

Industry Innovations for Enhanced Employability: A Case Study of Academic Industry Interaction

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Abstract—With recent advances in sophisticated technologies, changing needs of the Indian economy, and the very presence of challenges, the institutions present a platform for instigating innovations. Guru Nanak Innovation centers has been setup to analyze and help implement strategies for inclusive innovation in India and prepare a roadmap for innovation 20-20. It has invested significantly in developing world class research institutes and establishing strategic international research alliances. The mission of the innovation center is to develop an environment that promotes innovation, i.e. pursue research that not only advances science and technology but also to have a societal impact.

It is foreseen that the innovation center will act as a catalyst to: create a fertile environment for faculty and student entrepreneurship to grow; accelerate product development from the laboratory to the marketplace; increase connectivity between the Guru Nanak Institutions and industries to build global venture investment opportunities; and, provide entrepreneurial learning and mentoring initiatives. This paper summarizes the proposed goals for the innovation center and describes the center's initial programs.

Keywords—*Industry-institute interaction, innovation, entrepreneurial.*

I. INTRODUCTION

Education is the ordeal in which innovations are formed. To promote creativity and motivate innovations is the first step taken by Guru Nanak Innovation (GNI) to broaden and deepen the impact of innovations. With rapid advancement in new technology, changing needs of economy, and the presence of challenges, the college presents a platform for instigating innovations. In most colleges and universities, innovation centers have been put up with the funding of government but GNI has managed to establish a dynamic innovation center on its own. The mission of the center is to nurture an ecosystem that encourages innovation, to pursue research that advances science and technology and as well as have a societal impact [1].

The aim of GNI Innovation Center is to foster an ecosystem of innovation and connecting research with application for the benefit of students. It supports application oriented research to solve real world problems by developing ideas into innovative applications that can be that can benefit the students in more ways than one.

The main objectives of GNI Innovation center are:

- Encourage an environment of innovation in the campus
- Educate and sensitize students and faculty members by launching various schemes on innovation programs
- Select ideas with potential by conducting training/orientation programs/modules on innovation and researches
- Develop meaningful associations with various segments of industry
- Develop ideas into innovative applications.
- Create seamless building blocks of fundamental and applied research with emphasis on translation to industry [2].

Students must know that any innovation always starts off with an idea, on pursuing of which it turns into an invention and, after a lot of hard work turns into a potential new product which then requires even more hard work and expense to launch into the marketplace. GNI Innovation Centre is a platform for the institution to establish links between various stakeholders from the academy, initiate and assist innovation activities and act as a catalyst and facilitator. It provides guidance to students on all aspects of innovation process like training, support, organizing of initiatives to promote innovation activities. The GNI innovation centre is a hub for innovations, to facilitate and guide development of ideas into applications or products that can be marketed successfully. The main objective is to study and investigate the utilization of innovation centers and related issues among both male and female students of Guru Nanak Institutions (GNI) at Hyderabad.

The rest of the paper is organized as follows. Section two discusses the related work. Section three formulates the industry institute interactions and explains the results for various innovation centres and demonstrate the participation of students' branch and gender wise in robotics and automation centre, solar power application centre, software research and development centre and machine vision centre. We conclude in section four.

II. RELATED WORK

The establishment of innovation centers has spread worldwide. Any institution needs to provide an enabling

environment for potential innovators. Innovation by a stakeholder in any part of the world should be assessed. The ideas should be original, technically well-performing and commercially feasible. Table I and Table II display the list of top national and international universities and institutions that have inculcated innovation centers at their respective locations and can formulate modes of interaction to suit the specific needs of any activity, along with fostering innovation, research, and entrepreneurial activities in technology-based areas. All these institutions aim towards bringing together innovation and entrepreneurship aspects by creating knowledge and understanding.

