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ARTICLE

Need Saliency and Academic Behavior of Technical Students in India: Implications for Career Sustaining Competences

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ABSTRACT

In the current scenario of rapid expansion of higher education, it becomes imperative to study the dynamic factors underlying quality education, student motivation and learning outcomes. Most of the literature available as on date are predominantly based on western studies, where the individual's personal achievement, autonomy, control, power are considered to be most important. But these western models often influenced by their individualistic philosophy and cultural values are quite inapplicable for pluralistic Indian society, where we believe in collaboration and teamwork. Rare attempts have been made to develop an indigenous model to measure these attributes in our society. The present study is first of its kind to assess the salient and non-salient needs of technical students pursuing their studies in India. Authors have identified measures of the students' engagement in various academic, co-curricular activities and their performance outcomes. A sample of Four-hundred and Sixty-five (N=465) engineering/science students were collected through purposive sampling exclusively from IIT Kharagpur , a premier technical institute in eastern India where students across the country got selected and joined on merit basis, through the national level joint entrance examination for Engineering and Science, the toughest examination in the country, known as IIT-JEE. Career implications are discussed in light of the major findings.

1. Introduction

In the last two decades higher education in India has expanded rapidly, although with numerous challenges and diversities. The present century job scenario is leading our youths towards switching jobs more often than ever before across the sectors and subject disciplines. The global economic scenario is also ever changing, thus causing further transformations in the job market across the world. Additionally, with increasing automation, scientific innovations and cloud technologies many low skilled jobs have become redundant. A large number of multinational companies are downsizing their human resources and pushing jobs from middle level to high skilled, complex and judgment based jobs. The job roles and responsibilities are constantly changing. As a consequence the higher education sector in India has also felt its impact; specifically the technical institutes are

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facing problems in campus placements of engineering students. Moreover, in the corporate sector there is an increasing demand for corporate training services that cater to the re-skilling and up-skilling needs of working professionals. In order to mitigate some of these challenges the ministry of higher education, Government of India has taken up initiatives to launch few programme/s like 'Skill India', 'Make in India', 'Digital India', 'Start-up India' etc. to boost the industry/business infrastructure and job sector. Thus, in the Indian context it becomes imperative to assess the diverse needs of our youths, train and educate them to become highly competent and motivated to join the global workforce or become successful entrepreneurs. To become a developed nation and compete globally in the current knowledge/intellectual capital based economy, India needs not only good quality of higher learning institutes/universities to produce bright graduates/professionals, but should support the high quality of applied/basic research needed for expanding the Indian economy.

Therefore, in the current scenario of rapid expansion of higher education, it becomes imperative to study the dynamic factors underlying quality education, student motivation and learning outcomes. Hence, the success of education system and higher education per se should focus more on students' salient needs, their motivations, which largely depend on how well the institutional educational resources are utilized. Higher education institutions today emphasize on mass education which results in increasing access to tertiary education. At the same time with the corporatization and privatization of education in India, we are facing the challenge of developing our own education model (instead of adopting any Euro American models) which can meet our emerging (local) needs as well as respond to the global demands. Thus, it is of paramount importance to apply the need saliency model in Indian context to reexamine our major educational objectives at higher education level. Hence, it becomes imperative here to identify the salient needs of students in academic institutions and try to make provision for fulfilment of those needs. It's also vital to find out the positive parameters of better academic involvement and learners' satisfaction. This can ensure quality, continuous learning, and success.

2. Overview of literature

i) Theoretical background

Saliency refers to the value individuals place on life roles (e.g., study, work, family, home etc.), which can change over time (Sharf, 1997).[24] The construct of need saliency assumes that the hierarchy of human needs changes over time, as well as across various subjects of population. Empirical studies show that people attach greater priority to certain needs as compared to other needs. The saliency of the needs in case of any individual is primarily determined by his / her socialization in a given culture and is modified by present work condition or academic environment. Different groups of individuals like students, teachers, managers, doctors etc. may develop different need saliency patterns because of different cultural background, socialization training and priorities in life. They may value intrinsic and extrinsic performance outcome very differently. According to 'Self Determination Theory' (SDT) people are motivated to perform or learn, by one of these two motivational orientations: a) intrinsic motivation or learning because one finds the course content interesting; or b) extrinsic motivation, which is learning as a means to an end (i.e., grades, praise, high paid jobs) (Deci & Ryan, 1991).[6] The absence of any such motivation results in lack of motivation to learn (*amotivation*). This theory explains that fulfilment of intrinsic need is more important to personal growth and learning than fulfilment of extrinsic needs. Thus, the most meaningful and successful learning occurs when students are motivated intrinsically (Reeve et al., 2004).[21] As per SDT there are three primary components to intrinsic motivation for learning such as: 1) the need for autonomy, which occurs when students choose, on their own, to become engaged in learning because the subject and activities are closely aligned to their interest and values (Reeve et al. 2004).[21] 2) The second factor is competence, or the need to be effective in interaction with the environment and the learners need to test challenge and develop in new ways. The third requisite factor of intrinsic needs is relatedness or the need to establish close, secure relationships with others. Similarly there are three forms of extrinsic motivation (Reeve et al. 2004).[21] The least effective form is external regulation, which occurs when students are motivated purely by rewards and punishments from outside sources. The second form of extrinsic motivation is introjected regulation which occurs when students who are motivated by rewards and punishments begin to partially internalize this external pressure to learn. The third one is identified regulation that occurs when the externalized pressure to learn becomes internalized by the student (self-regulation). Research has shown that external and introjected regulation negatively impact learning, but identified regulation can have a positive impact on learning, when the material is considered import-

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ant but uninteresting to the learner (Reeve et al., 2004).[21]

