Perceptions of Academic Participants about Employability

Ms Punam Rattan[1] Dr Rajesh Kumar Singh[2]

[1] Research Scholar, Department of Applied Science (Computer Applications)
IKG PTU Kapurthala, Punjab, (India)
[2] Professor, SUS Institute of Computer Tangori , Punjab (India)

ABSTRACT

This paper is the outcome of research objective i.e. to study the perceptions of academic participants about employability of their students. Data is collected through questionnaire and using ANNOVA results are analyzed. Results have shown that student's employability is dependent on directly and indirectly on factors such as more no of activities to enhance personality of students and teaching methodology of institutes. And moreover it also depends on students attitude to get an employment or not.

I. INTRODUCTION

At present computer Industry demands continuous advancements and simultaneous learning from students and teachers point of view. Teachers who are teaching in this field has to update their knowledge and their way of teaching to these young generation plays an important role in preparing students for employment. Whatever the efforts are put in on students, there always exists the gap between skills demanded by employers and skills provided by Institutes and teachers. Industry has to spend lot of time and money in selection process, providing training to new employees. Students and teachers on their part are trying to fill this gap by organising various activities and changing methodologies of teaching, conducting seminars and workshops etc. But the gap is still widening day by day. This paper is an attempt to find out the perception of academic participants of IT industry about the effects of activities conducted, teaching IT subjects with different methods to fill skill gaps.

II. REVIEW OF LITERATURE

AdamQureshi , HelenWall, Joyce Humphries, Alex Bahrami Balani presented a paper on "Can personality traits modulate student engagement with learning and their attitude to employability?" This author exploresd the predictive role of personality in a multidimensional model of engagement and further initially their study did not find any difference between student and teachers perceptions towards employability. they concluded that there was decrease in students attitude towards engagement and employability. They further explored the relationship between student's personality traits, attitude towards employability and student engagement. Big-5 personality or FFM i.e. five factor model had been used as the dominant Model for categorising individual differences in personality. Author concluded that there are important individual differences which relate in different way's students general, emotional, behavioural engagement in studies.[1]

Carolina Ferreiraa, Andrea Neryb, Placido Rogerio Pinheiroa have published a research paper on "A Multi-Criteria Model in Information Technology Infrastructure Problems" Authors favoured that without technology

we can't survive. whihc in turn expects quality and efficient iT solutions in all areas. They proposed a model which suggests the prioritization of problems which cause negative impacts.[2]

Aspiring Minds report of (2016) focus on quantity of college have resulted in unemployment. Colleges at national level are showing great interest in employability of engineers. Colleges are adopting the idea of employability assessment from the first year itself. Their key findings were that there is no significant improvement in employability and more aspiration to work for start-ups. When students were asked for their choices for type of company, majority of them wanted to join large companies. When they were asked for role aspirations they selected software development as the highest one.[3]

Australian Learning and Teaching Council Ltd, an initiative of the Australian Government Department of Education, Employment and Workplace Relations also worked for reviewing graduating skills They have shown the importance of graduates skills and personal and societal level They further laid stress on embedding graduate skills in existing curricula rather than addressing them separately Authors have found that various strategies such as case study Role Plays experiential pedagogical approach Small Group learning plays an important role at graduating level Their study indicated that an inherent weakness in the graduating skills agenda According to them it's the overall lack of activities assessment measures and lack of opportunities through which students can enhance their learning and can demonstrate their achievement levels as outcomes are responsible for their unemployment[4]

Bilsland, Christine Nagy, Helga Smith, Phil presented a paper on " Planning the journey to best practice in developing employability skills: Transnational university internships in Vietnam". This paper presented the concept of Work Integrated Learning within campuses. They proposed internship programs during undergraduate courses. And their initial results shown that work supervisors were satisfied with the performance but the author proposed that further research on work integrated Learning would enable universities to deliver best. Research proposed that rich communication skills, involvement with company officials during WIL, understanding needs of industry and building closer connection with industry will get better employment for the students. Their research concluded that there is a mismatch between skill level of graduates and expectations of employers.[5]

Noor Aieda Abu Bakar, Aida Mustapha, Kamariah Md. Nasir, from university of Malaysia presents a paper on "Clustering Analysis for Empowering Skills in Graduate Employability Model". The main purpose of their study was to find the job market for undergraduate students. They used clustering method to apply various algorithms. Their results and findings have shown that undergraduates in Malaysia possess communication skill and satisfactory level Information Technology skills and the clustering analysis will provide an aid to university management to empower their skills more effectively so that they can be better placed. The data for the study was provided by MOHE, Malaysia.[6]

Argote and LInda presented a paper on "**Organizational Learning: Creating, Retaining and Transferring Knowledge** "Author concluded in their paper that it is nothe theory or a mdel which is accepted as organizational learning model rather different levels of learning gives impact in the management of firms means learning can not be completed through theory.[7]

A paper titled "Employability skills indicator as perceived by manufacturing employers" was published and according to authors researches throughout the world has shwon that technical gradutes actually lack in

employability skills and industry has to put in lot of efforts to make them employable. They cllected data from various Malaysian employers and showed that all employers agreed importance of seven employability skills; interpersonal, thinking, personal qualities, resource skills, tecnology skills, basic skills and informational skills. Tools was designed and tested by employers and results were amazing. They used kepner-Tregoe(K-T) Method.[8]

