

**PERCEPTION OF TEACHING FACULTY TOWARDS CHALLENGES IN
INTEGRATING ICT IN POLYTECHNIC EDUCATION – A STUDY IN
VISAKHAPATNAM**

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Abstract: Current situation of the polytechnic colleges shows us that access to Information & Communication Technology (ICT) is a major requirement for participation in a technological education. Adoption of ICTs as a means to provide access and continuity must begin by breaking up the digital education in the colleges that has not fully internalized adaptation dynamics yet. On the other hand there are various challenges involved in integration of ICT with reference to teachers as well as college administration. Since, the main objective of this research paper is to study the perception of teaching faculty towards challenges in integrating ICT in Polytechnic Education, the author has selected Visakhapatnam district in Andhra Pradesh as study area and teaching faculties in the selective polytechnic colleges as samples (368), who have shared their perceptions on the main objective of this paper. According to the perceptions of the teaching faculties in polytechnic colleges it is found that there is lack of sufficient ICT equipments, lack of trained teachers and lack of time with both students as well as students to learn and use ICT tools in teaching and learning practice. While ICT as technological tools have increased the degree of significance and educational conception, it is establishing new models of communication. The teaching-learning process in the classroom by using ICT tools requires a set of skills and knowledge to be developed by the teacher with a view to implement a methodology to make the most of technological tools, in which teacher training shall be deemed among the first options prior to facing new educational challenges. In this context of ideas derived from the above, the transition from traditional education to a knowledge acquisition-based technical education with information and communication has been no easy task. Thus, the functional role of teachers within this approach not only requires a change in their methodological practices, but a change of education system involving beliefs in the different environments where learning can be achieved.

Keywords: Integrating ICT, teaching faculty, challenges, polytechnic education.

Introduction

Information and communication technology (ICT) is developing at a very fast rate. The fast development of the ICT sector promotes growth through different levels of development, both in developing and developed countries (Charles, et al., 2023). The modern ICT has made the world a global village has been influenced by this digital phenomena. Education is one of them, where the role of ICT is undisputed globally. Thus, ICT has potentially powerful tool for extending educational opportunities. Moreover, ICT has the potential for increasing access to and improving the relevance and quality of education, this can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills and by enhancing teacher training (Rakesh Kumar, 2016). In 21st century teaching learning skill underscore the need to shift from traditional teacher centered pedagogy to more learner-centered method, so that's why we need ICT facilities in our modern education system. But some barriers may discourage teachers & student to integrated ICT in education, like- availability in educational institution, maintenance, lack of knowledge, pace of change & funding (Khalid Abdullah, 2009). The process of using ICT is changing everyday in education that's very complicated, because people can't know, what is it, how can we handle it, when we use it. People must know what can be done with ICT. This paper examined some key challenges faced by the Technical Education Institutions in general and Polytechnic Colleges in particular, in integrating ICTs into teaching and learning and key challenges of ICT envisaged in 21st century education system and how the technical institutions overcome the problems that they face in use of ICT in 21st century of education.

Role of ICT in Education

ICTs can play the same role in our information and communication process and their outcomes as played by other technologies in making our lives quite comfortable and purposeful (Chatterjee, 2021). ICT has developed very rapidly and has had a real impact on improving the quality of education in schools and colleges, especially learning institutions. Utilization and development of ICT in learning activities in education institutions is known as ICT based learning. Through the facilities provided by the system, teachers and students can explore and elaborate learning and teaching activities effectively and efficiently (Kristiawan, 2014). Hence, ICT has the potential to transform the nature of education.

Challenges in integrating ICT in Polytechnic Education

Since, ICT based learning allows students to interact directly with information sources, process learning outcomes, and even create learning outcomes to make them more interesting and fun, in integrating ICT in polytechnic education has come challenges. Some of those are discussed in the following:

1. Availability- The ICT facilities are not fully available in the educational institutions. Most of the institutions are not in a position to afford the purchase, maintenance and other expenditure involve in its use (Prakash, 2022).