Some of the external events or the factors in the learning environment often support or hinder intrinsic motivation, such as surveillance imposed goals, threat of failure / punishment, competition, evaluation system etc. serve to undermine students' intrinsic motivation towards learning. At the same time empirical findings have indicated that opportunities for self-direction, self-expression, multiple choices in course selection, positive feedback, acknowledgement of feelings by teachers/mentors, challenging assignments, co-curricular activities can also enhance the intrinsic motivation towards learning. Cross-cultural research has also shown that cultural variation is likely to influence students' motivation in academic front. One of the important behavioral distinctions observed among various cultures of the world is the differences between individualism and collectivism (Triandis, 1999).[26] Individualistic societies (e.g. Britain, U.S.) tend to value autonomy, competition, emotional detachment from one's in group (e.g., family ,clan etc.) and place personal goals/success over group success/achievements (Phinney,1996),[20] whereas collectivist societies (like Japan, India) value interdependence, group harmony, cooperation, emotional attachment within the group and prioritizing / emphasizing the collective achievements or group goals over individual goals / success (Triandis et al., 1998).[27] Self Determination Theory (SDT) also asserts that the basic psychological conditions like autonomy, competence, relatedness are the natural phenomena which apply to all human beings regardless of gender group or culture. However, some cross cultural studies have raised the question, whether autonomy is a necessary condition for well-being in collectivist societies also (Oishi, 2000;[19] Carver & Scheier, 2000;[4] Miller,1997).[17]

Similarly another motivational model called Job Involvement Theory (JIT) has also recognized the impact of varying cultural norms on motivational orientation (Kanungo, 1982).[13] This asserts that intrinsic and extrinsic motivations guide all human behavior. Even though not focused on motivation towards academics and learning Kanungo (1982)[11] stated that in the work setup the degree of job involvement (by the workers) is primarily determined by the ability of the job to fulfil the workers' most salient needs both intrinsic as well as extrinsic. In his study Kanungo (1982)[11] found that workers who value western individualistic norms often believe that work is central to satisfying salient intrinsic needs for autonomy and competence, and salient extrinsic needs for pay, promotion and personal recognition. Employees socialized in collectivist cultures are more likely to view work as a means of satisfying the salient intrinsic needs like relatedness, societal improvement, equality and harmony, even at the cost of other needs like autonomy or financial gains. However, in job involvement contrary to the dominant view Kanungo (1982)[11] found that managers who are motivated by extrinsic needs like pay, promotion etc. tended to be more involved in their jobs in comparison to their counterparts whose salient needs are more intrinsic and less involved in their jobs . In particular this is scenario in corporate world. But this model (JIT) has not been applied in educational field to assess the learners' academic involvement. Thus, it motivates the present author/s to assess the different kinds of intrinsic and extrinsic salient needs of students in higher academic institutions and how these influence their academic involvement in the campus. As the researchers are based in a premier technical institute in India, they preferred to study the salient needs of technical students who are selected through national common entrance examination and come here from all across the country.

ii) Empirical Research

Using the SDT, Deci and Ryan (1991)[6] have found that successful students are likely to have intrinsic motivational orientation such as a) they are autonomous learners who seek knowledge for its own sake; b) They have demonstrated competence and seek to challenge them in order to grow; c) They feel socially connected with others. Similarly, students who are at risk for low academic achievement at college have either a motivational orientation towards learning nonself determined forms of extrinsic motivation. If we analyze students' academic achievement and persistence from JIT perspective, it would suggest that successful college students who have internalized individualist cultural norms are likely to succeed if the campus environment provides opportunities for them to satisfy their intrinsic needs for autonomy and competence. At the same time it also explains that successful individualist oriented students may also be motivated by extrinsic needs for high CGPA/Grades in order to obtain successful, well-paying /high profile jobs after completion of the degrees. This also suggests that collectivist oriented students (cooperative/group minded) may be at risk for academic under–achievement ,if they seek to fulfill the salient intrinsic need for relatedness at the expense of the need for autonomy, competence and extrinsic rewards (high CGPA/grades/recognition/scholarships etc.).Moreover, empirical studies on achievement motivation have identified different types of goal orientation among students, the

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motivational processes associated with these goals and the conditions that elicit them. These goal orientations have been named as task involved versus ego involved (Maehr, 1983;[14] Nicholls, 1984),[18] as learning oriented versus performance oriented (Dweck, 1988),[7] and as mastery focused versus ability focused (Ames & Ames, 1984).[1] With a performance goal orientation , there is a concern for being judged as able, competent and an individual shows the evidence of ability by being successful , outperforming others , or by achieving success with little effort. A performance goal reflects a valuing of ability and normatively high performance outcomes; Whereas in case of a mastery goal, the importance is attached to developing new skills. The process of learning itself is valued, and the attainment of mastery is seen as dependent on effort. Achievement goal orientations are presumed to vary as a function of situational demands, as well as across the individuals (Maehr, 1984).[15] Research evidence has shown that situational demands can affect the salience of specific goals, which results in differential patterns of cognition, affect and performance. For example Ames and Archer (1988)[2] have found that students who perceived an emphasis on mastery goals in the classroom reported using more effective learning strategies, preferred challenging tasks, had a more positive attitude towards classroom learning, and had a stronger belief that success follows from one's effort. Likewise, students who perceived performance goals as salient tended to focus on their ability, evaluating their ability negatively and attributing failure to lack of efficiency. Their findings suggest that the classroom goal orientation may facilitate the maintenance of adaptive motivation patterns when mastery goals are salient and are adapted by students. Thus, it implies that the classroom learning with mastery approach can enrich the students' learning experiences and enhance their capacity to use long-term learning strategies and adopt motivational orientation for showing more realistic but challenging academic target/ goals.