Shahrul Ridzuan Arshad International Islamic University College Selango presented a paper on "THE DEVELOPMENT OF MALAYSIAN ONLINE EMPLOYABILITY TEST KIT (MASKIT): A PROTOTYPE FOR LANGUAGE COMPONENT" According to author it is the need of hour to identify the lacking of skills in young engineers as they are not fit for industry and further they concentrated to identify the graduate competencies so that they can be better employable IN their research language proficency skills are identified which play an important role in employability As a result MECT was developed using various software's like Class Marker etc They emphasized on online testing quizzes homework quizzes etc They identified that Malaysian students lack in English therefore more emphasis should be given to improve language so that they can read and write accordingly at their work place[9]

Department of Employment Australia presented a report on Labour Market Research – Information and Telecommunications (ICT) Professions This survey of America results that the competitions for vacancies available has been increasing every year and same is true for suitable candidates They have shown that in IT sector basic emphasis was not on qualification rather it was on IT Certifications in software packages and relevant packages Results also shown that majority of candidates were not selected by employers and were announced as unsuitable Employers from Software engineers faced a lot of difficulty in recruitment of employees. In this survey one more picture came out that most of the employers gave a high value to soft skills as the employees have to face the clients from time to time During this survey employers cleared that recruitments were not done for the sake of recruiting a person rather companies wait for the right candidate to come in future Apart from technical skills employers found that candidates are having less capabilities for problem solving and project management They also highlighted that there is shortage of employees for latest technologies[10]

Kangdon Lee from University of Northern Colorado presented a paper on "Augmented Reality in Education and Training" author says that there can be different way to teach different people. such as classroom teaching, or teaching with latest it gadgets. With the changing world at very fast pace there is a need to adopt and apply the right method at right place and in right time. Augmented Reality technology we can change the location and timing of training. author concludes that with augmented reality it can be used in education and training for interactive education, simplicity, contextual information etc.[11]

Norbert Joseph Thomes of Iowa State University did his dissertation on " Creating employable graduates in career and technical education: Defining the partnership between business and the community college" This study explained the partnership between education and business at rural comunity college. Their research was based on to understand the preparation of graduates from the eyes of employer and faculty. They also tried to find the development skill set required for employment.[12]

A study was initiated by the All India Council for Technical Education (AICTE) and the Confederation of Indian Industry (CII) with the objective of showcasing best practices of industry partnerships across AICTE

approved engineering institutes in India in six basic streams, viz. chemical, civil, computer & IT, electrical, electronics & communication and mechanical engineering. AICTE uploaded the questionnaire on their website and eligible institutes filled it by themselves. They evaluated on seven parameters like governance curriculum, faculty, infrastructure, services, entrepreneurship and placements—each consisting of specific sub-factors. This research was done with an aim to find that how good or bad engineering institutes are capable to provide industry ready engineers in INDIA and how good they are connected with industry. Their report says that high ranker's institutes are doing well on all the parameters and they have established channels of communication for knowledge from industry to institute. They have incorporated a case study on Developing market-relevant and consistently- updated curriculum. At the Bannari Amman Institute of Technology (BIT), for each of the five course disciplines offered, there are two members from the industry represented on each of its committees, including the Governance Council, Board of Studies, Academic Council and Standing Committee of the Academic Council. This institute also offers value-added courses such as Embedded Systems, Illumination Engineering, Computers Networking Virtual Instrumentation, CISCO CCNA, Macromedia Flash, PL/SQL Programming, Multimedia and Animation, Java Certification, CISCO Certification, Web Design and Analysis, and Personality and Soft Skills Development. experts, selected members from among the college's alumni pool are invited to be a part of its Board of Studies. The college also organises guest lectures by industry experts. In 2011-12, the college organised about 83 guest lectures—the most among the top seven colleges surveyed. The Academic Council of the college makes the necessary changes to the curricula based on inputs from all these sources. That institute was also rated as high in terms of faculty, Infrastructure Placements, Services, and entrepreneurship development programmes.[13]

Andreas Blom Hiroshi Saeki presented a report on behalf of The world Bank South Asia Region Education Team on title "Employability and Skill Set of Newly Graduated Engineers in India" According to author supply of quality skill has been one of the major concern for economic rowth of India. The Indian economy is growing but skill shortage is still a major concern in IT sector specially. According to the widely quoted report by the National Association of Software and Services Companies (NASSCOM) and McKinsey in 2005, only 25% of the engineering education graduates are employable by a multinational company. Many employers give concrete examples on the lack of skills of the newly graduated hires, which the employers link to shortcomings in the education system. This survey has shown that though Institutes are putting their best efforts still graduates lacks employability skills and comparative to USA in India employers are more dissatisfied than in USA. They further added that as said by NASSCOM report(2005) that 75% of engineering graduates are not employable by multinational companies.[14]

III. OBJECTIVE

To study perception of Management and Technology Institutes with regards to the employability of their students, course curricula and impact of institutions' local initiatives to enhance student's employability skills.

IV. RESEARCH METHODOLOGIES

Instrument: Self designed questionnaire on the basis of experience and review of literature a questionnaire was prepared. Faculty members teaching in Punjab Technical University affiliated colleges were asked to fill the data. Online as well as manual methods were used to collect data. Online google questionnaire was sent to more than 300 faculty members. As many as 100 faculty members from various institutes filled the data. Out of 300 some of them refused to fill the data straightforward by justifying the reason that institute details will be leaked etc. Others simply ignored repeated mails.

V. DATA ANALYSIS AND INTERPRETATION

The perceptions of academic participants about employability of institutes and course curricula have been discussed in this section of the study.

