions to their concern. A team can be formed with faculty and students (preferably final years). The team will be informed about the problem and the expected outcome. The understanding will be better if industry can conduct informative sessions and allow the team to study the older versions if any. If any specific methodology has to be followed then the industry must inform about the same. Mutual benefit can be derived from the shared expertise and experiences between the industry and the institute. With this the students were able to innovate and develop lab modules which could be used as sub systems for future development.

B. Industry

1. Funding for projects: When the survey was taken for this strategy, 88% of the stake holders agreed funding of student projects must happen. The institutes have the required skill set to develop the project but they lack funding. Hence most of the projects do not reach the prototype stage. There are a few funding agencies like UGC, AICTE, KSCST, ICSSR, DST to name a few but comparatively large a number of fund seekers. The ratio is highly mismatched. If this continues then most of the research work will be confined to papers or will remain closed in the books or MOU's. All industries big or small must support funding in their own strategic way and see that research work is implemented to benefit the masses. We know that industrial revolution was a result of exceptional research carried out by renowned scientists at various universities. Even today we have successful industry-institute collaborations which are leading by example, to name a few IISc, Bangalore and Wipro jointly working in the areas of AI, IOT and machine learning.

IIT Guwahati and Samsung India are coming forward to elevate the skill sets of 300 students in cutting edge technology and digital innovations.

IIT Chennai and Sterlite technologies have joined hands to develop 5G. IIT Chennai has also tied up with ESPN the leading sports channel to analyse

sport events using data science. The need of the hour is that these collaborations must happen beyond IIT's and focus on tremendous talent available in several other institutes.

2. Placements and Internships: Number of Placements with package details speaks of the success of a student and also speaks about the drive ability of the institute. For success rate to be high the institute must maintain the relation between the institute and the industry which plays a vital role in getting good placements for the institute. It is not enough that this is happening in IIT's and other premier institutes, Through this paper we would like to appeal to the industries to reach out to all budding talent and use their skill set to innovate and grow. Internships are now part of the curriculum. Earlier students would take it up only if interested. Internships is advantageous because it helps the students to associate with the industries much early. Many times internships convert into gainful employment. It was noticed that our college students who had taken up internships at electricity company were able to clear the entrance exam for KPTCL, the success rate was 65% much better than the previous 3 years.

3. Conduct Workshops: Workshops and Guest Lectures are the best way to reduce the gap between industry and institute. It is actually a platform for the industry to introduce themselves and test the students for the required skill set. One of the Bangalore companies (name not mentioned) conducted a workshop at our premises to introduce their services. A set of students was very much interested to work with them and they are currently doing internship at the same company. As part of the training they have helped in developing softwares for the clients. The workshop had 100% impact on only a few students but laid the foundation of a fruitful association.

4. Long Term Partnership Projects: These are projects which will be converted into actual services and products and call for huge investments. There is no stringent time limit on such projects so several batches of students will be involved. The investment is done by the industry and the implementation is done by the institutes. The institutes may also help in providing infrastructure and other logistic support. This will help the industry to save land and development cost. Finally the industry will have a branch in the college campus dedicated to the development of a particular product. One of the colleges in Mangalore, our own sister concerns at Hubballi have shown that industry and institute can co exists in the same campus and work together for the benefit of faculty and students. Some of these are owned by the faculty and are employing the students leading to an entrepreneurial setup. Start ups are now

growing at a faster pace because of the support they are getting from the institutes. Last year three start-ups were initiated by our own students and they are growing at a steady pace thanks to the pandemic, they could capture the local market.

C. Feedback

The response of the faculty members and the industry employees who participated in this experimental study was very important to us. It was essential to know if collaborations of this kind will help academic excellence. They were also asked to give suggestions that will help in better implementation. The industry was local to Belagavi the names are not revealed because the strategy is not limited to any industry in particular. Some of the experiences are listed in Table 2

TABLE 2. FEEDBACK DETAILS

Indus try	Skill Set	Outcomes	Experience
1.	Drivers for ARM	Program and write test benches	It was an advantage to work with 15 year old industry and learnt industry way of programming.
2.	Industrial microwave devices	SCR Firing cards an industrial approach	Great opportunity to interact and learn microwave heating concepts
3.	Drivers for peripheral devices	Test bench simulation and validation	It was a great learning experience Working with the industry learnt industry embedded programming
4.	Industrial automation using PLC	Laboratory PLC model for projects	A different experience working with the industry, learnt how to customise as per the requirement
5.	Tutorials for ITI employees.	Classes and examinations	They were enthusiastic in learning the theory and fared well in the exams

4. CONCLUSION

The strategy evolved because of the long term industrial association and the enthusiastic support

from the local industry. Belagavi is an established industrial hub, there are many industries with their own success stories. This was advantageous to us even in the pandemic because only the local industries were involved. The strategy is based on our own experience, stakeholder response and the inputs of the industry participants. The statistics worked well for this particular thought process. Changes can be made to adapt the strategy to any specific industry or application. The methodology has been framed and we have initiated the association with the industries. Eventually as many industries participate better results can be obtained. Results that were obtained now show that the strategy is beneficial and long term associations can be taken up on the same basis. This paper appeals to all the industries to come up with long term institute association and support the local student community.

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