In Indian organizational settings, Sahoo (2000)[22] has also found that satisfactions of salient needs are positively related to job involvement and work motivation. In another study (Sahoo & Rath, 2003)[23] on working and nonworking women's job and family involvement they have found that both group of participants considered interpersonal relationship as their salient need and needs like personal achievement and independent thought and action come up as nonsalient needs. Thus, their findings supported the need saliency model, which reaffirmed that involvement was significantly related to the satisfaction of salient needs and uncorrelated to the satisfaction of nonsalient needs. Thus, motivation is determined by salient need satisfaction potential.

Most of the literature on academic involvement and motivation is primarily based on western studies, where the individual's personal achievements, autonomy, control, power are considered to be most important. But these western models often influenced by their individualistic philosophy and cultural values are quite inapplicable for pluralistic Indian society, where we believe in collaboration and teamwork. Rare attempts have been made to develop an indigenous model to measure these attributes in our society.

3. Conceptual Frameworks

Need Saliency

The construct of need saliency assumes that there is no fixed hierarchy of needs across several subsets of human population. At an empirical level, people attach greater priority to certain needs as compared to other needs. The saliency of needs in any individual is determined by his / her past socialization in a given culture and is constantly modified by present conditions. Moreover, Need saliency formulation posits the following two basic propositions:

1. Work involvement / motivation are significantly related to salient need satisfaction.

2. Work involvement / motivation are unrelated to nonsalient need satisfaction. Individuals, for example, may be asked to indicate their priority ratings for a number of needs (let's say a list of 15 needs). Thus, needs rated first and second are regarded salient needs whereas the needs rated fourteenth and fifteenth are considered nonsalient needs.

One of the most prominent facts that have emerged from the rapid development of education system is the importance of higher education. There are, dynamic factors underlying education and students' motivation. The success of education system and higher education per se should focus more and more on the students as persons and on their motivation, which in turn depends on how well the higher educational resources are utilized. This acquires special significance in the context of Indian scenarios.

Student Engagement: Academic Behavior of Students

Student engagement has been defined as having three dimensions i) behavioral, ii) emotional, and iii) cognitive engagements (Bloom, 1956).[3] It is considered as having the attributes like emotional involvement, active participation and meaningful sense making (Harper & Quaye, 2009a).[10] More specifically it explains "participation in educationally effective practices, both inside and out-

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side the classroom, which leads to a range of measurable outcomes"(Kuh et al, 2007),[13] and " the extent to which students are engaging in activities that higher education research has shown to be linked with high quality learning outcomes"(Krause & Coates, 2008).[12] Coates (2007) [5] described engagement as "a broad construct intended to encompass salient academic as well as certain non-academic aspects of student experience, such as active and collaborative learning, participation in challenging academic activities, formative communication, involvement in enriching educational experiences, and a feeling of support from learning community".

4. Research Objectives

1. To assess both the salient and nonsalient needs of IIT Kharagpur (IITKGP, India) B.Tech. and M.Tech. Students.

2. To identify and measure the IITKGP students' engagements in various academic, co curricular activities and its impact on their performance outcomes and job placements.

3. To find out the existing positive parameters of academic involvements of IITKGP students in this institute and design a career path for them.

Hypotheses

H_1 IITKGP students would differ with regard to their salient and nonsalient needs.

H_2 IITKGP students would vary in their academic and cocurricular activities/engagements.

Operational Definition of Terms

1. Salient & Non-salient needs: Students' priorities in motivational factors of studying in this premier institute.

2. Knowledge-based economy: Knowledge is being considered as intellectual property or a source of financial capital in Indian economy.

3. Academic engagements: All kinds of curricular activities.

4. Performance outcomes: Academic achievement marks (CGPA), Campus job placement offers.

5. Method

Sample

The sample were exclusively collected from IIT Kharagpur , a premier technical institute in eastern India where students across the country got selected and joined on merit basis, through the national level joint entrance examination for Engineering and Science, the toughest examination in the country, known as IIT-JEE(Indian Institute of Technology-Joint Entrance in Engineering). In total Four Hundred Sixty-five (N=465) B.Tech. (Undergraduate) and M.Tech.(Masters) students of IIT Kharagpur from various engineering /science disciplines were randomly selected as the sample, from a total student population of Ten Thousand (Population=10,000) studying in Forty-four (44) Engineering, Science and Interdisciplinary subject disciplines; their age range were from 20+ to 27+ years, have got equal access to infrastructure facilities, academic, and all extra-curricular activities available in the campus. The sampling technique was purposive as it was drawn from the one institute (IIT Kharagpur, India). However, the student population of this institute was very diverse, and represented India's youngsters' major attributes. Normally, the higher education learners all across the country join this institute after going through a rigorous three-phase centralized entrance examination; thus the student population here represent the whole India like any other IITs.

Assessment Tool/s

1. Study Behaviour Questionnaire: This tool was developed and adapted by Prof. F.M. Sahoo & Dr. A. Mohanty from the original "Work Alienation" scale of Prof. R.N. Kanungo (1982)[11] for measuring the academic involvement of IIT Kharagpur students. There are six parts in this questionnaires such as 1) Part 1deals with salient factors in the study environment to be prioritized by each individual student according to his/her choice/ perception;2)in Part 2 the students are asked to map their satisfaction/dissatisfaction on a 6 point rating scale in 16 academic factors along with the overall rating of study environment in the campue;3) Part 3 consisting of 12 items, requires the participants to think about the value/ importance of their educational institution in relation to their life goals (in 7point rating scale); 4) Part 4 consists of 15 items where students are asked to evaluate their own study behaviour in a 6 point rating scale; 5) Part 5 is a graphic measure with 02 sets of circles representing one's study and one's individual self. The circles overlap in various degrees representing how one is involved in his/her study. The participant has to accurately depict his/her relationship by selecting the exact figure (intersecting circles). Similarly they have to identify the distance between themselves and their study desk in the figure which implies the relative importance of study in their life. By adding all the scores of these parts we could find the top 5 salient needs of students that have been fulfilled by this academic institution & their involvement in its academic activities.

