Teacher Educators' ICT Competencies in relation to their background Variables

Venumadhav.K,[1] Prof. Mahender Reddy Sarsani[2]
[1]*Research Scholar, University College of Education, Kakatiya University, Warangal, Telengana, India*
[2]*Former Dean, Faculty of Education, Kakatiya University, Warangal, Telengana, India*

Abstract **- This research paper focus is particularly on the ICT Competencies of the teacher educators, Kakatiya University region of Telangana state, India. For data collection, the researchers used well prepared questionnaire developed by the researchers. The simple random sampling technique was used for selection of sample of 210 teacher educators comprises both male and female from different teaching methodologies. The data is systematically classified and tabulated according to the established objectives of the study. The results revealed that, there is a significant mean difference on gender, teaching experience, academic qualifications, additional qualifications, locality, management and teaching methodologies. And also there is no significant mean difference among the different age groups of teacher educators on their ICT Competencies.**

Index Terms **- Teacher Education, Concept of ICT, ICT Competencies of the Teacher Educators.**

INTRODUCTION

ICT is combination of Information, Communication and Technology. Information is the summarization of data. Technically data are raw facts and figures that are processed into information. Communication is a process which disseminates information and knowledge. And technology is a mode (or) media through which information can be disseminated.

ICTs are defined as a "divide set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information" (Blurton, 2002).

Information and Communication Technologies are computer-based tools which covers computer hardware and software, the network, and other digital devices like video, audio, camera, and so on, which converts information (text, sound, motion, etc.) into digital form (Moursund & Bielefeldt, 1999).

As per the UNESCO's review of writers that 'for education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers have basic ICT skills and competencies' (UNESCO, 2002).

TEACHER EDUCATORS -ICT COMPETENCIES

The Common Wealth Report (1974) explains teacher competency, "In order to be competent the teacher must have a knowledge of child development, of the material to be taught and suitable methods; his skills must enable him to teach, advice and guide his pupils, community and culture with which he is involved; his attitudes should be positive without being aggressive. So that his example is likely to be followed as the transmits explicitly, and implicitly the national aims and moral and social values.

A competency is an ability to act adequately in a concrete situation, based on knowledge, skills and attitude. Competency includes knowledge, skill, attitudes and experiences which has to be target category of profession of educator.

The ICT competencies are set of terminology standards that define expertise in using computer technology in the classroom. Competencies are defined as "the set of knowledge, skills, and experience necessary for future, which manifests in activities" (Katane et al., 2006).

Authors such as Potter and Darbyshire (2005) and UNESCO (2004) are of the view that ICT competencies are concerned with the ability to:

1. Know when to apply or develop a practical skill in using an ICT resource.
2. Be aware of the reasons for using ICT and its effect on both users and context, and
3. Have a critical and confident attitude to learning with the technology.

Teachers require a certain amount of teaching competencies such as the capacity to plan instructional sessions, to prepare appropriate instructional material, to conduct group and individual instruction, and to assess student progress (IGNOU, 2009).

According to Mishra and Koehler (2006) technological, pedagogical and content knowledge are essential for teachers for successful integration of ICT in education. For successful instructional use of ICT, four types of competencies are required. These four competencies are–(1). Technological Competencies (TC), (2). Pedagogical Competencies (PC), (3). Didactical Competencies (DC) and (4). Social Competencies (SC).

Freedman (1999) presents technological key ICT skills in four main areas of knowledge namely: hardware, software, curriculum and general knowledge. They include the ability to recognize when and how to apply ICT to the solution of problems.

The competencies consist of ICT related skills grouped into three general domains.

1. Basic technology operation.
2. Personal and professional use of technology tools.
3. Application of technology in instruction.

Van Eck et al. (2002) also mentioned the following ICT competencies as reviewed by Zwaneveld and Bastiaens (2010):

1. The use of hardware.
2. The use of software.
3. The use of ICT in the learning process and the coaching of the students.
4. The use of ICT in the vicinity of the teaching.
5. The use of ICT in further professionalization.

Above discussions, many researchers mentioned that / research studies explain that few of the Technological ICT competencies are regarding to teacher educators:

1. Hardware repairs.
2. Clear understating about hardware and software.
3. Using available computer hardware.
4. Writing general computer programs.
5. Use of different operating system.
6. Use of different instructional packages.
7. Use of e-mail.
8. Accessing the internet.

