

# Information and Communication Technology (ICT) Infrastructure and Attitude of Pre-Service Teachers towards Information and Communication Technology (ICT)

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**Abstract**— The present study investigated the Information and Communication Technology (ICT) Infrastructure and Attitude of Pre-Service Teachers towards ICT amongst the Pre-Service Teachers enrolled in Diploma in Elementary Education (D.El.Ed.) in the District Institute of Education and Training (DIET), Changlang, Arunachal Pradesh. The descriptive research method was used. The sample included 56 Pre-Service Teachers. The result revealed that the institute has all the basic infrastructural capacity required to impart ICT-based education to the pre-service teachers. The resources included computers, laptops, overhead projectors, whiteboards, and a generator for electricity backup facility. The overall attitudes of the pre-service teachers toward ICT were generally positive. Further, the findings suggest that there is no significant mean difference in pre-service teachers' attitudes towards ICT based on Sex, Locale, and Year of Study.

**Keywords:** Attitude, Information and Communication Technology (ICT), Infrastructure, Pre-Service Teachers.

## 1. Introduction

The purpose of teacher education is to prepare candidates for the profession of teaching by exposing them to a variety of activities and events that are specifically designed to aid in their development of the abilities, dispositions, knowledge, habits, attitudes, values, and other characteristics necessary for this profession (Sekar & Lawrence, 2015). The present generation of learners lives in a technologically interactive global network and thus, needs educators who can incorporate the best approach that technology has to offer for education (Victor, 2013). In fact, with the use of computer simulations and visualisation tools, students can learn difficult ideas in more tangible ways (Gaurav et al., 2018). Therefore, it becomes crucial, both educationally and professionally to ascertain the attitudes of preservice teachers who are preparing to raise future generations in the digital age (Akturk et al., 2015). It was also highlighted in the document of National Education Policy (NEP) 2020 to incorporate the digitalization of education right from the school level. Additionally, ICT serves as a tool for accessing the massive amount of information that is continually changing in today's knowledge-driven era. Thus, teacher education institutions should be able to provide the fundamental facilities needed to offer and integrate cutting-edge technical services for pre-service teachers. The District Institute of Education and Training (D.I.E.T) Changlang which was inaugurated by Shri Tape Bagra (the then Deputy Commissioner of Changlang) on 18<sup>th</sup> April 1996 (Keyang, 2020) is the first teacher education institution in Arunachal Pradesh. The present study thus aims to study the ICT infrastructure of DIET Changlang and the attitude of pre-service teachers enrolled in two years D.El.Ed. program towards ICT.

## 2. Review of Related Literature

Prior research findings (Akturk et al., 2015; Dixit & Kaur, 2015; Mulay et al., 2017; Sindhwani, 2021; Yusuf & Balogun, 2011) revealed that the pre-service teachers' attitudes toward ICT were generally positive and no significant mean difference in the attitude of male and female pre-service teachers was found (Dixit & Kaur, 2015; Gaurav et al., 2018; Sambasivarao & Subbaiah, 2022; Sindhwani, 2021; Victor, 2013; Yusuf & Balogun, 2011). However, some research findings (Akturk et al., 2015; Sankar, 2015) found the contrary stating male pre-service teachers had a more positive attitude towards ICT than females. Again, no significant mean difference in the Attitude of Rural and Urban Pre-service Teachers towards ICT was reported (Gaurav et al., 2018; Sekar & Lawrence, 2015; Victor, 2013); however, Dixit & Kaur (2015) stated the contrary. Furthermore, no significant

mean difference in the Attitude of Second-semester and Fourth-semester Pre-service Teachers towards ICT was reported by Sambasivarao & Subbaiah (2022).

### 3. Objectives of the Study

1. To study the ICT Infrastructure of the District Institute of Education and Training (DIET), Changlang.
2. To study the Pre-Service Teachers' Attitude towards ICT based on Sex, Locale, and Year of Study.

### 4. Hypotheses

H<sub>0</sub>1: There is no significant mean difference in the Attitude of Male and Female Pre-service Teachers towards Information and Communication Technology (ICT).

H<sub>0</sub>2: There is no significant mean difference in the Attitude of Rural and Urban Pre-service Teachers towards Information and Communication Technology (ICT).

H<sub>0</sub>3: There is no significant mean difference in the Attitude of Second-semester and Fourth-semester Pre-service Teachers towards Information and Communication Technology (ICT).

### 5. Delimitation of the study

The study is delimited to the Pre-Service Teachers enrol in 2-year full-time D.El.Ed. programme in DIET, Changlang, Arunachal Pradesh only.

### 6. Methodology

#### 6.1. Research Design

The research method used was Descriptive Research.