2. Students' Feedback: Both the B.Tech. and M.Tech.

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students' feedback/s were collected from Career Development Centre (CDC-the Career Counseling & Job Placement Cell) of IIT Kharagpur, regarding various issues related to academic achievement, placements, their success and failures.

3. Students' Academic Engagements and Co-curricular Activities: Besides regular classes and labs a list of students' other campus activities was collected for the research purpose which includes the following events:

1. "Technova" – Technical Paper Presentation
2. "Metallomania" –Poster making competition
3. "Roboladle" – Robotics event
4. "Virtual Reality" – Coding competition
5. Business(BIZQUIZ).
6. Metallurgical and Materials Engineering(METAQUIZ)
7. Engineering Quiz (THE ONE)
8. Online Photography Competition
9. Online Quiz
10. Megalith (Civil Engg.-12 items)
11. Spring fest (Socio- culture-fest-71 items)
12. Petro fiesta (Society of petroleum-12 items)
13. Great-step (Mining Engg. Geo-science & Engg.-12 items)
14. National Student Space Challenge (Space Tech. students-11items)
15. Bitwise (Computer Science & Engg. society -07 items)
16. Sky-fall Kshitij (National Level Mechanical Design-09 items)
17. Exhibitions-08
18. Workshops-10
19. Mega shows-02

Research Design

The present study adopted a qualitative descriptive research by using the students' need assessment tool, collecting the information through interviews and conducting surveys across the campus.

Data Collection and Analysis

In the 1st phase-IIT KGP students' salient and non salient needs were assessed by administering the 'Need Saliency' scale (developed and adopted by Prof. F.M.Sahoo and Dr.A.Mohanty in Indian context).

In the 2nd phase: IIT KGP students' academic engagements and co-curricular activities were identified; their performance outcomes in terms of CGPA (Credit Grade Point Average) scores and job placements were collected from the institute CDC (Career Development Centre- institute's career counseling & students' job/ placement cell).

Results and Interpretation

Both the quantitative and qualitative analyses have been done to analyze the data.

The present authors used sum scores of the questionnaire for the data analysis as it deals with motivational attributes, which were implicit in nature; the questionnaire items were often overlapping with each other. Therefore, it is assumed that the use of sum/total scores would better represent the factor structure of the questionnaire (McNeish & Wolf, 2020).[16]

Major Findings

The age distribution of the sample and the reliability measure of instruments were reported initially. The result of frequency tabulation of salient needs shows gaining knowledge to be on the lead followed by brand name of the institution among sixteen different types of needs mentioned in the survey are presented in Table 1. The descriptive statistics of salient and non-salient needs were reported at Table 2. Frequency of salient need tabulation among male and females (Fig 1) show gaining knowledge to be the highest reported salient need by males and brand name of the institution to be the highest reported need by females. Chi-square test was conducted to assess the relation between gender and salient need types show no significant association, indicating that choice of salient need is not dependent on gender types.

Table 1 Age Distribution of the Sample Respondents

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	<=20	80	44.4	44.4	44.4
	2	21-21	54	30.0	30.0	74.4
	3	22+	46	25.6	25.6	100.0
	Total		180	100.0	100.0	

Table 2 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.496	.773	4

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Table 3 Summary of the Findings

Salient Need Factors	Frequency	Percent
Brand Name of the Institution	103	22.2
Collaborative learning	2	.4
Cordial Peer Relationship	10	2.2
Fair Assessment	2	.4
Freedom from Social Pressure	7	1.5
Gaining Knowledge	126	27.1
Healthy Interpersonal Contact	8	1.7
Individual Attention to Student	7	1.5
Interesting Course Work	68	14.6
Job Prospect	49	10.5
Multiskilling	13	2.8
Opportunity for Higher Studies	17	3.7
Professionally Competent Teachers	15	3.2
Sound Administrative Policy	5	1.1
Supportive Learning Environment	24	5.2
Well Planned Schedule	9	1.9
Total	465	100.0

Table 4 Descriptive Statistics on Salient and Non-salient need scores

		to age in 3 groups	Gender	Qualification	Salient Need Score	Non Salient Need Score	Total Score	Overall Score
N	Valid	180	180	180	180	180	180	180
	Missing	0	0	0	0	0	0	0
Mean		1.81			8.63	8.13	67.04	4.23
Std. Deviation		.817			2.484	2.045	11.444	1.195
Skewness		.362			-.832	-.182	-.349	-.668
Std. Error of Skewness		.181			.181	.181	.181	.181
Kurtosis		-1.412			.071	-.546	.114	.066
Std. Error of Kurtosis		.360			.360	.360	.360	.360
Minimum		1			2	3	32	1
Maximum		3			12	12	96	6