TABLE I. LIST OF TOP NATIONAL INSTITUTIONS HAVING INNOVATION CENTERS

S no.	Name of the institution	Location	Innovation Center
1	Indian Institute of Science	Bangalore	Society for Innovation and Development [4].
2	Indian Institute of Technology	Roorkee	Center for Research and Innovation [5].
3	Indian Institute of Technology	Madras	Centre for Social Innovation and Entrepreneurship [6].
4	Indian Institute of Technology	Kanpur	SIDBI Innovation and Incubation Centre [7].
5	University of Delhi	Delhi	Cluster Innovation Center [2].
6	Indian Institute of Information Technology	Hyderabad	Engineering Technology and Innovation Center (ENTICE) AND Center for Innovation and Entrepreneurship (CIE) [8].
7	Bapatla Engineering College	Guntur, Telangana	Microsoft Innovation Center [9].
8	Global Design Engineering Center	Pune, Noida, Chennai	Emerson Innovation Center [10].
9	Amal Jyothi College of Engineering	Kerala	Innovation and Entrepreneurship Development Center [11].

TABLE II. LIST OF TOP INTERNATIONAL INSTITUTIONS HAVING INNOVATION CENTERS

S no.	Name of the institution	Location	Innovation Center
1	Yale University	New Haven	Yale Center for Engineering Innovation and Design [12].
2	University of Connecticut	Connecticut	Fraunhofer Center for Energy Innovation [13].
3	European Institute of Engineering and Technology	Budapest, Hungary	Knowledge and Innovation Community [14].
4	National University of Singapore	Singapore	Engineering and Design Innovation Center [15].
5	Loughborough University	Leicestershire, UK	Systems Engineering Innovation Centre [16].
6	Illinois Institute of Technology	Chicago	Ed Kaplan Family Institute for Innovation and Tech Entrepreneurship [17].
7	Michigan State University	United States	MSU Innovation Center [18].

III. INDUSTRY INSTITUTE INTERACTION

Guru Nanak Institutions is having 4 innovation centers namely robotics and industrial automation research center, solar power applications, software research and development, and machine vision. Women should involve in nontraditional tasks. The identification of gender related issues plays a major role in developing and evaluating interventions that aim to promote technology. Involvement of women in the design, development and application of technology is equally important as the involvement of men.

A. Robotics and Industrial Automation Research Centre

The GNI robotics research lab aims to work on innovative projects that extend the state of the art in the field of robotics. The center is working on major and mini projects in multiple domains of robotics involving industrial automation, mobile robot navigation, home automation & vehicle automation. The center has partners with Robolab technologies private limited, Pune.

The following technologies was imparted in Robotics Lab:

- Electronic PCB design technology
- Micro Controller Programming
- Sensor Technology
- Pneumatic Technology

The details of participation among students are as follows:

TABLE III. DETAILS OF PARTICIPATION IN ROBOTICS CENTRE

S. No	Branch	No. of students participated	No. of students successfully completed training	No. of students placed in relevant company
1.	ECE	81 (39.9%)	81 (41.1%)	75 (41.6%)
2.	ME	30 (14.7%)	28 (14.21%)	25 (13.88%)
3.	CSE	20 (9.85%)	20 (10.1%)	18 (10%)
4.	IT	15 (7.38%)	14 (7.1%)	12 (6%)
5.	AE	11 (5.41%)	10 (5%)	8 (4%)
6.	EEE	46 (22.66%)	44 (22.3%)	42 (23.3%)
Total		203 (100%)	197 (95.56%)	180 (88.66%)

Table III shows that maximum number of respondents in robotics and industrial automation research center are from department of electronics communication engineering (39.9%) At GNI, the number of girl students is almost equal to the number of boys.

TABLE IV. CLASSIFICATION BASED ON GENDER FOR ROBOTICS CENTRE

S. No	Gender	No. of Respondents	Percentage
1.	Male	133	65.5
2.	Female	70	34.5
Total		203	100%

According to the Table IV, the number of male respondents in Robotics and industrial automation research center are greater than the number of female respondents (65.5%).