#### 6.2. Population and Sample

The entire population of 88 Pre-Service Teachers undergoing Diploma in Elementary Education (D.El.Ed.) was invited for the study, however, only 62 voluntarily participated in the research, of which 19 were males & 43 were females. Further, after testing normality, a total of six outliers were found which were then excluded for the final data analysis. Hence, the sample size consisted of 56 (16 males and 40 females) for the final data analysis.

#### 6.3. Tools and Techniques used

The present study adopted the "Attitude of Student Teachers towards ICT Scale" developed by Anal & Reddy (2021). It consisted of 5-point Likert Scale with 47 items. The reliability was measured using both the Split-half method (0.888) and Cronbach Alpha ( $\alpha=0.934$ ). Content Validity was established through expert opinion.

### 7. Results and Interpretations

**Table 1.** Infrastructural Status of DIET, Changlang, Arunachal Pradesh

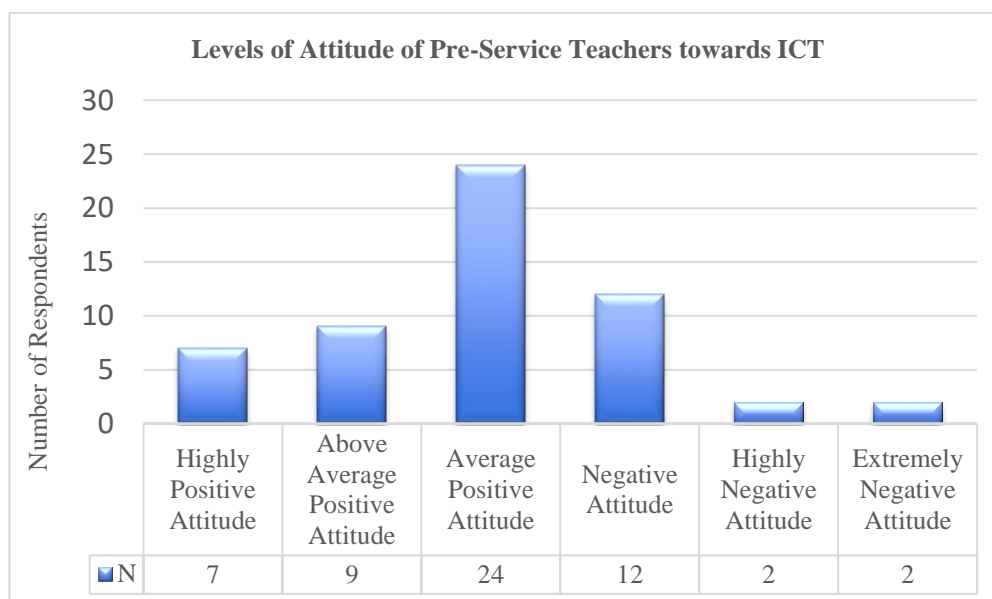
Total Classroom	02
Library	Available
Computer Room	Available
Availability of Computers for students	Total N=10 (8= Desktops and 2=Laptops)
Projector	Available
Wi-Fi service	Not Available
Electricity Back-up	Availability of Generator
Drinking Water	Available
Toilets	Separately for Male and Female students
Running water supply in Toilets	Available

Drama and Art room	Available
Playground	Available
Museum for display and collection of Teaching-Learning Aids	Available

The infrastructure included two classrooms each equipped with an overhead projector and whiteboard; a computer room consisting of eight desktops and two laptops; a library; a generator; a drama and art room; a museum for the display of teaching-learning aids; drinking water facilities; playground; and separate toilet facilities with running water supply for male and female pre-service teachers.

**Table 2.** Levels of Attitude of Pre-Service Teachers toward Information and Communication Technology (ICT)

Sl. No.	Range of Z-Scores	Level of Attitude	N	Percentage
1.	+1.26 to +2.00 $\sigma$	Highly Positive Attitude	07	12.50%
2.	+0.51 to +1.25 $\sigma$	Above Average Positive Attitude	09	16.07%
3.	+0.51 to -0.50 $\sigma$	Average Positive Attitude	24	42.86%
4.	-0.51 to -1.25 $\sigma$	Negative Attitude	12	21.42%
5.	-1.26 to -2.00 $\sigma$	Highly Negative Attitude	02	3.57%
6.	-2.01 to -3 $\sigma$	Extremely Negative Attitude	02	3.57%
<b>Total</b>			<b>56</b>	<b>100%</b>



**Fig. 1.** Levels of Attitude of Pre-Service Teachers towards ICT

Majority of the pre-service teachers ( $n = 24$ ) 42.86% had an average positive attitude; ( $n=7$ ) 12.50% had a highly positive attitude; ( $n=09$ ) 16.07% had above average positive attitude, ( $n=12$ ) 21.42% had a negative attitude, ( $n=02$ ) 3.57% had a highly negative attitude, while two of them (3.57%) had an extremely negative attitude towards ICT.