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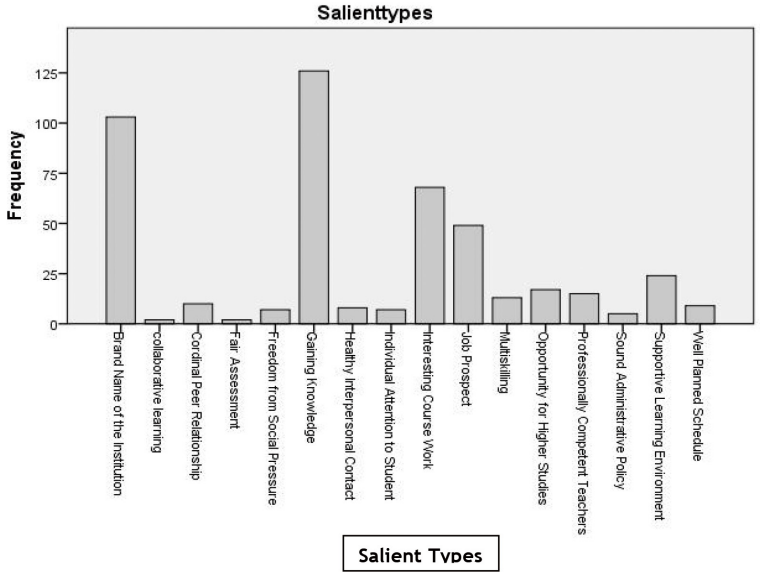
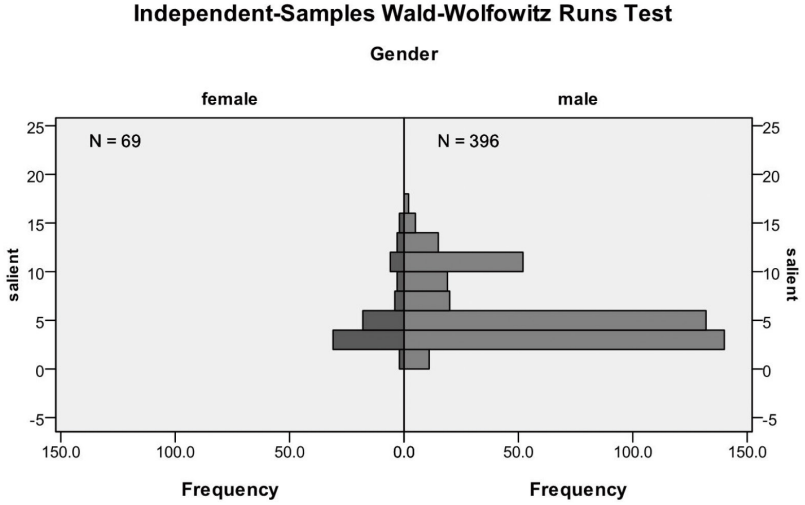


Fig 1. Salient Needs



Total N		465
Minimum Possible	**Test Statistic[1]**	14.000
	Standard Error	5.433
	Standardized Test Statistic	-19.240
	Asymptotic Sig. (2-sided test)	.000
Maximum Possible	**Test Statistic[1]**	139.000
	Standard Error	5.433
	Standardized Test Statistic	3.769
	Asymptotic Sig. (2-sided test)	1.000

[1] The test statistic is the number of runs.

1. There are 12 inter-group ties involving 441 records.

Fig 2. Gender Variation on Salient Needs

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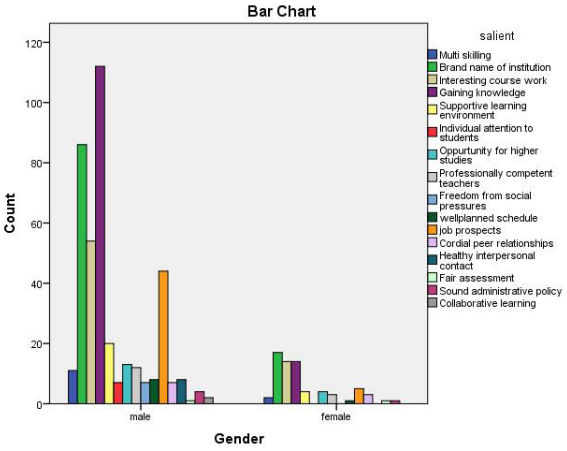


Fig. 3

Table 5 Summary of Findings

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of salient is the same across categories of Gender.	Independent-Samples Wald-Wolfowitz Runs Test	1.000[2]	Retain the null hypothesis.
2	The medians of salient are the same across categories of Gender.	Independent-Samples Median Test	.890	Retain the null hypothesis.
3	The range of salient is the same across categories of Gender.	Independent-Samples Moses Test of Extreme Reaction	.000[1]	Reject the null hypothesis.
4	The distribution of salient is the same across categories of Gender.	Independent-Samples Mann-Whitney U Test	.377	Retain the null hypothesis.
5	The distribution of salient is the same across categories of Gender.	Independent-Samples Kolmogorov-Smirnov Test	.639	Retain the null hypothesis.
6	The distribution of salient is the same across categories of Gender.	Independent-Samples Kruskal-Wallis Test	.377	Retain the null hypothesis.
7	The distribution of salient is the same across categories of Gender.	Independent-Samples Jonckheere-Terpstra Test for Ordered Alternatives	.377	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

[1]Exact significance is displayed for this test.

[2]Computed using the maximum number of runs when breaking inter-group ti among the records.

The students' feedback and their performance outcomes (CGPA & Placements) are being discussed in the following section.

Table 6 Students' Feedback as Received in 2015

Summary of Students' Feedback Survey

No. of students placed in December (without PPO): 980

No. of students who filled the feedback : 826

No. of UG Students placed in December : 755

No. of UG Students who filled feedback : 630

No. of PG Students placed in December: 224

No. of PG Students who filled feedback : 196

Note : All statistics are based only on the number of students who were placed in December and filled the feedback form (i.e, 826) and the percentages are also calculated accordingly.

Table 7 Undergraduate Students' Preference/s & Actual Placements in Core Subjects

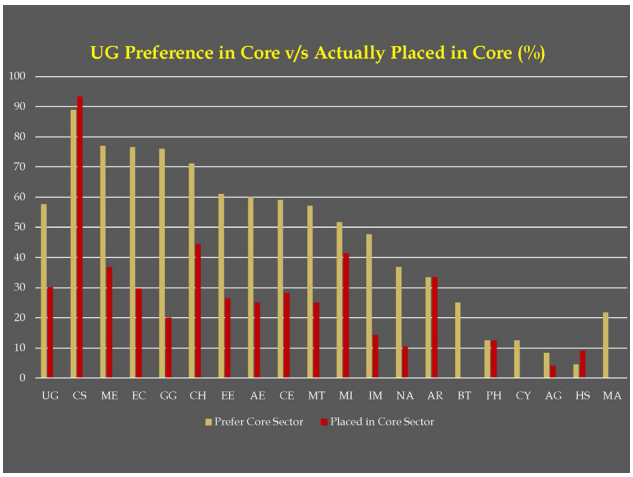


Table 8 Post-graduate Students' Preference/s & Actual Placements in Core Subjects