2. Lack of knowledge- In the 21st century most relevant or biggest challenge is lack of knowledge to handle ICT equipment. Teacher's lack of knowledge and skills is one of the main hindrances in the use of ICT in education (Tanuja Saha, 2023). They simply do not have the knowledge, expertise or organizational capacity needed.
3. Cultural challenge- Diversities of culture in different parts of the world are also challenges in introducing ICT in education (Hambira, et al., 2017). A large proportion of educational software produce in the world market is in English also. But in India where English is not the first language this represents a serious challenge in integrated ICTs use in education system.
4. Insufficient funds- Effective and efficient use of technology depends on availability of hardware, software and having access to resources by teacher and students and administrative staff. In developing countries, technology implementation into education system is a difficult task as it requires a magnum of funds. The teaching aids for ICT demands a lot of funds and setting up the infrastructure, maintenance and support of ICT facilities are some of the problems that the Educational Institution are facing (Simin Ghavifekr, et al., 2016).
5. Lack of time- Teacher has been found to be the major predictors of the use of new technologies in instructional setting. The teachers teach more than one subject and then they have to teach ICT which means they have a heavy load. These teacher's do not have time to design, develop and incorporate technology into teaching and learning. The teacher needs time to collaborate with other teacher's as well as learn how to use hardware and software (Sicilia, 2005).
6. Lack of trained teacher- A major challenge in the use ICT in 21st century is the lack of knowledge and skills. The teachers do not want to have transition to new methodologies and way of teaching-learning. They will want to stick over the broadcast model of teaching instead of interactive model designed through the use of ICT (Rafiq, 2020).
7. Lack of equipment- The developing of ICT infrastructure in a country is depending on availability of resources. Resources like- computer, printer, projectors, scanner etc. which are not available in the every institution (Aishah Alkahtani, 2017).

Literature Review

Kundu and Kedar Nath (2018) stated in their study that in a developing country like India, lack of technology, internet access, and qualified trainers act as the biggest challenge in providing ICT-based educational services to the masses, especially to the rural masses. With reference to importance of ICT in education and teaching-learning process, Chatterjee (2021) noted that when ICT well-utilized in schools, it has the potential to improve the teaching learning process in many ways because ICT is learner centric and brings about active involvement of students in the learning process. On the other hand Xavier Muianga, et al., (2018) said that students get motivated when learning activities are challenging, authentic, multi-sensorial and multi-disciplinary. Therefore, education institutions tend to witness a higher attendance, motivation levels, academic

accomplishments and effective communication as an outcome of ICT programs and projects (Avinash and Shailja, 2013). Since, teachers too gain as a good result of ICT initiatives in schools and colleges they find ICT to be useful for teaching as well as for personal and professional work because ICT makes teaching more innovative, interesting, interactive, easy and effective (Andoh, 2012). In this process teacher education found that the transformation to technology embedded classroom requires the transformation of teacher in order to create awareness of ICT among the teacher educators Kaur (2015). While imparting knowledge with the aid of ICT, educators find that students are more receptive and responsive. Also, ICT can help to impart more information and knowledge to students in a shorter time, enabling maximum utilization of resources and time. Although ICT has the potential to improve education system of a country to a great extent, yet it is not the case in the developing countries. Astha Gautam and Sanjay Kumar (2019) said that moreover the technology has number of advantages, it does have number of issues and challenges too. There are multiple issues and challenges confronting the implementation of ICT education in schools and educational institutions in these countries and the problems are much more magnified in case of schools located in remote villages and rural areas (Tanuja Saha, 2023). Thus, the introduction of ICT in educational institutions faces hindrances in the form of internal and external barriers.

Need and significance

ICT is generally welcomed in educational institutions as a core 21st-century skill. Consequently, computers are widely used and computer skills are often considered to be necessary tickets into the world of institutional jobs (Granger, et al., 2002). Teachers across many regions in the country have been found to be more likely to adopt ICT for preparing class hand-outs, preparing lessons, keeping records and sending emails than they are to put computers into the hands of students for them to do independent research and class presentations. The integration of ICT in teacher education curriculum was achieved through the NCTE (National Council for Teacher Education). This was a programme that targeted teacher training and polytechnic colleges. This programme involved universities and other educational institutions in one way or another. It must be noted that the adoption of ICT at teachers' colleges in a way paved the way for universities to implement the use of ICT because some students came to university when they had had some basic knowledge of the use of ICT while in high school or at other colleges. Government also supported the integration ICT through providing funding and seeking donations for computer hardware and other related gadgets that are used. The integration of ICT into teaching at education institutions like at any other government or private colleges is therefore, a development that was supported by both government and the private management. Thus, it is found need and significant at present scenario to study on challenges in implementation of information technology in education