VI. DIFFERENT ACTIVITIES ORGANIZED IN THE INSTITUTES

There are several activities being organized in the Management and Technology Institutes. These include guest lectures from professionals of other institutes and universities, guest lectures from industry experts, industrial visits, IT workshops, debugging of codes, software testing techniques, installation of softwares, quiz competitions, training to do IT certifications in campus, personality development workshops, logical reasoning tests, inter college functions, National level competitions in IT, teaching one foreign language, mock interviews, conducting campus placements, participation in placement drives and alumni meets. The frequency of organizing these activities has been shown in Table 1.1.1.1

Table 1.1.1.1: Mean frequency of organizing different activities in the institutions

S. No.	Activity	Mean	SD	Mean%	Overall
1	Institute organizes Guest Lectures from professors of other Institutes and Universities	3.41	0.88	68.27	F
2	Institute organizes Guest Lectures from Industry experts	3.29	1.09	65.87	F
3	Institute organizes Industrial Visits	3.37	0.95	67.33	F
4	Institute organizes IT Workshops	3.68	0.94	73.60	F
5	Institute organizes activities such as debugging of codes	3.15	1.06	62.93	F
6	Institute organizes activities to implement Software Testing Techniques	2.97	1.06	59.47	O
7	Institute organizes activities such as the Installation of Software by students	3.52	1.04	70.47	F
8	Institute organizes various Quiz competitions	3.69	0.94	73.73	F
9	Institute provides training to do IT Certifications in campus	3.37	1.22	67.47	F
10	Institute organizes Personality Development	3.65	1.04	72.93	F

	workshops				
11	Institute organizes Logical Reasoning Tests	3.45	1.14	68.93	F
12	Institute organizes Inter college functions	3.53	1.09	70.53	F
13	Institute Participates in National level competitions in IT Competitions	2.88	1.32	57.60	O
14	Institute teaches one foreign language	2.18	1.29	43.60	O
15	Institute conducts Mock Interviews	3.29	1.19	65.73	F
16	Institute Conducts campus placements	3.65	1.08	72.93	F
17	Institute participates in Placement Drives	3.72	1.06	74.40	F
18	Institute Conducts Alumni Meets	3.15	1.15	63.07	F
	Average	3.33	0.76	66.61	F
	F-ratio	5.89**			

'F' stands for 'frequently', 'O' stands for 'occasionally' and 'R' stands for 'rarely'. '**' stands for significant at 1% level.

It is observed from Table 1.1.1.1 that the highest frequency of organizing various activities to enable the students to get employment was 3.72 (frequently) for the activity of 'Institute participates in Placement Drives', followed by 3.69 (frequently) for the activity 'Institute organizes various Quiz competitions', 3.68 (frequently) for the activity of 'Institute organizes IT Workshops'', 3.65 (frequently) for the activity of 'Institute organizes Personality Development workshops', 3.65 (frequently) for the activity of 'Institute Conducts campus placements', 3.53 (frequently) for the activity of 'Institute organizes Inter college functions', and 3.52 (frequently) for the activity of 'Institute organizes activities such as the Installation of Software by students'. These activities were frequently organized in the institutes to train the students for employability.

The lowest frequency of organizing various activities to enable the students to get employment was 2.18 (rare) for the activity of 'Institute teaches one foreign language', which was organized rarely in the institutes. This activity was followed by 2.88 (occasionally) for the activity of 'Institute Participates in National level competitions in IT Competitions', 2.97 (occasionally) for the activity of 'Institute organizes activities to implement Software Testing Techniques', 3.15 (occasionally) each for the activity of 'Institute organizes activities such as debugging of codes' and 'Institute Conducts Alumni Meets', 3.29 (occasionally) each for the activity of 'Institute organizes Guest Lectures from Industry experts' and 'Institute conducts Mock Interviews', 3.37 (occasionally) each for the activity of 'Institute organizes Industrial Visits' and 'Institute provides training to do IT Certifications in campus', 3.41 (occasionally) for the activity of 'Institute organizes Guest Lectures from professors of other Institutes and Universities' and 3.45 (occasionally) for the activity of 'Institute organizes Logical Reasoning Tests'. The variation in mean score of organizing various activities to train students for employability ranging from as low as 2.18 to as high as 3.72 was found to be significant at on percent level as indicated by the value of F-ratio of 5.89.

Thus, seven out of 18 (38.89%) activities were being organized frequently in the management and technology institutes, 10 of 18 (55.56%) of the activities were organized occasionally and one of 18 (5.55%) were found to

be organized rarely in these institutes. Therefore, the overall frequency of organizing such activities to enable the students to get employment was at the occasional level. None of the activities was reported to be organized very frequently in these institutes. It is, therefore, recommended to enhance the frequency of such activities in order to better train the students for increasing employability of the management and technology institutes.

5.1 Factor analysis of activities being organized to train students

The factor analysis was employed to determine the grouping of various activities on the basis of their nature. This was done through Principal Component Technique. The results of the analysis have been given in Table 1.1.1.2.

Table 1.1.1.2: Factor analysis of different activities being organized to train students

S. No.	Activity	Factor-1	Factor-2	Factor-3	Communality
1	Institute organizes Guest Lectures from professors of other Institutes and Universities	0.158	0.002	**0.846**	0.74
2	Institute organizes Guest Lectures from Industry experts	0.329	0.267	**0.771**	0.77
3	Institute organizes Industrial Visits	0.365	0.477	**0.500**	0.61
4	Institute organizes IT Workshops	0.149	**0.535**	0.594	0.66
5	Institute organizes activities such as debugging of codes	0.172	**0.563**	0.419	0.52
6	Institute organizes activities to implement Software Testing Techniques	0.149	**0.787**	0.248	0.70
7	Institute organizes activities such as the Installation of Software by students	0.274	**0.773**	0.039	0.67
8	Institute organizes various Quiz competitions	**0.794**	0.302	0.055	0.72
9	Institute provides training to do IT Certifications in campus	0.219	**0.802**	0.083	0.70
10	Institute organizes Personality Development workshops	**0.601**	0.498	0.174	0.64
11	Institute organizes Logical Reasoning Tests	**0.577**	0.539	0.155	0.65
12	Institute organizes Inter college functions	**0.627**	0.342	0.138	0.53
13	Institute Participates in National	**0.543**	0.527	0.326	0.68