B. Solar Power Application Centre

The solar power application lab too aims to work on innovative projects that extend smarter energy applications. The center is working on projects involving a future based truly on sustainable energy. The details of participation of students are as follows in Table V:

TABLE V. DETAILS OF PARTICIPATION AMONG SOLAR POWER APPLICATION CENTRE

S. No	Branch	No. of students participated	No. of students successfully completed training	No. of students placed in relevant company
1.	ECE	95 (42%)	92 (43.1%)	90 (43%)
2.	ME	21 (9%)	18 (8.4%)	18 (8.6%)
3.	AE	24 (10.6%)	21 (9.8%)	21 (10%)
4.	EEE	86 (38%)	82 (38.4%)	80 (38.2%)
Total		226 (100%)	213 (94.24%)	209 (92.47%)

The above table shows that maximum number of respondents in solar power applications is from department of electrical communication Engineering (43.77%).

TABLE VI. CLASSIFICATION BASED ON GENDER FOR ROBOTICS CENTRE

S. No	Gender	No. of Respondents	Percentage
1.	Male	107	47.3
2.	Female	110	53.7
Total		217	100%

According to the above table, the number of female respondents in solar power applications lab is greater than the number of male respondents (53.7%).

C. Software Research and Development Centre

The goal of this center is to support software development skills through research, education and technology transfer. GNI is Golden partners with Microsoft. We have conducted MTA – Microsoft Technology Associate, MOS – Microsoft Office Specialist, and MCP – Microsoft Certified Professional courses and certifications for the students. The details of student participation are given in Table VII:

TABLE VII. DETAILS OF PARTICIPATION AMONG SOFTWARE RESEARCH AND DEVELOPMENT CENTRE

S. No	Branch	No. of students participated	No. of students successfully completed training	No. of students placed in relevant company
1.	ECE	35 (14.4%)	33 (14.53%)	33 (15.4%)
2.	ME	28 (11.52%)	25 (11.01%)	24 (11.2%)
3.	CSE	79 (32.5%)	75 (33%)	72 (33.64%)
4.	IT	65 (26.7%)	63 (27.75%)	60 (28%)
5.	AE	12 (4.9%)	10 (4.4%)	6 (2.8%)
6.	EEE	24 (9.8%)	21 (9.25%)	19 (8.8%)
Total		243 (100%)	227 (93.41%)	214 (80.06%)

Table VII shows that maximum number of respondents in software research and development are from department of computer science and engineering (32.5%).

TABLE VIII. CLASSIFICATION BASED ON GENDER FOR ROBOTICS CENTRE

S. No	Gender	No. of Respondents	Percentage
1.	Male	105	43.2
2.	Female	138	56.8
Total		243	100%

According to the Table VIII, the number of female respondents software research and development is greater than the number of male respondents (56.8%).

D. Machine Vision

In machine vision, the aim is to foster technology and methods that are used to provide imaging-based automatic inspection and analysis for applications such as process control, and robot guidance in industry. The details of participation of students are as shown in Table IX:

TABLE IX. DETAILS OF PARTICIPATION AMONG MACHINE VISION

S. No	Branch	No. of students participated	No. of students successfully completed training	No. of students placed in relevant company
1.	ECE	55 (25.1%)	54 (26%)	52 (25.8%)
2.	ME	31 (14.1%)	31 (14.9%)	30 (14.9%)
3.	CSE	51 (23.2%)	47 (22.7%)	45 (22.38%)
4.	IT	54 (24.6%)	50 (24.1%)	50 (24.87%)
6.	EEE	28 (12.7%)	25 (12%)	24 (11.94%)
	Total	219 (100%)	207 (94.52%)	201 (91.78%)

The above table shows that maximum number of respondents in machine vision lab is from department of electrical communication engineering (25.1%).

TABLE X. CLASSIFICATION BASED ON GENDER FOR ROBOTICS CENTRE

S. No	Gender	No. of Respondents	Percentage
1.	Male	131	59.8
2.	Female	88	40.2
	Total	219	100%

According to the above table, the number of male respondents Machine Vision lab is greater than the number of female respondents (59.8%).

E. Feedback

The following is the level of satisfaction received from the students shown in Table XI:

TABLE XI. LEVEL OF SATISFACTION FROM THE STUDENTS

S no	Response	No. of respondents	Percentage
1	Fully satisfied	387	43.5
2	Satisfied	279	31.2
3	Less satisfied	225	25.1
4	Dissatisfied	--	--
	Total	891	100%

Table XI shows the results that most of the students 387 respondents (43.5%) are fully satisfied with all facility

provided by the management. Furthermore, 279 (31.2%) indicated they were satisfied while 225 (25.1%) indicated less satisfied.