Review of literature related to teacher educators' ICT Competencies

According to Chabra & Dhananjay (2011) the curriculum frame work is compared of four classes of competencies encircled by four supportive themes they are a) Context and Culture; b) Leadership and vision; c) Lifelong learning and d) Planning & Management change. These themes may be understood as a strategic combination of opportunities that help teacher educators developed four core competencies they are: 1) Pedagogy; 2) Collaboration and Networking; 3) Social issues and 4) Technical issues.

Jyothi bhalla (2014) conducted a study on Computer Competence of School Teachers. The investigator developed the questionnaire to measure teacher current competency level regarding computer technology and integration of pedagogy and technology.

The results of the study are:

a). About two-third of the teachers lacked competencies related to graphics, publisher, software installation, troubleshooting strategies, and responsible use of software / hardware by restraining from unauthorized instruction, manipulation other's data and hacking.

b). More than half of the teachers lagged behind in the pedagogical competencies associated with selection of computer tools and pedagogy that integrate computers in curriculum that are appropriate to each individual student are learning objectives, that allow their students to manage their learning, and also that allow them to manage their own learning for updating subject knowledge / skills.

c). In case of integration of technology and pedagogy, about two third of the teachers reported lack of competence in using computers for evaluation or assessment of students' performance, designing personalized learning experiences, evaluating or adopting instructional software to their curricular needs, and writing courseware for their lesson.

ICT @ Schools Scheme in Karnataka (2015) studied the status of the ICT implementation in the state of Karnataka, assess the status of computers, software and peripherals in the schools, assess the impediments in the running of the ICT programme and assess the competence of head teachers / ICT teachers / subject teachers / students in ICT use.

Rajeswari and Amutha Sree (2017**)** investigated on "Teaching Competence of Teacher Educators' and Attitude towards ICT". The investigator used Normative Survey method in this study and Random

Sampling technique used for collection of data. The present study consists of 500 teacher educators. The study reveals that there is significant difference in the teaching competence among the teacher educators with regard to handling classes and attitude towards ICT among the teacher educators with regard to gender and handling classes. There is a significant relationship between teaching competence and attitude towards ICT of teacher educators.

Deepty Gupta & Gaurav Singh (2018) conducted a study on Competency of Teacher Educators and Student Teachers towards e-learning tools. A random sampling technique was employed in this study and the total sample size was 30 Teacher Education Institutions. The scale was divided into four dimensions having a total of 48 items. The investigator was developed a similar tool for the student teachers also. The four dimensions of the rating scale were basic computer competency, advanced computer competency, basic internet competency and advanced internet competency. The study revealed that advanced internet competency which is considered to be a requisite for the usage of e-learning tools is very low.

OBJECTIVES OF THE STUDY

The researcher has formulated the following objectives of the study.

1. To construct the tool to assess the teacher educators' ICT competencies working in teacher education institutions.
2. To find out ICT Competencies among the teacher educators' in relation to their gender, age, academic qualifications, additional qualifications, teaching methodologies, teaching experience, management of the college and location of the college.

HYPOTHESES OF THE STUDY

Keeping in view of the objectives of the study, the researcher has formulated Eight (8) null-hypotheses with regard to teacher educators' (1) Gender, (2) Age, (3) Teaching Experience, (4) Academic Qualifications, (5) Additional Qualifications, (6) Location of the College, (7) Management of the College and (8) Teaching Methodologies.

METHODOLOGY

Method: Normative Survey method is used in this study.

Tool: The researchers have constructed Information Communication Technology–Competencies Scale (ICT-CS) with a total of 61 items from Four (4) dimensions of concepts such as (i) Usage of Devices (17 items) (ii) Utility / Applications of Software (24 items) (iii). Usage of Internet / Social Media Networks (13 items) and (iv) Other Software (7 items) with basic (or) intermediate (or) advance type answers were developed. A Pilot Study was undertaken to verify the applicability of the items.