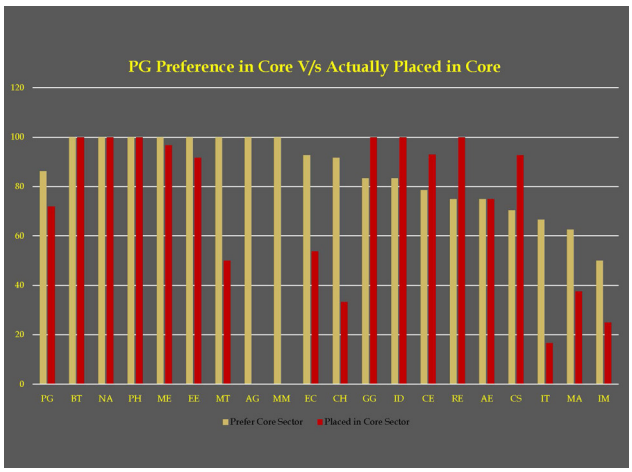


Table 9 Students' Perception about Hurdles of Placements

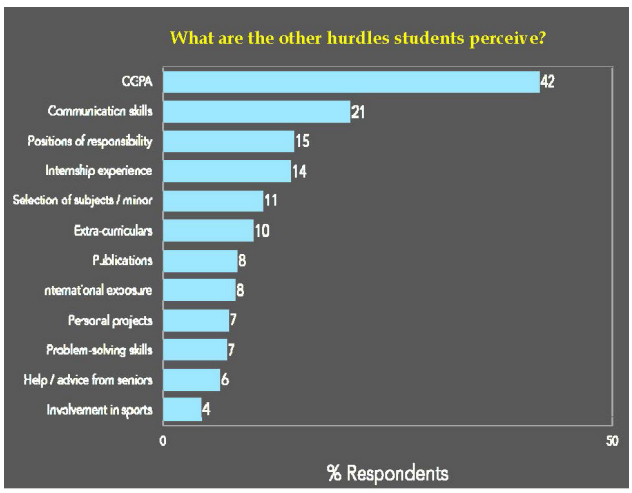


Table 10 Students' Perception of the Strength of CG-PA-Career Grade Point Average in Placements

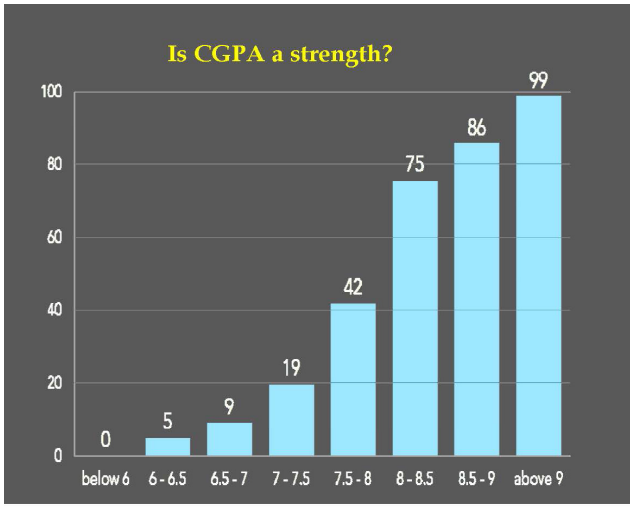


Table 11 Students' Perception of Low-CGPA as A Hurdle in Career Graph

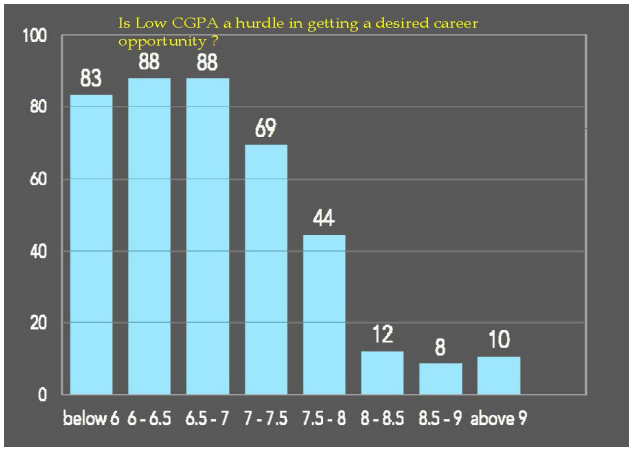
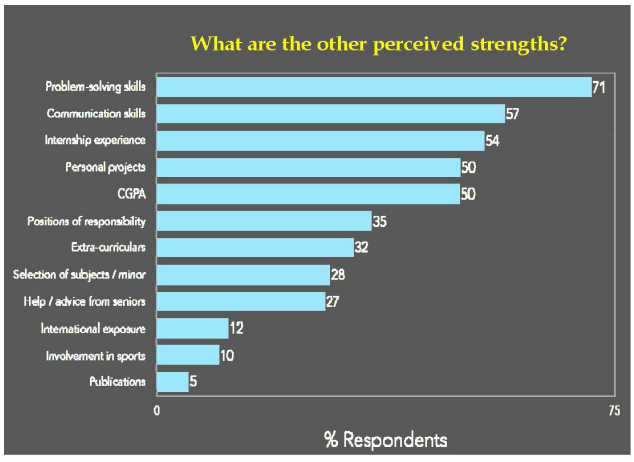


Table 12 Students' Perceived Strengths & Vital Factors of Job Placements



Interpretation

From the above mentioned data (2015) it is found that IITKGP students' top five salient needs are: a) gaining knowledge (27.1%), b) brand name of the institution (22.2%), c) interesting course work (14.6%), d) job prospects (10.5%), and e) supportive learning environment (5.2%), which revealed their potential motivational factors for joining this academic institution of higher learning.