Problems faced by the students shown in Table XII:

TABLE XII. PROBLEM FACED BY THE STUDENTS

S no.	Type of problem	No. of respondents	Percentage
1	Slow access speed	125	14.05
2	Difficulty in finding relevant information	120	13.42
3	Time not sufficient	456	51.23
4	Infrastructure is not suitable	190	21.30
	Total	891	100%

From Table III and Figure 1, we find that the maximum participation in robotics and industrial automation research center is from ECE students (41.6%) and from the overall participation, it is observed that the male participation in the lab is greater than that of females (65.5%) as shown in Table IV. As in solar power application center, the maximum participation is found to be from EEE students (43.8%). Table V shows that the female participation in this lab is greater than male participation (53.7%).

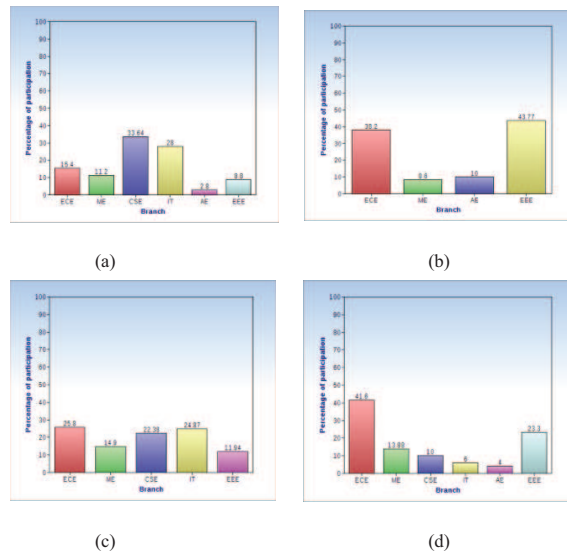


Figure 1: Participation of students' branch wise (a) in robotics and automation center, (b) in solar power application center, (c) in software research and development center and (d) in machine vision center.

In the software research and development center, the peak participation is found to be from CSE and IT students shown

in Table VI (61.64%) and here too, the female participation is greater than that of males shown in Table VII (56.8%). In the machine vision center, we observe that maximum participation is from ECE students (25.8%) as shown in Table VIII and in Figure 2, it is found that male participation is greater than female participation (59.8%) as shown in table VIII. From table IX, we find that majority of the respondents were fully satisfied with working in the innovation center (78.45%). In table X, we see that majority of respondents faced a time management problem (51.23%).

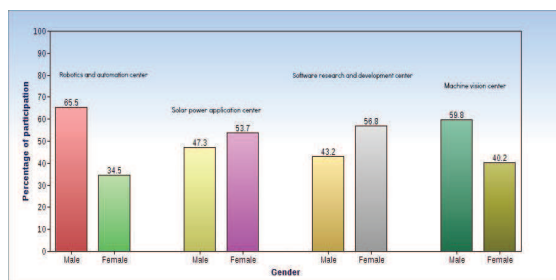


Figure 2: Participation of students' gender wise in robotics and automation center, solar power application center, software research and development center and machine vision center.

IV. CONCLUSION AND FUTURE SCOPE

The study investigated the awareness and utilization of GNI innovation centers for various purposes. GNI also invested an amount of INR 80, 00, 000 to provide the students with best quality infrastructure and research equipment. With the help of this innovation center, students and faculty members learn to focus on problem solving, project work, and training for real world problems. Students will learn to be flexible enough to undertake innovative problem solving projects in collaboration with industries to earn their credits. The scope, caliber, and ability to innovate in GNI has been recognized by AP education society and thus, Guru Nanak Institutions was awarded the "best innovative engineering college award" at the AP education awards in 2014 and shall continue to win more. Eventually the centers intends to undertake industrial

projects in course of time and offer solutions to their problems. The innovations center of GNI will generate its own revenues by offering its services to the needy industries and become self-sufficient. The major domain areas will increase further to attracts many more students.

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