	level competitions in IT Competitions				
14	Institute teaches one foreign language	0.334	**0.482**	0.366	0.48
15	Institute conducts Mock Interviews	**0.641**	0.280	0.423	0.67
16	Institute Conducts campus placements	**0.778**	0.063	0.277	0.69
17	Institute participates in Placement Drives	**0.786**	0.104	0.320	0.73
18	Institute Conducts Alumni Meets	0.198	0.178	**0.720**	0.59
Eigen Value		8.83	1.54	1.38	
% Variance		49.05	8.58	7.68	
% Cumulative Variance		49.05	57.63	65.31	
KMO-MSA			0.901		
Bartlett's Test of Sphericity			1773.19		
d.f. = 153 sig. 0.000					
Naming of Factors					
Factor	Name				
F-1	Competitive Activities				
F-2	Technological Development				
F-3	Practical Interaction				

The KMO measure of sampling adequacy (KMO-MSA) worked at 0.901, which was significant at one percent level. This proved that the data set was fit for factor analysis. Similarly, the communalities ranged from 0.48 to 0.77, which were quite high. This indicated that there existed multiple correlations between different activities. Hence factor analysis should be run.

The Eigen value came to be 8.83 for factor-1, 1.54 for factor-2 and 1.38 for factor-3. Total variance explained by the three factors was 65.71 percent. Three factors came to be as under:

Factor-1 included the following 8 activities:

8	Institute organizes various Quiz competitions
10	Institute organizes Personality Development workshops
11	Institute organizes Logical Reasoning Tests
12	Institute organizes Inter college functions
13	Institute Participates in National level competitions in IT Competitions
15	Institute conducts Mock Interviews
16	Institute Conducts campus placements
17	Institute participates in Placement Drives

5.2 Factor-2 included following 6 activities

4	Institute organizes IT Workshops
5	Institute organizes activities such as debugging of codes
6	Institute organizes activities to implement Software Testing Techniques
7	Institute organizes activities such as the Installation of Software by students
9	Institute provides training to do IT Certifications in campus
14	Institute teaches one foreign language

5.3 Factor-3 included following 4 activities

1	Institute organizes Guest Lectures from professors of other Institutes and Universities
2	Institute organizes Guest Lectures from Industry experts
3	Institute organizes Industrial Visits
18	Institute Conducts Alumni Meets

The factors were named as 'competitive activities', 'activities related to the technological development' and 'activities related to the practical interaction'.

Competitive Activities: These activities included quiz competitions, personality development workshops, logical reasoning tests, inter college functions, mock interviews, placement drives, etc.

Technological Development: These activities included IT workshops, debugging of codes, software testing, software installation, IT certification and teaching foreign language.

Practical Interaction: These activities included guest lectures from other institutes, universities & industry experts, industrial visits and alumni meets.

5.4 Importance of different teaching methodologies during computer professional courses

There are some teaching methodologies which are applied while teaching computer professional courses. These methodologies include problem solving method, direct instructions, case studies, concept mapping, peer tutoring, cooperative learning, interactive instructional videos, puzzle based questions, pair programming, game based interactive programming methods, subjects wise presentation, online tests, time bound assignments and subject wise additional projects. The level of importance of these teaching methodologies for the academic participants has been presented in Table 1.1.2.1

Table 1.1.2.1: Importance of different teaching methodologies during computer professional courses

S. No.	Teaching Methodology	Mean	SD	Mean%	Overall
1.	Problem Solving Method	4.45	0.66	88.93	Imp
2.	Direct Instructions	4.08	0.78	81.60	Imp

3.	Case Studies	4.11	0.96	82.13	Imp
4.	Concept Mapping	4.01	0.79	80.27	Imp
5.	Peer tutoring	3.89	0.77	77.87	Imp
6.	Cooperative Learning	4.11	0.76	82.27	Imp
7.	Interactive Instructional Videos	4.06	0.84	81.20	Imp
8.	Puzzle Based Questions	3.83	0.95	76.67	Imp
9.	Pair Programming	3.84	0.91	76.80	Imp
10.	Game Based Interactive Programming	3.79	0.98	75.73	Imp
11.	Subject Wise Presentation	4.03	0.80	80.67	Imp
12.	Online Tests	4.07	0.91	81.47	Imp
13.	Time-bound Assignments	4.11	0.89	82.27	Imp
14.	Subject Wise Additional Projects	3.99	0.96	79.87	Imp
	Average	4.03	0.44	80.55	Imp
	F-ratio	1.57^{NS}			

'Imp' stands for 'important' and 'NS' stands for statistically non-significant

A perusal of Table 1.1.2.1 shows that all the 14 teaching methodologies were neither very important nor unimportant but these were important for the academic participants to train students for employability through teaching them the computer professional courses. However, the highest importance score came to be 4.45 (important) for the methodology of 'problem solving method', followed by 4.11 (important) each for the methodology of 'cooperative learning', 'time-bound assignments' and 'case studies', 4.08 (important) for the methodology of 'direct instructions', 4.07 (important) for the methodology of 'online tests' and 4.06 (important) for the methodology of 'interactive instructional videos'.