Sample: In the present study, the sample was selected in two stages, in stage-1, 25 teacher education institutions were selected for final study by using Simple Random Sampling Method from five (5) districts of Khammam, Warangal Urban, Warangal Rural, Mahabubabad and Janagon. In stage–2, all the teacher educators of the said colleges were selected for the final study. A total of 210 sample comprises of 25 Principals and 185 Teacher Educators were selected for the present study and the data was collected from all the 185 Teacher Educators and Principals of the said 25 colleges.

Data Collection Procedure: The researcher has personally visited the colleges with prior permission, to collect the required data from the teacher educators and Principals. All the teacher educators were given booklet of ICT Competencies Scale (ICT-CS).

Reliability and Validity: The reliability of ICT-CS was tested and employing various methods of reliability that all the coefficients are found to be 0.82 for test-retest method and 0.80 for Split-half (odd-even) method, which are statistically significant at 0.01 level. The intrinsic validity of the ICT-CS tool is 0.91. To establish the validity of the items of the tool is calculated with Chi-Square (χ^2)–test of significance. All items are highly significant at 0.001 levels.

RESULTS OF THE STUDY

The data is systematically classified and tabulated according to the established objectives of the study. The interpretations of the results are presented in the Tables 1 to 6.

1. ICT Competencies of Teacher Educators vs Gender and Age

The gender-wise and age influence of teacher educators on ICT competencies mean score is presented in the table-1.

Table-1: Shows the mean differences on ICT competencies mean score of teacher educators in relation to their gender and age.

Sl.No	Variable	Category	No. of Teacher Educators	Mean	S.D	t-value & F-value
1	Gender	Male	157	84.84	4.10	2.40*
		Female	53	86.87	5.66	
2	Age	27 to 35 years	81	85.56	4.36	1.20#
		36 to 44 years	110	85.47	4.79	
		45 to 53 years	19	83.79	4.59	

* Significant at 0.05 Level, # Not significant

The table-1 reveals that the ICT competencies mean scores of male teacher educators is 84.84 and female teacher educators is 86.87 on ICT competencies, whereas the SD values for male and female teacher educators are 4.10 and 5.66 respectively. The t-value found to be 2.40, which is a significant at 0.05 level.

Therefore, the formulated null hypothesis "There will be no significant mean difference in the ICT competencies of teacher educators with regard to their gender" has been rejected.

It can be concluded there is a significant mean difference between male and female teacher educators in their ICT competencies. Female teacher educators' ICT Competencies are better than male teacher educators' ICT Competencies.

The same table-1 explains that the ICT competencies mean scores of the teacher educators having 27 to 35 years age is 85.56, teacher educators having age between 36 to 44 years is 85.47 and teacher educators having age between 45 to 53 years is 83.79; whereas the Standard Deviation (SD) values are 4.36, 4.79 and 4.59 respectively. The F-value indicates 1.20 which is not significant even at 0.05 level. Hence, there is no significant mean difference in their ICT competencies of teacher educators.

Therefore, the formulated null hypothesis "There will be no significant mean difference in the ICT competencies of teacher educators with regard to their age" has been accepted.

It can be concluded that there is no significant mean difference among the different age groups of teacher educators on their ICT competencies.

2. ICT Competencies of Teacher Educators vs Teaching Experience

The teaching experience-wise influences on their ICT competencies mean score is presented in the table-2.

The table-2 represents that the ICT competencies mean scores of below 5 years experienced teacher educators is 85.31, between 5 to 10 years experienced teacher educators is 84.55, between 10 to 15 years experienced teacher educator is 86.64 and between 15 to 20 years experienced teacher educators is 86.65, whereas the Standard Deviation (SD) values are 5.33, 4.03, 5.13 and 3.51 respectively. The F-value indicates 2.73, which is a significant at 0.05 level. Hence, there is a significant mean difference of teacher educators in their ICT competencies.

Therefore, the formulated null hypothesis "There will be no significant mean difference in the ICT competencies of teacher educators with regard to their teaching experience" has been rejected.

