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A Study On Role Of ICT In The Skills Development Of Engineering Students

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Abstract

Current era is the era of ICT (Information Communication Technology) and skill development. ICT has basically modified the exercise and tactics of all varieties of endeavors inside business, society, governance. In emerging countries like India, the demand for qualified engineers is increasing. To meet the growing demand for skilled workers, there is an urgent need for skills in the formal education system and, at the same time, for skills development outside the formal education system. To bridge this gap, a balance must be maintained between basic theory teaching and actual job contact for students. ICT has transformed the way of learning among the students as compare to the traditional methods. So considering the need of an hour engagement of ICT is witnessed in all the area of higher education. The research attempts to analyze the role of ICT in skill development among engineering students. Three skills have been identified i.e problem-solving skills, Digital skills & Research skills. The study has been conducted on 152 respondents from the different areas of Raipur, Durg- Bhilai city by using a questionnaire. After data collection, it is analyzed using T-Test and One way Annova. The finding provides that ICT plays an important role in the skill development of engineering students.

Keywords:- Skill Development, Engineering, ICT, Problem-solving skills, Digital skills & Research skills.

Introduction

People need a wide range of skills to contribute to today's economy. Skills development has always been an important agenda for all governments in India. When it comes to a fast-growing country like India, the skill set you need matters more than any other economy. To meet lifestyle and work needs, a person needs to develop different types of skills. The focal point of education is to teach people to think, to use their rational abilities to solve problems better. The curriculum for the future engineering department should be based on skill development rather than teaching existing knowledge. Engineering teachers should teach methods, not solutions. Emphasis should be placed on developing analytical skills, design skills and problem-solving skills.

The aim of Skill Development is to create qualified workers with the internationally recognized skills, knowledge and qualifications that are needed and continuously improved to gain access to decent employment and to secure India's competitiveness in the dynamic world. (Employees and self-employed) in both organized and unorganized sectors, seeks greater participation of young people, women, the

disabled and other disadvantaged sectors and seeks a synergy of the efforts of different sectors and reforms the current system with an improved ability to adapt to changing technologies and job market. Skills development can help build a "virtuoso cycle" in which the quality and relevance of education and training for all genders drives innovation, investment, technological change, business development, economic diversification and competitiveness to accelerate the creation of economies to need of more jobs.

Role of ICT

It has bit by bit remodeled educational society into knowledge and data society that in result reworking economy to knowledge economy and supporting nations to form wealth by exploring knowledge. It's a contemporary and qualitative technological approach and features a deep impact on education system which introduced qualitative changes and redoubled productivity and adjusted the vogue and functioning of the tutorial system and its governance. Academic establishments ought to convert their raw input students to techno-oriented output. By the adoption of data and technology (ICT) education became rather more effective than past. Researchers, academicians and trade professionals have established that ICT give opportunities to all educational participants to find out and excel. The new jobs that are created will necessitate a different set of skills. As a result, it is critical to prepare future generations to thrive in a changing landscape. In this dynamic era, educational institutes play a critical role, and society requires a more robust education system to meet the challenge. The World Economic Forum predicts that complex problem-solving, critical thinking, creativity, people management, teamwork and collaboration, emotional intelligence, judgement and decision-making, service orientation, negotiation, and cognitive flexibility will be required by education 4.0, in addition to strong digital skills. (Hindustan Times)

Skill Development & Engineering

In an extremely fast-changing global scenario, engineering graduates of the twenty-first century will solve novel, complex, multidisciplinary problems. Various reports from around the world on current and future engineering education emphasized the importance of skills among engineering students. For example, the United Kingdom Royal Academy of Engineering reported from a study conducted among industries that the most important quality among engineering students that employers want is the ability to transfer and use their data and skills in the workplace setting, to solve world problems. **(Mohd-Yusof et al.)**

Review of Literature

(Bransford, 2004) Engineering schools must consider the fact that students will learn in a completely different way in the future. Until recently, the majority of our engineering schools developed curricula by predicting the problems we will face. As a result, the emphasis is on knowledge rather than skills. Curricula based on specific knowledge are constructed from the ground up. Engineers whose education is built from the ground up are unable to comprehend and address complex issues.