Methodology

The study employed a case study approach to study the challenges in implementation of ICT in education institutions in general and polytechnic colleges in particular. Therefore, the polytechnic colleges in Visakhapatnam district in Andhra Pradesh state have taken the sample study units and the teaching faculty in those institutions considered as respondents in this study. Thus, the data was collected from the respondents with the help of questionnaires, where the challenges in implementation of ICT in the polytechnic colleges were observed with the help of opinions, perceptions and attitudes of the respondents. Hence, the research tool for this study contains demographic details of the respondents along with various challenges of integrating ICT in polytechnic education. These challenges like availability of ICT equipment, knowledge and skills among faculty on technology, sufficient funds to install, availability of time and trained teachers which are important. An empirical inquiry has been done in this study to investigate a contemporary phenomenon in depth and with-in its real-life context of ICT implementation in education, especially in the polytechnic colleges. Moreover, in Visakhapatnam district there are 15 Polytechnic Colleges out of which 11 are in the private sector and 4 colleges are in public sector, the existing universe of 417 faculty members working in all the 15 polytechnic colleges, among which 368 teaching faculties have responded and filled the questionnaires. The study purposively selected the teaching faculties of various technical courses utilizing ICT in their teaching and learning practices. This analysis of the data helped to make a closer look in the challenges of integrating ICT in educational institutions in general and polytechnic colleges in particular for better utilization of ICT tools among the students as well as faculty. In this purpose the data was processed by SPSS software, and the output results were presented by percentages, scores and ranks. Hence, the data was presented in the following tables and analysed the results with discussion.

Data analysis

In the process of data analysis the perceptions of the respondents towards various challenges of ICT implementation in polytechnic colleges were framed in the tables with the frequencies, percentages, scores and ranks. In addition to the perceptions of the respondents about challenges of ICT implementation their demographic data also collected and presented by distribution with frequencies and percentages. In the demographic profile of the respondents gender, age, education qualification, experience and monthly income levels are considered. Hence, the demographic distribution of the respondents and their perceptions towards challenges in implementation of information and communication technology in polytechnic colleges are presented in the following tables and the results are analysed and discussed.

Table-1: Distribution of respondents by their demographic profile

Category	Particulars	Frequency	Percentage
Gender	Male	211	57.3
	Female	157	42.7

Age	Less than 30 years	81	22.0
	30-40 years	114	31.0
	40-50 years	82	22.3
	50-60 years	69	18.7
	More than 60 years	22	6.0
Educational qualification	Graduation	118	32.1
	Post graduation	180	48.9
	Ph. D.	70	19.0
Experience	Less than 5 years	95	25.8
	5-10 years	89	24.2
	10-20 years	66	17.9
	20-30 years	68	18.5
	More than 30 years	50	13.6
Monthly Income	Less than 75,000	249	67.7
	75,000-1.0 lakh	49	13.3
	1 lakh-1.5 lakh	48	13.0
	More than 1.5 lakhs	22	6.0
	Total	368	100.0

According to the distribution of respondents by their demographic profile showed in the Table-1, it is found that 57.3 percent are males and remaining 42.7 percent are females. Whereas, age-wise distribution of respondents indicate as many as 31.0 percent are in the age group of 30-40 years and a minimums 6.0 percent are in above 60 years age-group. The education qualification-wise distribution of respondents indicates 48.9 percent qualified post graduation, 32.1 percent qualified graduates and the rest of 19.0 percent are with Ph. D. qualification. The experience of the respondents reveals that while 25.8 percent are having less than 5 years of experience, 13.6 percent are having more than 30 years experience. And the monthly income levels of the

respondents shows as many as 67.7 percent are earning less than Rs.75,000/- and a minimum of 6.0 percent are earning above 1.5 lakhs rupees.

Table-2: Perceptions of teaching faculty towards challenges in integrating ICT in polytechnic education

S. No	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	Lack of sufficient ICT equipment at institutions	8 (2.2)	27 (7.3)	51 (13.9)	137 (37.2)	145 (39.4)	368 (100.0)
2	Lack of knowledge among faculty to integrate ICT in teaching practices	38 (10.3)	44 (12.0)	60 (16.3)	90 (24.5)	136 (37.0)	368 (100.0)
3	Lack of interest among teachers to integrate ICT in teaching practices	25 (6.8)	64 (17.4)	70 (19.0)	88 (23.9)	121 (32.9)	368 (100.0)
4	Lack of awareness among faculty about advanced teaching practices	52 (14.1)	64 (17.4)	72 (19.6)	86 (23.4)	94 (25.5)	368 (100.0)
5	Lack of sufficient time to faculty for integrating ICT in teaching practices	7 (1.9)	34 (9.2)	44 (12.0)	82 (22.3)	201 (54.6)	368 (100.0)
6	Faculty reluctance to accept changes in teaching methods with technology	38 (10.3)	39 (10.6)	61 (16.6)	77 (20.9)	153 (41.6)	368 (100.0)
7	Institutions need huge funds to acquire the ICT equipment	38 (10.3)	52 (14.1)	61 (16.6)	98 (26.6)	119 (32.3)	368 (100.0)
8	Technical issues like hardware and software problems discourage technology	55 (14.9)	62 (16.8)	70 (19.0)	74 (20.1)	107 (29.1)	368 (100.0)
9	Teachers need proper training to utilize ICT in teaching activities	59 (16.0)	66 (17.9)	72 (19.6)	80 (21.7)	91 (24.7)	368 (100.0)