Table-2: Shows the mean differences on ICT competencies mean score of teacher educators in relation to their teaching experience

Sl.No	Teaching experience	No. of Teacher Educators	Mean	S.D	F- value	Mean Differences				
							0 - 5 y	5 -10 y	10 – 15 y	15 – 20 y
1	Below 5 years	45	85.31	5.33	2.73*	0 to 5 years	-	#	#	#
2	5 to 10 years	101	84.55	4.03		5 to10 years	#	-	*	*
3	10 to 15 years	47	86.64	5.13		10 to 15 years	#	*	-	-
4	15 to 20 years	17	86.65	3.51		15 to 20 years	#	*	#	-

*Significant at 0.05 Level, # Not Significant

Further analysis to find out the mean differences among the different teacher educators' teaching experience groups were presented in the last column of same table–2. The significant difference was found between 5 to 10 years and 10 to 15 years; and between 5 to 10 years and 15 to 20 years.

It can be concluded that 10 to 15 years and 15 to 20 years teaching experience groups ICT Competencies are higher than their counterparts' below 5 years and 5 to 10 years.

3. ICT Competencies of Teacher Educators vs Academic Qualifications

The Academic qualification-wise influence on their ICT competencies mean score is presented in the table-3.

The table-3 evident that the ICT competencies mean scores of Post graduation in arts (M.A) teacher educators is 83.95, Post-graduation in commerce (M.Com) teacher educators is 85.08 and mean scores of Post graduation in sciences (M.Sc.) teacher educators is 87.16, whereas the Standard Deviation (SD) values are 4.56, 4.42 and 4.11 respectively. The F-value indicates 13.07, which is highly significant at 0.01 level. Hence, there is a significant mean difference of teacher educators in related to their ICT competencies.

Therefore, the formulated null hypothesis "There will be no significant mean difference of teacher educators on ICT competencies with regard to their academic qualifications" has been rejected.

Further analysis to find out the mean differences among the academic qualifications of the teacher educators were presented in the last column of same table-3. The significant difference was found between Post-graduation of Sciences (M.Sc.) and Post-graduation of Arts (M.A).

Table-3: Shows the mean differences on ICT competencies mean score of teacher educators in relation to their academic qualifications

Sl.No	Academic Qualifications	No. of Teacher Educators	Mean	S.D	F- value	Mean Differences			
						PG in Arts (M.A)	PG in Commerce (M.Com)	PG in Sciences (M.Sc.)	
1	Post graduation in Arts (M.A)	110	83.95	4.56	13.07**	-	#	*	
2	Post graduation in Commerce (M.Com)	13	85.08	4.42		#	-	#	
3	Post graduation in Sciences (M.Sc.)	87	87.16	4.11		*	#	-	

**Significant at 0.01 Level # Not significant

It can be concluded that Post-graduation of Sciences (M.Sc.) teacher educators ICT Competencies are higher than their counterparts of Post-graduation of Arts (M.A).

4. ICT Competencies of Teacher Educators vs Additional Qualifications

The Additional qualification-wise influence on teacher educators' ICT competencies mean score is presented in the table-4.

Table-4: Shows the mean differences on ICT competencies mean score of teacher educators in relation to their additional qualifications

Sl.No	Qualifications	No. of Teacher Educators	Mean	S.D	t-value
1	Additional Qualifications (PGDCA / DCA /Computer Degree)	98	86.06	5.04	2.09*
2	No additional Qualification	112	84.73	4.13	

*Significant at 0.05 level

The table-4 reveals that the ICT competencies mean scores of Additional qualifications (PGDCA / DCA / Computer Degree) of the teacher educators is 86.06, mean scores of No additional qualifications of the teacher educators is 84.73, whereas the Standard Deviation (SD) values are 5.04, 4.13 respectively. The t-value indicates 2.09, which is significant at 0.05 level. Hence, there is a significant mean difference between Additional qualification teacher educators and No additional qualification teacher educators with related to their ICT competencies.

Therefore, the formulated null hypothesis "There will be no significant mean difference of teacher educators on their ICT competencies with regard to their Additional qualifications" has been rejected.

It can be concluded that additional qualification of the teacher educators ICT competencies are higher than no additional qualification of the teacher educators ICT competencies.

5. ICT Competencies of Teacher Educators vs Location and Management

The Location-wise and Management influence on teacher educators' ICT competencies mean score is presented in the table-5.