Mahisa & Anju(2014) in the study of role of ICT in higher education in India, It was investigated that ICT, as a change agent, plays an important role in changing the educational practices that were previously practiced.

Chandha (2015) presented her viewpoint on technological learning tools for learning in her study titled "ICT & Present Classroom Scenario". She described various methods for incorporating ICTs into the mainstream of classroom teaching and attempted to promote a positive attitude toward successful ICT implementation, as well as practical ideas for doing so.

Sandhu (2015) focused on the issues and concerns related to the integration of ICT in teacher education programs. She raised a major issue, stating that making teachers comfortable with innovative technologies is one of the most important factors to consider, as their comfort will aid in the integration of ICTs into classroom

study. Teacher education should be transformed for this purpose in order to prepare teachers for changing scenarios.

(Digital learning 2015)"Engineering colleges need to upgrade labs and tools, in addition to their curriculum in respect to the material available worldwide. Unfortunately, engineering curricula have not been updated in many years. Today, skill development must prioritize and prioritize manufacturing practices. Until now, skill development has been focused on the service sector, and this must change."

(Leiden et.al. 2017) In emerging economies such as India, the demand for skilled engineers is increasing. There is an urgent need to develop skills in the formal education system while also creating skills outside of the formal education system to meet the growing demand for skilled employees [planning commission]. To close this gap, there must be a balance between theory/fundamental teaching and providing students with real-world experience. Combining didactical approaches and existing concepts with emerging industry topics results in the concept of Learning Factories **[Buth.et.al. 2017**]

(Girish & Suresh 2017) They focused on the challenges and opportunities for implementing ICT in the classroom for teaching and learning in their study. They discovered a number of challenges, including high costs, a lack of essential infrastructure required for the complex operation of ICT-enabled learning tools, and a failure to meet basic needs such as electricity. However, there are opportunities for ICT implementation in the long run because learning outcomes have improved significantly with their assistance.

Dorothy et.al (2018) Problem-solving and research are related in both the engineering profession and the education system. The empirical research presented in this article concerned the effectiveness of the teaching and learning model, which was founded on this relationship and derived from the parameters of the research skill enhancement structure.

Lillejord et.al (2018) According to their report published in Norwegian Higher Education, higher education institutions are not fully utilizing the opportunities provided by digitally enabled technologies. They discovered that while seventy six percent of students reported that digital tools provide flexibility and freedom and are important for their studies, they are used infrequently or not at all.

Research Methodology

Sampling Design : Data was collected from the engineering students of both private and government colleges of Raipur, Durg- Bhilai District. Data was collected from the 200 respondents out which 152 were used for the study, 48 samples were rejected due to half filled responses.

Data Collection: Data was collected through structured questionnaire. The variables were identified from the review of literature. The respondents have to give their responses in 5-likert scale i.e 5 for strongly disagree and 1 for strongly agree.

Demographic Data: Demographic factors considered for the study is gender, Different Specialization of engineering students and the Institution category i.e Private and Government

Reliability and Validity of Data: from the analysis it is found that the Cronbach's Alpha result is 0.824.It is presumed that the Cronbach's Alpha outcome is adequate. Validity of data was found high.

Data Analysis

Hypothesis Test

Table 1 (Gender Basis)

Descriptives									
		N	Mean	Std. Deviation	Std. Error	Annova Table			
							Upper Bound	F	Sig.
Problem solving skills	1	65	24.2923	4.10306	.50892	Between Groups	2.287	.166	.684
	2	87	24.5402	3.38191	.36258	Within Groups	2061.055		
	Total	152	24.4342	3.69655	.29983	Total	2063.342		
Digital skills	1	65	13.8769	1.88338	.23360	Between Groups	1.149	.236	.628
	2	87	13.7011	2.41658	.25909	Within Groups	729.245		
	Total	152	13.7763	2.19933	.17839	Total	730.395		
Research skills	1	65	22.2308	3.74904	.46501	Between Groups	.699	.051	.821
	2	87	22.3678	3.63483	.38969	Within Groups	2035.768		
	Total	152	22.3092	3.67240	.29787	Total	2036.467		

H_{01}: There is no significant effect of ICT usage in the development of problem solving skills on gender basis.