10	Lack of proper maintenance of ICT materials discourage teachers	49 (13.3)	54 (14.7)	72 (19.6)	80 (21.7)	113 (30.7)	368 (100.0)
11	Unavailability of ICT tools for all students at their home	37 (10.1)	43 (11.7)	57 (15.5)	94 (25.5)	137 (37.2)	368 (100.0)

The Table-2 presents the perceptions of teaching staff about availability of ICT tools as a challenge in implementation. It is noticed that out of total respondents 39.4 percent are strongly agreed followed by 37.2 percent are agreed and 2.2 percent are strongly disagreed towards lack of sufficient ICT equipment at institutions. It is found that as many as 37.0 percent are strongly agreed, 24.5 percent are agreed and 10.3 percent are strongly disagreed towards lack of knowledge among faculty to integrate ICT in teaching practices. Whereas 32.9 percent are strongly agreed, 23.9 percent are agreed and 6.8 percent are strongly disagreed that there is lack of interest among teachers to integrate ICT in teaching practices. The data shows that majority of 25.5 percent are strongly agreed followed by 23.4 percent are agreed and 14.1 percent are strongly disagreed towards lack of awareness among faculty about advanced teaching practices. It shows that dominated group of 54.6 percent are strongly agreed, 22.3 percent are agreed and 1.9 and percent are strongly disagreed towards lack of sufficient time to faculty for integrating ICT in teaching practices.

It is noticed that 41.6 percent are strongly agreed, 20.9 percent are agreed and 10.3 percent are strongly disagreed that the faculty reluctance to accept changes in teaching methods with technology. It is found that as many as 32.3 percent are strongly agreed, 26.6 percent are agreed and 10.3 percent are strongly disagreed that institutions need huge funds to acquire the ICT equipment. Whereas 29.1 percent are strongly agreed, 20.1 percent are agreed and 14.9 percent are strongly disagreed towards technical issues like hardware and software problems discourage technology. The data reveals that dominated group of 24.7 percent are strongly agreed, followed by 21.7 percent are agreed and 16.0 percent are strongly disagreed that teachers need proper training to utilize ICT in teaching activities. It is observed that 30.7 percent are strongly agreed, 21.7 percent are agreed and 13.3 percent are strongly disagreed towards lack of proper maintenance of ICT materials discourage teachers. From the data majority group of 37.2 percent are strongly agreed, followed by 25.5 percent are agreed and least number of 10.1 percent are strongly disagreed towards unavailability of ICT tools for all students at their home.

Table-3: Perspective score analysis of teaching faculty towards challenges in integrating ICT in polytechnic education

S. No	Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
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	Scale value (SV)	1	2	3	4	5	
1	Lack of sufficient ICT equipment at institutions	8	27	51	137	145	368
	Frequency x scale value	8	54	153	548	725	1488-II
2	Lack of knowledge among faculty to integrate ICT in teaching practices	38	44	60	90	136	368
	Frequency x scale value	38	88	180	360	680	1346-V
3	Lack of interest among teachers to integrate ICT in teaching practices	25	64	70	88	121	368
	Frequency x scale value	25	128	210	352	605	1320-VI
4	Lack of awareness among faculty about advanced teaching practices	52	64	72	86	94	368
	Frequency x scale value	52	128	216	344	470	1210-X
5	Lack of sufficient time to faculty for integrating ICT in teaching practices	7	34	44	82	201	368
	Frequency x scale value	7	68	132	328	1005	1540-I
6	Faculty reluctance to accept changes in teaching methods with technology	38	39	61	77	153	368
	Frequency x scale value	38	78	183	308	765	1372-III
7	Institutions need huge funds to acquire the ICT equipment	38	52	61	98	119	368
	Frequency x scale value	38	104	183	392	595	1312-VII

8	Technical issues like hardware and software problems discourage technology	55	62	70	74	107	368
	Frequency x scale value	55	124	210	296	535	1220-IX
9	Teachers need proper training to utilize ICT in teaching activities	59	66	72	80	91	368
	Frequency x scale value	59	132	216	320	455	1182-XI
10	Lack of proper maintenance of ICT materials discourage teachers	49	54	72	80	113	368
	Frequency x scale value	49	108	216	320	565	1258-VIII
11	Unavailability of ICT tools for all students at their home	37	43	57	94	137	368
	Frequency x scale value	37	86	171	376	685	1355-IV
	Total score						14603
	Maximum possible Score	5 (Maximum score points) 368 (number of respondents) X 11 (number of statements)					20240
	Percentage of score	Total score for challenges in integrating ICT / Maximum Possible Score X 100					72.1
	Average	Total Score / Number of statements					1327.5