Table-5: Shows the mean differences on ICT competencies mean score of teacher educators in relation to their Location and Management

Sl.No	Variable	Category	No. of Teacher Educators	Mean	S.D	t-value & F-value

1	Location	Rural	93	83.51	3.74	5.66**
		Urban	117	86.82	4.73	
2	Management	Private	186	87.75	3.61	3.33**
		Government	24	85.04	4.65	

** Significant at 0.01 Level, # Not significant.

The table-5 explains that the ICT competencies mean scores of the rural teacher educators is 83.51 and mean scores of urban teacher educators is 86.82, whereas the Standard Deviation (SD) values are 3.74 and 4.73 respectively. The t-value indicates 5.66, which is a significant at 0.01 level.

Therefore, the formulated null hypothesis "There will be no significant mean difference of teacher educators on ICT competencies with regard to their location" has been rejected.

Hence, there is a significant mean difference between Rural and Urban teacher educators in their ICT competencies.

It can be concluded that ICT competencies of Urban teacher educators higher than the ICT competencies of Rural teacher educators.

The same table-5 shows that the ICT competencies mean scores of the teacher educators working in private management is 87.75 and mean scores of teacher educators working in government management is 85.04, whereas the Standard Deviation (SD) values are 3.61 and 4.65 respectively. The t-value indicates 3.33, which is significant at 0.01 level.

Therefore, the formulated null hypothesis "There will be no significant mean difference of teacher educators on ICT competencies with regard to their management of the college" has been rejected.

Hence, there is a significant mean difference between teacher educators working in private and government management in relation to ICT competencies.

It can be concluded that working in Private management teacher educators ICT competencies are higher than working in Government management teacher educators in their ICT competencies.

6. ICT Competencies of Teacher Educators vs. Teaching Methodologies

The Teaching Methodologies-wise influence on their competencies mean score is presented in the table-6.

The table-6 represents that the ICT competencies mean scores of the Mathematics methodology teacher educators is 90.63, mean scores of Bio-Science is 85.58, mean scores of Social Studies is 84.13, mean scores of Telugu is 80.60 and mean scores of Physical Sciences is 85.91, mean scores of English is 85.06, whereas the Standard Deviation (SD) values are 3.09, 4.01, 4.32, 3.00, 2.92, and 3.70 respectively. The F-value indicates 23.82, which is a highly significant at 0.01 level. Hence, there is a significant mean difference of teacher educators towards ICT competencies.

Therefore, the formulated null hypothesis "There will be no significant mean difference of teacher educators on ICT competencies with regard to their teaching methodologies" has been rejected.

Table-6: Shows the mean differences on ICT competency mean scores of teacher educators in relation to their Teaching Methodologies

Sl.No	Teaching Methodologies	No. of Teacher Educators	Mean	S.D	F- value	Mean Differences						
							Maths	Bio -Sci	Soci.St	Telugu	Phy -Sci	English
1	Mathematics	35	90.63	3.09	23.82**	Mathematics	-	*	*	*	*	*
2	Bio-Science	33	85.58	4.01		Bio-Science	*	-	#	*	#	#
3	Social Studies	63	84.13	4.32		Social Studies	*	#	-	*	#	#
4	Telugu	25	80.60	3.00		Telugu	*	*	*	-	*	*
5	Physical Sciences	23	85.91	2.92		Physical Sciences	*	#	#	*	-	*
6	English	31	85.06	3.70		English	*	#	#	*	*	-

** Significant at 0.01 level.

Further analysis to find out the mean differences among the teaching methodologies of the teacher educators were presented in the last column of same table–6. The significant mean difference was found between Mathematics and Biological–Sciences, Social Studies, Telugu, Physical–Sciences and English; between Telugu and Biological–Sciences, Social Studies, Physical-Sciences and English; between Physical–Sciences and English.

It can be concluded that there is a significant mean difference among the teacher educators on ICT competencies with regard to their teaching methodologies. Mathematics and Physical-Sciences teacher educators' ICT competencies are more positive than their counterparts of Telugu, Biological Sciences, Social Studies and English.