Calculated value after test:- 0.684
The above tabular value suggests that there is no essentialness impact of gender orientation in the level of usage of ICT in problem solving skills.

H_{02}: There is no significant effect of ICT usage in the development of digital skills on gender basis.

Calculated value after test:- 0.628
It shows there is no criticalness impact of gender orientation fair and square of use of ICT in the advancement of digital aptitudes.

H_{03}: There is no significant effect of ICT usage in the development of research skills on gender basis.

Calculated value after test:- 0.821
This suggests that there is no hugeness impact of gender orientation fair and square of utilization of ICT in the improvement of research skills.

H_{04}: There is no significant effect of ICT usage in the development of problem solving skills on engineering specialization students/researchers.

Calculated value after test:- 0.022
This suggests that there is an importance impact of engineering specialization in the ICT utilization for the improvement of problem solving abilities.

H_{05}: There is no significant effect of ICT usage in the development of digital skills on engineering,specialization students/researchers.

Calculated value after test:- 0.018
It shows there is a criticalness impact of engineering specialization in the ICT utilization for the advancement of digital abilities.

H_{06}: There is no significant effect of ICT usage in the development of research skills on engineering,specialization students/researchers.

Table 2 (Specialization)

Descriptives					ANOVA			
	N	Mean	Std. Deviation	Std. Error		Sum of squares	F	Sig.

Problem-solving skills	1	45	24.2222	3.49603	.52116	Between Groups	196.995	2.551	.022
	2	39	23.9487	3.77630	.60469	Within Groups	1866.347		
	3	24	23.5833	3.43785	.70175	Total	2063.342		
	4	19	24.6842	3.85937	.88540				
	5	10	24.4000	2.67499	.84591				
	6	12	28.1667	3.83366	1.10668				
	7	3	24.3333	3.21455	1.85592				
	Total	152	24.4342	3.69655	.29983				
Digital skills	1	45	13.8222	1.93401	.28831				
	2	39	13.7179	1.45002	.23219	Between Groups	72.405	2.659	.018
	3	24	12.7917	2.76593	.56459	Within Groups	657.990		
	4	19	14.8947	3.03488	.69625	Total	730.395		
	5	10	12.7000	2.21359	.70000				
	6	12	14.8333	1.40346	.40514				
	7	3	14.0000	1.73205	1.00000				
	Total	152	13.7763	2.19933	.17839				
Research skills	1	45	22.5778	3.38102	.50401				
	2	39	23.6154	4.09503	.65573	Between Groups	169.355	2.192	.047
	3	24	22.0000	3.34924	.68366	Within Groups	1867.112		
	4	19	20.4737	2.98828	.68556	Total	2036.467		
	5	10	20.5000	5.38000	1.70131				
	6	12	22.1667	1.89896	.54818				
	7	3	22.0000	2.00000	1.15470				
	Total	152	22.3092	3.67240	.29787				

Calculated value after test:- 0.047
This suggests that there is an essentialness impact of engineering specialization in the ICT utilization for the improvement of research abilities.

Table 3 (Institution Category)

Group Statistics						**Independent Samples Test**				
	Institution	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**		**F**	**Sig.**	**T**	**Sig. (2-tailed)**
Problem-solving skills	1	72	24.2500	3.20980	.37828	Equal variances assumed	6.208	.014	-.582	.562
	2	80	24.6000	4.09878	.45826	Equal variances not assumed			-.589	.557

Digital skills	1	72	13.7917	2.05514	.24220	Equal variances assumed	.975	.325	.081	.935
	2	80	13.7625	2.33435	.26099	Equal variances not assumed			.082	.935
Research skills	1	72	21.9306	3.93370	.46359	Equal variances assumed	2.708	.102	-1.208	.229
	2	80	22.6500	3.40922	.38116	Equal variances not assumed			-1.199	.233

H_{07}: There is no significant effect of ICT usage in the development of problem solving skills on institution categorization.