The lowest importance score was to the tune of 3.79 (important) for the teaching methodology of game based interactive programming', followed by 3.83 (important) for methodology of 'puzzle based questions', 3.84 (important) for the methodology of 'pair programming', 3.89 (important) for the methodology of 'peer tutoring', 3.99 (important) for the methodology of 'subject wise additional projects', 4.01 (important) for the methodology of 'concept mapping'' and 4.03 (important) for the methodology of 'subject wise presentations'. All the aspects were important; hence the variation between mean scores was very low. The calculated F-ratio also confirmed that the variation from 3.79 to 4.45 was non-significant.

Thus the teaching methodology like 'problem solving method', 'cooperative learning', 'case studies' and 'time bound assignments' emerged as the most important methodologies to train the students for employability while teaching computer professional courses.

5.5 Factor analysis of teaching methodologies

The factor analysis was employed to determine the grouping of various teaching methodologies on the basis of their nature. This was done through Principal Component Technique. The results of the analysis have been given in Table 1.1.2.2.

Table 1.1.2.2: Factor analysis of teaching methodologies important during computer professional courses

S.No.	Teaching Methodology	Factor-1	Factor-2	Factor-3	Factor-4	Factor-5	Communality
1	Problem Solving Method	0.100	0.531	-0.358	**0.613**	0.152	0.82
2	Direct Instructions	0.118	-0.238	0.158	**0.733**	0.083	0.64
3	Case Studies	0.021	0.001	0.485	**0.617**	0.024	0.62
4	Concept Mapping	0.161	0.092	0.160	0.405	0.426	0.41
5	Peer tutoring	-0.155	0.072	0.141	0.067	**0.765**	0.64
6	Cooperative Learning	0.275	-0.195	-0.018	0.049	**0.797**	0.75
7	Interactive Instructional Videos	0.254	0.096	**0.706**	0.106	0.136	0.60
8	Puzzle Based Questions	0.065	0.250	**0.808**	0.163	0.092	0.75
9	Pair Programming	0.221	**0.767**	0.220	-0.126	-0.039	0.70
10	Game Based Interactive Programming	0.246	**0.738**	0.144	-0.008	-0.030	0.63
11	Subject Wise Presentation	**0.567**	0.375	0.267	-0.012	-0.034	0.54
12	Online Tests	**0.724**	0.156	0.030	0.127	0.211	0.61
13	Time-bound Assignments	**0.875**	0.125	0.077	-0.020	-0.064	0.79
14	Subject Wise Additional Projects	**0.840**	0.142	0.128	0.205	0.073	0.79
Eigen Value		3.90	1.92	1.38	1.08	1.00	
% Variance		27.87	13.73	9.83	7.71	7.17	
% Cumulative Variance		27.87	41.6	51.43	59.14	66.31	
KMO-MSA			0.688				
Bartlett's Test of Sphericity			619.77				
		d.f = 91	sig. 0.000				

The KMO measure of sampling adequacy (KMO-MSA) worked at 0.688, which was significant at one percent level. This proved that the data set was fit for factor analysis. Similarly, the communalities ranged from 0.41 to 0.52, which were quite high. This indicated that there existed multiple correlations between different teaching methodologies. Hence factor analysis was run.

The Eigen value came to be 3.90 for factor-1, 1.92 for factor-2, 1.38 for factor-3, 1.08 for factor-4 and 1.00 for factor-5. Total variance explained by the 5 factors was 66.31 percent. Five factors came to be as under:

Factor-1 written work' included the following methodologies:	
11	Subject Wise Presentation
12	Online Tests
13	Time-bound Assignments

14	Subject Wise Additional Projects

Factor-2 programming included following 2 methodologies	
9	Pair Programming
10	Game Based Interactive Programming

Factor-3 videos included following 2 methodologies:	
7	Interactive Instructional Videos
8	Puzzle Based Questions and Videos

Factor-4 instructional Methodologies included following 3 methodologies:	
1	Problem Solving Method
2	Direct Instructions
3	Case Studies

Factor-5 Team Work included the following 2 methodologies	
5	Peer tutoring
6	Cooperative Learning

The factors were named as 'written work', 'programming', 'videos', 'instructional Methodologies' and 'team work'.

Written work: These teaching methodologies included subjects wise presentation, online tests, time bound assignments and subject wise additional projects.

Programming: These methodologies included pair programming and game based interactive programming.

Videos: These methodologies included interactive instructional videos and puzzle based questions.

Instructional Methodologies: These methodologies included problem solving methods, direction instructions and case studies.

Team Work: These methodologies included peer tutoring and cooperative learning.

Aspects of Students and Teachers

The academic participants were asked to register the percent level of different aspects of students and teachers being practised in the institutes to train the students for employability. They responded in terms of none, less than 25 percent, 25 percent to 50 percent, 51 percent to 75 percent and more than 75 percent. These percentages were assign score in the respective order of , 1, 2, 3 and 4 and the mean score were calculated to assess the overall status of their responses. The results so obtained have been shown in Table 1.1.3.1.

Table 4.1.3.1: Percent score of different aspects of students and faculty members

S. No.	Aspects	Mean	SD	Mean%	Overall %
1	Percentage of students who seek placement through placement drives	2.23	1.23	55.83	25-50
2	New faculty members join in Computer Department per semester	1.22	0.65	30.50	<25
3	Full time or part time faculty members are IT Practitioners with Industry Backgrounds	1.34	1.08	33.50	<25
4	Faculty members hold a PhD Degree	1.41	1.22	35.17	<25
5	Faculty members attend FDP in a semester	1.74	1.18	43.50	25-50
	Average	1.59	0.70	39.70	25-50
	F-ratio	4.28**			

'**' stands for significant at 1% level

The analysis given in Table 1.1.3.1 indicated that the highest mean score was found to be 2.23 for percentage of students who seek placement through placement drives. This score stands for 25 to 50 percent. This was followed by 1.74 for faculty members attending FDP in a semester i.e. 25 to 50 percent and 1.41 for faculty members holding Ph. D. Degree i.e. less than 25 percent. The lowest score came to be 1.22 for new faculty members joining in computer department per semester i.e. less than 25 percent and 1.34 for full time or part time faculty members are IT practitioners with industry background which indicated less than 25 percent. The overall score was 1.59 which indicated that students and teachers practising various aspects of strength was 25 to 50 percent. The variation in mean scores of different aspects was found to be significant as conveyed by the F-ratio of 4.28.