FINDINGS AND CONCLUSIONS

1. There is a significant mean difference between male and female teacher educators in their ICT competencies. Female teacher educators' ICT competencies are better than male teacher educators' ICT competencies.
2. No significant mean difference among the different age groups of teacher educators on their ICT competencies.
3. There is a significant mean difference among the different teaching experience group teacher educators on their ICT competencies. The teaching experience of 10 to 15 years and 15 to 20 years groups' ICT competencies are higher than their counterparts below 5 years and 5 to 10 years experience groups.
4. There is a significant mean difference among the teacher educators on ICT competencies with regard to their academic qualifications. Post-graduation of Sciences (M.Sc.) teacher educators ICT Competencies are higher than their counterparts of Post-graduation of Arts (M.A) and Post-graduation of Commerce (M.Com.) teacher educators ICT Competencies.
5. There is a significant mean difference among different additional qualifications of teacher educators in their ICT Competencies. Additional qualifications of the teacher educators ICT competencies are higher than no Additional qualification of the teacher educators ICT Competencies.
6. There is a significant mean difference between rural and urban teacher educators in their ICT competencies. Urban teacher educators' ICT competencies are higher than the ICT Competencies of Rural teacher educators.
7. There is a significant mean difference among the teacher educators of different management colleges in their ICT competencies. Working in Private management college teacher educators ICT Competencies are higher than working in Government management college teacher educators in their ICT Competencies.
8. There is a significant mean difference among the teacher educators on ICT competencies with regard to their teaching methodologies. Mathematics and Physical Sciences teacher educators' ICT Competencies are higher than their counterparts of Social Studies, Telugu, Biological Sciences and English.

DISCUSSION

As one of the objectives of the study, to know the ICT competencies of the teacher educators in relation to their background variables. The results revealed that no significant difference was found in relation to age of the teacher educators but significant difference were found in ICT competencies of gender, teaching experience, academic qualifications, location of the college, management of the college, teaching methodologies and different additional qualifications of the teacher educators.

REFERENCE

[1] Bhalla, J. (2014). Computer Competence of School Teachers, *IOSR Journal of Humanities and Social Science*, January, 19 (1) version (3), Pp.69 -80.

[2] Bbielefeldt, T. (2001). Technology in Teacher Education, *Journal of Computing in Teacher Education*, 17 (4), Pp, 4-15.

[3] Blurton, C. (2002). New Directions of ICT-Use in Education. Available online http://www.unesco.org/education/educprog/1wf/d1/edict.pdf; accessed retrieved from http://en.wikibooks.org/wiki/ICT_in_Education/Notes#4.

[4] Deepty, G., & Gaurav, S. (2018). Competency of Teacher Educators and Student Teachers towards E-learning Tools, *Journal of Indian Education*, 44(2), 126- 139.

[5] Freedman, T. (1999). Managing of ICT. England: Hodder & Stoughton.

[6] Freeman, F.S. (1955). Theory and Practice of Psychological Testing. USA Sir ISSAC Pitman & Sons Ltd (1962). Theory and Practice of Psychological Testing London: IBH Publishing Co.

[7] Haris, J., Mishra, P., & Koehler, M. (2009). Teachers' Technological Pedagogical Content Knowledge and Learning Activity Types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, 41 (4), 393-416.

[8] IGNOU (2007). Media selection and Integration in BES-361: *Educational Technology. IGNOU: New Delhi*. Pp. 75-79.
[9] Katane, I.et.al. (2006). Teacher competence and further education as priorities for sustainable development of rural school in Latvia, *Journal of Teacher Education and Training*, 6, 41-59.
[10] Porter, F. and Derbyshire, C. (2005). Understanding and Teaching the ICT National Curriculum, London: Continuum.
[11] Rajeswari, S., & Amutha Sree (2017). Teaching Competence of Teacher Educators' and Attitude towards ICT, *International Journal of Research and Development*, 2(2), Pp, 27-30.
[12] Sonal, C., & Dhananjay, J. (2011). Infusing ICT into Teacher Education: Planning for 2020, *New Frontiers in Education*, October-December, 44 (4), 364-370.
[13] Third Party Evaluation of ICT @ Schools Scheme in Karnataka (2015), CIET, NCERT
[14] Zwaneveld, B. & Bastiaens, T. (2010). ICT competencies of the teacher: About supporting learning and teaching process with the use of ICT. Retrieved from ifbm. Fermunihagen. De /ICT /competencies/of/ the/teacher on 11.04.2020.