Calculated value after test:- 0.014
It shows there is essentialness impact of institution categorization for the development of problem solving aptitudes through ICT.

H_{08}: There is no significant effect of ICT usage in the development of digital skills on institution categorization.

Calculated value after test:- 0.325
It shows there is no criticalness impact of institution categorization for the development of digital aptitudes through ICT.

H_{09}: There is no significant effect of ICT usage in the development of research skills on institution categorization.

Calculated value after test:- 0.102
It shows there is no criticalness impact of institution categorization for the development research aptitudes through ICT.

Results and Discussions:

Effect of Gender (Reference from Table No1)

- It was discovered that gender does not influence the use of ICT-enabled assets in the development of problem-solving skills. The examination found that both male and female students/researchers utilize ICT empowered assets for the improvement of problem solving skills.
- Furthermore it was discovered that gender orientation doesn't influence the utilization of ICT empowered assets in the development of digital skills. Both genders agreed that institutes provide them with computerized information and workshops are planned to update and improve their specialized abilities. Both are of the very view that ICT empowered technological skills in their course educational program is given to them to improve their competence and furthermore technological help is given to them to build their computerized proficiencies.
- The examination additionally found that the development of research skills through ICT is inconsequential on gender orientation premise. Both the male and female students do broad utilization of ICT for the development of research skills.

Effect of specialization (Reference from Table No2)

- It was discovered that engineering specialization influences the utilization of ICT in the development of problem solving skills. Engineering course specialization students in CS, Electronics, and tele communication are increasingly utilizing ICT-enabled assets in the development of problem-solving abilities.
- Also it was discovered that students do influence the utilization of ICT

empowered assets in the development of digital skills. The examination found that students from CS, Electronics and civil specialization as contrast applied science, mechanical, and electrical students are increasingly utilizing ICT-enabled resources for the development of digital skills.

- A significant difference was found among the students of engineering course for the development of research skills. CS, Electronics and mechanical course respondents utilize ICT tools for research reason to upgrade their research skills as compare to the other specialization of engineering course, as ICT tools helps in the computation of statistical data also it enhances their quality of research and presentation of research.

Effect of Institution Category (Reference from Table No3)

- Institution categorization does affect the usage of ICT enabled resources in the development of problem solving skills. The studies found that both public and private institutes' make use of ICT enabled resources for the development of problem solving skills. Result shows that student from government institutes are more oriented to inculcate problem solving skills through ICT as compare to the private institutes.
- The research discovered that all the institutes employ ICT enabled sources for the development of digital skills. Institutes organize training program and workshop at their premises to enhance the digital skills of the students. ICT enabled technological skills content is covered inside the course curriculum at their institutes for the enhancement of digital talents.
- The development of research skills through ICT is insignificant on institution categorization basis. Both government and private organization of students do broad utilization of ICT for the advancement of research skills among them. Both kind of foundations believed that ICT upgrade the exploration abilities. ICT has made simpler the figuring and estimation of measurable information.

Conclusion

The research study shows that ICT is playing an important role in the skill enhancement of engineering graduates. Through the use of ICT students are able to develop the problem solving skills, Digital skills & Research skills. No difference was found on the basis of gender in the skill development through the use of ICT tools. Specialization does affect the use of ICT tools in their skill development. Government institution found to be more competent to develop the problem solving skills among the students & In terms of digital skills and research abilities, both institutions exhibit the same ramification. As a result, the study concludes that in order to meet expectations and meet demand, the knowledge economy requires educational institutions to produce graduates with necessary IT and other competitive skills.

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