The analysis revealed that on the average about 37.50 percent of students seek placement through placement drives of the institutes. Similar was the percentage of faculty members attending faculty development programmes in a semester. About 15 percent of faculty members join the computer department, IT practitioners with industry background and holding Ph. D. Degree. In case of educational qualification of faculty members, the situation was not much encouraging as the number of faculty members holding Ph.D. Degree was much low. This situation needs improvement.

Agreement on different placement aspects

The respondents were asked to register their level of agreement on different aspects of placement of students. They responded in terms of 'strongly disagree', 'disagree', 'neutral', 'agree' and 'strongly agree'. These attributes were assigned scores in the respective order of 1, 2, 3, 4 and 5 and the mean scores were calculated in order to estimate the overall level of agreement among academic participants and to perform analysis of variance (ANOVA). The results so obtained are shown in Table 1.1.4.1.

Table 1.1.4.1: Agreement among academic participants on different placement aspects

S. No.	Aspects	Mean	SD	Mean%	Overall
1	Faculty are trained enough to train computer students	3.72	0.98	74.40	A
2	Joining placement drives conducted by PTU are effective	3.58	0.92	71.60	A
3	Alumni plays a big role in placements of current students	3.67	0.97	73.47	A
4	BCA/MCA courses meet the employers need according to market requirements	3.47	1.03	69.33	N
5	Conducting inter college competition in Computer field improves various skills of students	3.98	0.93	79.60	A
6	Conducting to0 many extracurricular activities adversely affect the performance of students	3.60	0.97	72.00	A
7	The Institute sponsor faculty for FDP to upgrade their knowledge	3.63	0.89	72.67	A
8	Student are encouraged to do certifications before completion of courses	3.60	0.83	72.00	A
9	As per faculty academic curriculum/syllabus fulfils the need to meet the challenges given by IT industry	3.37	1.01	67.47	N
10	IT Certifications helps to get better employment	3.70	1.08	74.00	A
	Average	3.63	0.64	72.65	A
	F-ratio	5.34**			

'A' stands for 'agree' and 'N' stands for 'neutral'. '**' stands for significant at 1% level

A perusal of Table 1.1.4.1 indicated that the highest extent of agreement was 3.98 (agree) on 'Conducting inter college competition in Computer field improves various skills of students', followed by 3.72 (agree) on 'You are trained enough to train computer students', 3.70 (agree) on 'IT Certifications helps to get better employment', 3.67 (agree) on 'Alumni plays a big role in placements of current students', 3.63 (agree) on 'The Institute sponsor faculty for FDP to upgrade their knowledge', 3.60 (agree) each on 'Conducting to0 many extracurricular activities adversely affect the performance of students' and 'Student are encouraged to do certifications before completion of courses' and 3.58 (agree) on 'Join Placement drives conducted by PTU are effective'. These were the aspects of placement of students where overall the academic participants agreed.

The lowest score of agreement was 3.37 (neutral) on 'In your opinion academic curriculum/syllabus fulfils the need to meet the challenges given by IT industry' and 3.47 (neutral) on 'BCA/MCA courses meet the employers need according to market requirements'. The academic participants could not depict any definite opinion on academic curriculum/syllabus fulfils the need to meet the challenges given by IT industry and BCA/MCA

courses meet the employers need according to market requirements. Overall, the mean score of placement aspects came to be 3.63 which indicated that the academic participants agreed on the placement aspects as a whole. However, the mean score ranged from 3.37 to 3.98, which exhibited significant variation from one aspect to the other as indicated by the value of F-ratio i.e. 5.34, which was significant at one percent level.

5.6 Factor analysis of placement aspects

The factor analysis was employed to determine the grouping of various placement aspects on the basis of their nature. This was done through Principal Component Technique. The results of the analysis have been given in Table 1.1.4.2.

Table 4.1.4.2: Factor analysis of placement aspects

S.No.	Aspects	Factor-1	Factor-2	Factor-3	Communality
1	Faculty are trained enough to train computer students	**0.804**	0.062	0.345	0.77
2	Joining placement drives conducted by PTU are effective	**0.907**	0.160	0.184	0.88
3	Alumni plays a big role in placements of current students	**0.843**	0.087	0.266	0.79
4	BCA/MCA courses meet the employers need according to market requirements	0.213	**0.910**	0.058	0.88
5	Conducting inter college competition in Computer field improves various skills of students	**0.827**	0.211	0.260	0.80
6	Conducting to0 many extracurricular activities adversely affect the performance of students	0.040	0.126	0.100	0.54
7	The Institute sponsor faculty for FDP to upgrade their knowledge	0.099	0.164	**0.894**	0.84
8	Student are encouraged to do certifications before completion of courses	0.131	0.212	**0.846**	0.78
9	As per faculty academic curriculum/syllabus fulfils the need to meet the challenges given by IT industry	0.206	**0.766**	-0.122	0.65
10	IT Certifications helps to get better employment	0.269	**0.833**	0.046	0.77
Eigen Value		4.54	2.09	1.05	
% Variance		45.39	20.91	10.48	
% Cum. Variance		45.39	66.3	76.78	
KMO-MSA		0.790			
Bartlett's Test of Sphericity		954.82			
		d.f. = 95 sig. = 0.000			
Naming of factors					
Factor	Name				

F-1	Interactive work
F-2	Suitable syllabus
F-3	Teachers-students

The KMO measure of sampling adequacy (KMO-MSA) worked at 0.790, which was significant at one percent level. This proved that the data set was fit for factor analysis. Similarly, the communalities ranged from 0.54 to 0.88, which were quite high. This indicated that there existed multiple correlations between different aspects of placement. Hence factor analysis should be run.