Besides these, (according to 2015 Dec. placement data), the 'Career Development Center' (CDC) of IIT Kharagpur states that even though undergraduate (UG) students prefer to be placed/get a job in their core subjects, very few could actually get jobs in their core branch. Except few branches like Computer science, Aerospace engineering and Physics, the UG students are being placed in non-core sector jobs like IT/service sector. Out of total 58% students who aspire to work in core sectors only 30% UG students could get these. In case of postgraduate (PG) students, the situation is better; baring few branches like Agriculture, Mining and machines, and Chemistry students are well-placed in core sectors. However, almost 88% students reported that below 7.0 CGPA (academic score) is really a barrier/hurdle in getting their desired career goals/jobs; 99% students expressed that having CGPA above 9.0 is the greatest strength in achieving their career goals. When further asked about other potential hurdles in their career graph they gave the feedback about most vital factors i.e., CGPA (42% students agreed), communication skills (21%), position of responsibility like hall or gymkhana- executive body position (15%), internship experience (14%), selection of minor/elective subjects (11%) and extra-curricular activities (10%) matter most for their job placement. Moreover, they have added that their potential strengths (being the technical students of premier institute) are problem solving skills (71% students stated), communication skills (57%), internship experience (54%), personal projects, CGPA (both 50%) are the top 5 positive attributes.

Contrary to the above mentioned opinion/data, during the campus placement period (2015 Nov.-Dec.), when the multi-national companies like TCS, KLA Tencor, Lanxess India Pvt. Ltd., Sasken communication technology and Edgeverve systems Ltd. suggested to CDC, IIT Kharagpur for giving more focus on problem solving skills, core subject knowledge, effective communication skills and articulation of thoughts. In comparison to UG students the PG students, who normally are non-IIT B.Tech. students, need to develop in-depth knowledge in their core branches. Thus, it could be assessed that there are gaps among UG and PG students' academic standards/ performance; between what the student community

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assume them to be and what they actually have/possess. Therefore, a clear gap was evident between the employers' expectations and students' performance, employability skills.

6. Discussion and Conclusion

According to recent literature on global employment scenario (FICCI, 2016)[8] Indian job market has recently witnessed an evolution with the changes in demography, technology, and socio-economic factors leading towards frequent job hopping by youngsters and professionals. As the world is gradually moving toward emerging markets, a growing younger population (called as demographic dividend), increasing consumption and purchasing power have been observed in Indian middle class society, in addition to changing geopolitical landscape, global trade and upward talent mobility. The data shows that majority of Indian employees spend 2-5 years in their current tenures, whereas only 12% employees serve tenures exceeding 10 years in a single job position in India. The current employment scenario, underpinned by the fusion of technologies cutting across the physical, digital, and biological worlds has given rise to new skill requirements, job roles and specializations that did not exist in the past. Thus, the global job market has unfolded into newer spheres, especially into services allied industries, start-ups, e-commerce business, outsourcing etc. with evolving roles and skill requirements. Therefore, the new employment paradigm with new job roles mandates life-long skilling to boost industry-readiness, 21st century generic, professional, and sustainable competences that would govern the global employment outlook till 2030.Thus, the researchers felt the need to map these gaps accurately in IITKGP and fill up with proper career development programs, career guidance, counseling, and motivation training programs within the campus along with the regular academic programs. The CDC can possibly develop the 21st century employable skills among students for better placements and job opportunities.

As we are heading towards 2020 goal of creating skilled workforce to be fitted into global economy/job we have to systematically draw career pathways for our students in which CDC plays vital role in providing career services to foster/develop professional skills required by 21st century employers, society and global economy. Even though, students' career pathways are being influenced by number of factors like, parents, peers, faculty, diversity and quality of our academic programs, the academic institutions, universities, industries and policy makers must play active and collaborative role in making career pathways more transparent, inductive and constructive. The relationship between education and occupational aspirations is complex, and gets further complicated with ground realities. Given the placement data, employers' comments our CDC should start "career service programs" tailored to meet the specific needs of our students and match these with employers' requirements.

Career service program on campus

From the current job holders and alumnus of our institute we found that presently employees of MNCs face increasingly complex demands as part of their job. Besides required content/domain knowledge, critical skills such as professionalism and work ethics, oral and written communication skills, collaboration and team work, critical thinking and problem solving are consistently defined as vital to job success. Employers expect that technical students of premier institutes must/should bring value to their organizations and take interest in grooming them for future leadership positions. Therefore, every academic campus must make efforts to develop and communicate services and resources that are directly catering to the needs of professional/graduate students.

As one size model cannot fit into all situations, we recommend for multiple approaches/strategies for career pathways on campus:

1. Centralized CDC services: The career development center (CDC) along with students' affairs department can start centralized service to enable all students to use all resources and services already available in the campus. On campus recruitment, job fairs, self-assessment instruments, career counseling, expert talk, pre-placement training, internship starting from 2nd year onwards can be adapted to serve the needs of professional graduates. Moreover throughout the year the employers with diverse hiring needs can be in touch with the center for getting a heterogeneous pull of human resource from wide range of academic back grounds. The career counselor attached to the CDC must raise certain questions among the students to be asked by them to appraise their strengths, weaknesses, skills/competencies to be developed and opportunities available in the market. Example: what are my skills/interests and values, and how do these affect my career decisions? What career options are available to me, and how do I begin to explore and make sense of them? How do I conduct a job search? What is involved in that process? These issues should be a part of daily conversation and discussion in CDC, along with inviting career professional experts/consultants for accessing career information from a wide range of sources.