The perspective score analysis of teaching faculty towards challenges in integrating ICT in polytechnic education is shown in the Table-3. There are 11 statements and each one is carrying a score on the basis of perceptions of the respondents. Here it is found that the maximum possible score of challenges in integrating ICT in polytechnic education shows 20,240 and the perceived score is 14,603, which is 72.1 percent of total score. This indicates that the teaching faculty experience 72.1 percent level challenges in integrating ICT in polytechnic education. Hence, the perspective score of individual statements of various challenges have been given ranks and the rank order analysis has been discussed in the following.

It can be understood that the 1st rank is given to the statement “Lack of sufficient time to faculty for integrating ICT in teaching practices” with a score value of 1540, followed by 2nd rank is given to the statement “Lack of sufficient ICT equipment at institutions” which is secured a score value of 1488. In this order 3rd rank is given to the statement “Faculty reluctance to accept changes in teaching methods with technology” with a score value of 1372, the 4th rank is given to the statement “Unavailability of ICT tools for all students at their home” which is carrying a score value of 1355. It is found from the data 5th rank is given to the statement “Lack of knowledge among faculty to integrate ICT in teaching practices” with a score value of 1346, the 6th rank is given to the statement “Lack of interest among teachers to integrate ICT in teaching practices” with a score value of 1320, the 7th rank is given to the statement “Institutions need huge funds to acquire the ICT equipment” which is secured a score value of 1312, 8th rank is secured by a statement “Lack of proper maintenance of ICT materials discourage teachers” with a score value of 1258. It is noticed that the 9th rank is given to the statement “Technical issues like hardware and software problems discourage technology” with a score value of 1220, the 10th rank is given to the statement “Lack of awareness among faculty about advanced teaching practices” which is secured a score value of 1210 and 11th rank is secured by a statement “Teachers need proper training to utilize ICT in teaching activities” with a score value of 1182.

Discussion

The perceptions of teaching faculty towards challenges in integrating ICT in polytechnic education revealed that a predominant group of 76.9 percent felt lack of knowledge among faculty is the major challenge to integrate ICT in teaching practices, whereas 76.6 percent felt lack of sufficient ICT equipment at institutions also the challenge in this regard. While 62.7 percent opined unavailability of ICT tools for all students at their home is a challenge of integrating ICT in polytechnic education, 62.5 percent observed faculty reluctance to accept changes in teaching methods with technology is another challenge. Moreover, 61.5 percent felt lack of sufficient time to faculty is a challenge for integrating ICT in teaching practices, 58.9 percent opined institutions need huge funds to acquire the ICT equipment. It is found that 56.8 percent respondents opined that lack of interest among teachers is the one of the challenges to integrate ICT in teaching practices and 52.4 percent felt lack of proper maintenance of ICT materials also discourage teachers. Since, 48.9 percent opined lack of awareness among faculty about advanced teaching practices is the challenge in integrating ICT in polytechnic education, 49.2 percent felt technical issues like hardware and software problems discourage technology. Hence, finally it is observed that 46.4 percent faculty opined that teachers need proper training to utilize ICT in their teaching activities.

Conclusion

Current situation of the polytechnic colleges shows us that access to ICT is a major requirement for participation in a technological education. Adoption of ICTs as a means to provide

access and continuity must begin by breaking up the digital education in the colleges that has not fully internalized adaptation dynamics yet. According to the perceptions of the teaching faculties in polytechnic colleges it is found that there is lack of sufficient ICT equipments, lack of trained teachers and lack of time with both students as well as students to learn and use ICT tools in teaching and learning practice. While ICT as technological tools have increased the degree of significance and educational conception, establishing new models of communication, besides generating spaces for training, information, debate, reflection, among others, as well as breaking up the barriers of culture and traditionalism in the classroom. The teaching-learning process in the classroom by using ICT tools requires a set of skills and knowledge to be developed by the teacher with a view to implement a methodology to make the most of technological tools, in which teacher training shall be deemed among the first options prior to facing new educational challenges. In this context of ideas derived from the above, the transition from traditional education to a knowledge acquisition-based technical education with information and communication has been no easy task. Thus, the functional role of teachers within this approach not only requires a change in their methodological practices, but a change of education system involving beliefs in the different environments where learning can be achieved.

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