The Eigen value came to be 4.54 for factor-1, 2.09 for factor-2 and 1.05 for factor-3. Total variance explained by the 3 factors was 76.78 percent. Three factors came to be as under:

Factor-1 included the following 4 methodologies:

1	Faculty are trained enough to train computer students
2	Joining placement drives conducted by PTU are effective
3	Alumni plays a big role in placements of current students
5	Conducting inter college competition in Computer field improves various skills of students

Factor-2 included following 3 methodologies:

4	BCA/MCA courses meet the employers need according to market requirements
9	As per faculty academic curriculum/syllabus fulfils the need to meet the challenges given by IT industry
10	IT Certifications helps to get better employment

Factor-3 included following 2 methodologies:

7	The Institute sponsor faculty for FDP to upgrade their knowledge
8	Student are encouraged to do certifications before completion of courses

The factors were named as ‘interactive work’, ‘suitable syllabus’ and ‘teacher-students interaction’.

Interactive Work: These placement aspects included faculty trained enough to train students, effectiveness of joining placement drives, alumni’s role in placement and inter-college competitions.

Suitable Syllabus: These placement aspects included BCA/MCA courses as per market needs, academic curriculum as per IT industry and usefulness of IT certification.

Teachers-Students Interaction: These placement aspects included sponsoring the faculty for Faculty Development Programmes and encouragement to students to do certification.

Ways to improve upon the quality of BCA/MCA programmes

The respondents were asked to register their level of agreement on different ways for the improvement in BCA/MCA programmes. They responded in terms of ‘strongly disagree’, ‘disagree’, ‘neutral’, ‘agree’ and ‘strongly agree’. These attributes were assigned scores in the respective order of 1, 2, 3, 4 and 5 and the mean

scores were calculated in order to estimate the overall level of agreement among academic participants and to perform analysis of variance (ANOVA). The results so obtained are shown in Table 1.1.5.1.

Table 1.1.5.1: Agreement among academic participants on different ways to improve BCA/MCA programmes

S. No.	Aspects	Mean	SD	Mean%	Overall
1	By updating syllabus as per industry requirements	3.85	1.13	77.07	A
2	By working on interpersonal skills of students	3.81	0.94	76.27	A
3	By giving exposure to industry projects	3.97	1.02	79.47	A
4	By introducing specialization in MCA/B. Tech. Courses	3.85	1.08	77.07	A
5	By improving teaching quality	3.81	1.08	76.27	A
6	By more effective industry-Institute interactions	3.95	1.02	79.07	A
7	By sending Faculty to attend FDPs	3.66	1.15	73.20	A
8	By improving practicability of courses	3.80	1.07	76.00	A
	Average	3.84	0.86	76.80	A
	F-ratio	1.39^{NS}			

'A' stands for 'agree' and 'NS' stands for 'non-significant'

It can be seen from the Table that the academic participants agreed on all the ways required for the improvement of BCA/MCA programmes. However, the highest extent of agreement was 3.97 on the method of 'by giving exposure to industry projects', followed by 3.95 on the method of 'by more effective industry-Institute interactions', 3.85 each on the methods of 'by updating syllabus as per industry requirements' as well as 'by introducing specialization in MCA/B. Tech. Courses'

The lowest extent of agreement came to be 3.66 on the method of 'By sending Faculty to attend Faculty Development Programmes', followed by 3.80 on the method of 'by improving teaching quality' and 3.81 each on the method of 'by working on interpersonal skills of students' as well as on 'by improving practicability of courses'. The extent of agreement ranged from 3.66 to 3.97. The variation between scores was found to be non-significant as indicated by the non-significant value of F-ratio i.e. 1.39.

Determinants of employability of institutes and curriculum

To identify the determinants of employability of institutes and curriculum, multiple backward step regression analysis was performed. The results of the analysis are shown in Table 1.1.6.1. In the 1st run model, 3 factors of activities, 5 factors of teaching methodologies, participation of teachers & faculty and ways for improvement were taken as the independent variables. The employability was developed as the composite score of question 4. The analysis revealed that in the 1st run model, the magnitude of multiple determination was 0.191 where 2 out of 10 variables were significant. But in the final run model, the magnitude of multiple determination reduced to 0.152, where the same 2 variables remained significant. This showed that the contribution of 8 non-significant variables was only 3.9 percent towards variation in the employability variable. The 2 significant variables could explain 19.1 percent of the variation in employability.

Table 1.1.6.1: Determinants of employability of institutes and curriculum

Variable	1st run model		Final run model	
	β	t-value	B	t-value
Constant	1.85	3.34**	1.59	3.81**
Competitive activities (CA)	-0.02	0.18		
Technological Development (TD)	-0.12	1.30		
Practical Interaction (PI)	0.24	2.64**	0.22	3.68**
Written work (WW)	-0.04	0.48		
Programming (Prog)	-0.01	0.16		
Videos	0.01	0.01		
Instructional Methodologies (IA)	0.33	3.45**		
Team work (TW)	0.02	0.29	0.32	3.69**
Participation (Parti)	0.18	2.00*		
Ways for improvement (WFI)	-0.04	0.61		
R-square	0.191		0.152	
F-ratio	3.31**		13.24**	

The regression coefficient of practical interaction (0.22) and instructional Methodologies (0.32) was significantly positive, which indicated that an increase in practical interaction and instructional Methodologies would lead to an increase in the employability of the institutes and curriculum.