2. Academically based career services: The parent academic department (of students) can provide many benefits, not possible through centralized office (CDC). Depart-

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ments bring expertise in the discipline; provide mentoring to prepare them for placing placement interviews. The final year students would be able to ask them questions i.e. a) what, how, why should they prepare for a core company job? b) What must they know (domain knowledge + miscellaneous) before facing the core company? The respective core departments can prepare "career pathway institutional module" with specific objectives like: a) identifying core subjects from second year onwards and briefing their importance; b) awareness and preparation on the basic text books on the core subjects; c) motivating them to know about in-house expertise and projects that are done at departmental level; d) enforce that each student should know the details of the B.Tech/M.Tech projects being done and its application in various fields (i.e. social/interdisciplinary/research); e) encourage them to take internship related to core projects; f) insisting students to do SWOT (strength, weakness, opportunity and threat modules)analysis for self-appraisal in order to map their knowledge and competence required for a core company and how could they contribute to that company and add value; g) encouraging students to consult expert faculty depending on the company's visit to campus; h) even though the students have very good informal network with their seniors, the department should showcase their pass success stories, alumni network, resources available and ongoing project to attract students to core branches and core company placements/jobs.

3. Campus collaboration: In addition to these, career service pathways can be well integrated with other resources and centers in the campus i.e., alumni cell, entrepreneurship cell, innovation centers, gymkhana for organizing various events, activities, programs for not only showcasing students' talents but inviting potential corporate/industries and govt./MNC employers for partnership in different ventures from agriculture to aerospace, from renewable energy to mobile apps. Smart collaborations can stretch campus resources and provide a more coherent package of career related services for students.

4. Developmental approach: Moreover, our students' career issues must be placed in the context of other developmental and life issues they face such as financial and family issues, social adjustment and relationship issues etc. Hence faculty advisers, mentors and career service providers must be aware of these issues and how they bear on student's career decisions and preparations. Campus/institute must also develop resources and services like hospitals and counseling centers to deal with health/mental health, yoga clubs, indoor and outdoor games with coaches, meditation centers etc. to handle student life skill problems, stress, anxiety, depressions etc. Experts have also offered a framework for understanding the student experiences stages: entry level, engagement and exit level (Stewart, 1995;[25] Golde and Dore, 2001).[9] Each stage offers an explanation of typical features and challenges students face during their academic careers. Hence, students increasingly need support, whether pursuing academic or non-academic options in reaching their goals. The emotional issues of leaving the campus, not succeeding in an interview, not getting the jobs of their choice or having a new professional identity should not be ignored, but to be dealt with utmost care and concern.

Thus, by the end of a 4yr/5 yr. professional degree program, as students make transition to the professional world they should be able to answer some key questions: How do I employ the skills that I have developed? How do I define myself in relation to my chosen profession? How do others perceive me as a professional (Weidman, Twale, & Stein, 2001)?[28] Career service center can help students in finding their answers and realizing/experiencing their professional identities. Surveys across the globe confirmed the importance of faculty adviser in student career development as most students indicate that faculty members, career advice are far more than any other group of influencers. Careers encouraged by faculty appear to be closely aligned with the career interest of students. Mostly teaching/faculty and research positions are most endorsed careers by both student and faculty. Positions in industry, govt. and non-profit organizations are of interest to some students and are less often endorsed by faculty. Therefore, the institute/industry must build connections/networks with their past students, track career outcomes and job placement information for professional students, connect graduate/post graduate students with alumni network, broaden the focus of graduate education to include development of professional skills. Employers should also enhance and expand collaborative relationship with academia and make strategic investments in collaborative research, training, internship, consultancy as well as teaching programs through visiting faculty/ chair professor/student exchange programs. Moreover, our policy makers/educational administrators must create an advisory committee of leaders in business and graduate education to support work priorities; establish a professional plus program for graduate students on research assistance-ship and increase budget allocation for education and skill development programme/s all across the country.

With reference to the above discussion we hope and aspire to develop some core competencies, domain knowledge and career related soft skills among our youth. Some of these are: 1. communication and interpersonal skills, 2. critical and creative thinking, 3. personal

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effectiveness , 4.integrity and ethical conduct, 5. teaching competence, 6. societal and civic responsibilities, 7.leadership, 8.research management, 9. knowledge creation, translation, mobilization and sharing, 10.career management etc.. All these competencies would definitely help us in developing mass skilled workforce prepared and well suited for global economy. In this context the FICCI (Federation of Indian Chambers of Commerce & Industry) in 2016 reported that "Till 2020 the next wave in India's job market is expected to be driven by new pillars, including technological growth, government reforms and socio-political advancements which will lead the transformation of India's employment scenario, giving way to specialization in new technologies and skills; up to 2030, India will witness a similar impact on job scenario as globally." Subsequently, as a result of job markets' transformation our students would be finding it increasingly difficult to keep pace with the evolving skill requirements. Therefore, the technical and higher education institutions should focus on continuous learning and up- skilling to stay abreast with 21st century skills.

7. Conclusion

The rapid changes in the job market across the globe pose many challenges for higher education system in India to keep pace with industry requirements and students' aspirations. Therefore, the Indian higher education system has to transform its curricula, pedagogy, training toward continuous professional development and life-long learning to align itself with changing world. Presently, the technology-enabled MOOCS (NPTEL Online Courses) are the best channels for lifelong learning. A strong 'Academia-Industry' partnership programme could help Indian students to re-skill and up-skill their existing knowledge/capabilities through on-the-job training, peer-to-peer learning, mentoring, experiential learning, problem-based learning, group-based projects/assignments, deep learning issues, prolonged internships, student exchange programme/s with global elite universities etc. to stay updated and relevant in the global job market. Now-a-days the learners have more choices to learn at their own pace in a global set-up; the global ranking of the universities/higher education institutes is one such initiative to compete for brand name, funding sources, intellectual property, patents and global positioning. There is an urgent need for paradigm shift in Indian higher education system toward transformative education and sustainable competence development for a sustainable future.

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