Direct and indirect effects on employability

In order to develop a model for employability of the institutes based on the views of academic participants, structural equation modelling was done. The direct effects on employability as well as indirect effects on employability were evaluated. The results have been presented in Table 1.1.6.2.

Table 1.1.6.2: Direct and indirect effects on employability: Academic Participants

Independent Variables	Dependent Variables		
	Employability	Practical Interaction	Interactional Methodologies
Employability		0.17	0.20
Competitive Activities (CA)		0.29	
Technological Development (TD)		0.32	
Practical Interaction (PI)	0.22		
Programming (Prog)		-0.15	
Videos			0.21
Instructional Methodologies (IA)	0.32		
Team Work (TW)			0.16
Participation (Parti)		0.26	
Ways for Improvement (WFI)		0.15	

We have already studied that the direct effects of independent variables on employability in Table 1.1.6.2. Now we will study the indirect effects on employability through the significant variables like practical Interaction and instructional Methodologies. Table 1.1.1s clearly showed that competitive activities, technological development, programming, participation and ways for improvement through practical interaction and videos and participation through technology, technology and participation through practical and videos and team work through instructional Methodologies also affect the employability in an indirect manner. There we may conclude that all the variables, except written work, are having high inter-correlations.

VI. CONCLUSION

Overall, it is recommended to enhance the frequency of activities like guest lectures, industrial visits, IT workshops, software testing techniques, quiz competitions, personality development workshops, logical reasoning tests, mock interviews placement drives, etc. in order to better train the students for increasing employability of the management and technology institutes.

The teaching methodology like ‘problem solving method’, ‘cooperative learning’, ‘case studies’ and ‘time bound assignments’ emerged as the most important methodologies to train the students for employability while teaching computer professional courses. Due emphasis needs to be laid on these methodologies. In case of educational qualification of faculty members, the situation was not much encouraging as the number of faculty members holding Ph.D. Degree was much low. This situation needs improvement.

The study revealed that the academic participants agreed that syllabus should be updated, interpersonal skills of the students should be explored, exposure to be given to the industry projects, specialization should be introduced in BCA/MCA courses which may be employment oriented. Teaching quality as well as practicability

of courses also needs improvement and industry-institute interactions should be made more effective than the existing one. This indicated that there are important deficiencies in the overall system of management and technology institutes which may hinder the employability of the institutes and the curriculum. This can be safely said because the level of agreement on these measures to be taken is quite high. Therefore, it is need of the hour that management and technology institutes should implement these measures in order to enhance the employability of the institutes and the syllabus.

The regression analysis brought out that the practical interaction like organizing guest lectures, industrial visits and alumni meets would contribute positively towards employability of the institutes. Similarly, instructional Methodologies of the faculty towards teaching the students such as adoption of problem solving method, direct instructions and case studies are also there to help in enhancing employability of the institutes.

BIBLIOGRAPHY

[1] A. Qureshi, H. Wall, J. Humphries, A. Bahrami Balani, and A. B. Balani, "Can personality traits modulate student engagement with learning and their attitude to employability ? ☆" *Learn Individ. Differ.*, vol. 51, pp. 349–358, 2016.

[2] C. Ferreira, A. Nery, and P. R. Pinheiro, "A Multi-Criteria Model in Information Technology Infrastructure Problems," *Procedia Comput. Sci.*, vol. 91, pp. 642–651, 2016.

[3] Aspiring Minds, "M&S Annual Report 2016," 2016.

[4] B. Rigby *et al.*, "Review of Graduate Skills: critical thinking, teamwork, ethical practice and sustainability," *Aust. Learn. Teach. Counc. Proj. Embed. Dev. grading generic Ski. across Bus. curriculum.*, pp. 1–25.

[5] C. Bilsland, H. Nagy, and P. Smith, "Planning the journey to best practice in developing employability skills: Transnational university internships in Vietnam," *Asia-Pacific J. Coop. Educ.*, vol. 15, no. 2, 2014.

[6] N. Aieda, A. Bakar, A. Mustapha, and K. Nasir, "Clustering Analysis for Empowering Skills in Graduate Employability Model," vol. 7, no. December 2013, pp. 21–28, 2014.

[7] L. Argote, *Organizational learning: Creating, retaining and transferring knowledge*. 2013.

[8] M. S. Rasul, R. A. Rose, and A. N. Mansor, "Employability skills indicator as perceived by manufacturing employers," *Asian Soc. Sci.*, vol. 9, no. 8, 2013.

[9] S. R. Arshad and I. S. Wahidin, "the Development of Malaysian Online Employability Test Kit (Maskit): a Prototype for Language Component," *Wcik E-Journal Integr. Knowl.*, vol. 2013, pp. 135–143, 2013.

[10] E. and W. R. Department of Education, "Labour Market Research - Information and Telecommunications (ICT) professions," no. June, pp. 1–6, 2013.

[11] K. Lee, "Augmented Reality in Education and Training," *TechTrends*, vol. 56, no. 2, pp. 13–21, 2012.

[12] N. J. Thomes, "Creating employable graduates in career and technical education: Defining the partnership between business and the community college," *ProQuest Diss. Theses*, p. 163, 2012.

[13] A. Survey, "Survey of Engineering Institutes," no. November, 2012.

[14] A. Blom and H. Saeki, "Employability and Skill Sets of Newly Graduated Engineers in India: A Study.," *IUP J. Soft Ski.*, vol. 6, no. April, pp. 7–50, 2012.