**H<sub>01</sub>:** There is no significant mean difference in the Attitude of Male and Female Pres-Service Teachers towards Information and Communication Technology (ICT).

**Table 3.** Mean difference in the Attitude of Male and Female Pres-service Teachers towards ICT

Sex	N	Mean	Std. Dev.	Degrees of Freedom ( $d_f$ )	't' value	p (2-tailed)	Level of Sig.	Remark
Male	16	166.25	12.080	54	0.890	0.377	.05	Not Sig.
Female	40	169.03	09.883					

### Interpretation of results

The independent samples t-test for the scores of Male and Female Pre-Service Teachers' Attitude towards ICT indicated that there is no significant mean difference between the two groups at  $d_f(54)$ , i.e.,  $p(0.377)$  is greater than ( $>$ ) the  $\alpha(.05)$ . Further, at .05 level of significance, the calculated t-value i.e.,  $Cal.(t)=0.890$  is less than ( $<$ ) the table (t) value (2.01). Thus, the null hypothesis is retained.

Hence, it can be stated that there is no significant mean difference in the scores of Male and Female Pre-Service Teachers' Attitude towards ICT.

**H<sub>02</sub>:** There is no significant mean difference in the Attitude of Rural and Urban Pres-service Teachers towards Information and Communication Technology (ICT).

**Table 4.** Mean difference in the Attitude of Rural and Urban Pres-service Teachers towards ICT.

Locale	N	Mean	Std. Dev.	Degrees of Freedom ( $d_f$ )	't' value	p (2-tailed)	Level of Sig.	Remark
Rural	48	169.13	10.126	54	1.577	0.121	.05	Not Sig.
Urban	08	162.88	11.946					

### Interpretation of results

The independent samples t-test for the scores of Rural and Urban Pre-Service Teachers' Attitude towards ICT indicated that there is no significant mean difference between the two groups at  $d_f(54)$ , i.e.,  $p(0.121)$  is greater than ( $>$ ) the  $\alpha(.05)$ . Further, at .05 level of significance, the calculated t-value i.e.,  $Cal.(t)=1.577$  is less than ( $<$ ) the table (t) value (2.01). Thus, the null hypothesis is retained.

Hence, it can be stated that there is no significant mean difference in the scores of Rural and Urban Pre-Service Teachers' Attitude towards ICT.

**H<sub>03</sub>:** There is no significant mean difference in the Attitude of Second-Semester and Fourth-Semester Pres-service Teachers towards Information and Communication Technology (ICT).

**Table 5.** Mean difference in the Attitude of Second-Semester and Fourth-Semester Pres-service Teachers towards ICT.

Semester	N	Mean	Std. Dev.	Degrees of Freedom ( $d_f$ )	't' value	p (2-tailed)	Level of Sig.	Remark
Second	27	169.04	10.090	54	0.549	0.585	.05	Not Sig.
Fourth	29	167.48	11.028					

### Interpretation of results

The independent samples t-test for the scores of Second and Fourth Semester Pre-Service Teachers' Attitude towards ICT indicated that at .05 level of significance, there is no significant mean difference between the two groups at  $d_f(54)$  i.e.,  $p(0.585)$  is greater than ( $>$ ) the  $\alpha(.05)$ . Further, at .05 level of significance, the calculated t-value i.e.,  $Cal.(t)=0.549$  which is less than ( $<$ ) the table (t) value=2.01. Thus, the null hypothesis is retained.

Hence, it can be stated that there is no significant mean difference in the Attitude of Second-semester and Fourth-semester Pres-service Teachers towards Information and Communication Technology (ICT).

## 8. Discussion

The pre-service teachers' attitudes toward computers were generally positive, as evidenced by the fact that the majority of the pre-service teachers (N=24) have shown Average Positive Attitude towards ICT which is aligned with previous research findings (Akturk et al., 2015; Dixit & Kaur, 2015; Mulay et al., 2017; Sindhwani, 2021; Yusuf & Balogun, 2011). Further, the findings suggest that there is no significant mean difference in the attitude of male and female pre-service teachers towards ICT which is similar to previous findings (Dixit & Kaur, 2015; Gaurav et al., 2018; Sambasivarao & Subbaiah, 2022; Sindhwani, 2021; Victor, 2013; Yusuf & Balogun, 2011). However, it is in contrast to some research findings (Akturk et al., 2015; Sankar, 2015). Again, there is no significant mean difference in the Attitude of Rural and Urban Pre-service Teachers towards ICT which is in alignment with earlier research findings (Gaurav et al., 2018; Sekar & Lawrence, 2015; Victor, 2013); but in contrast to that of (Dixit & Kaur, 2015). Additionally, no significant mean difference in the Attitude of Second-semester and Fourth-semester Pre-service Teachers towards ICT was found, which is similar to the findings of Sambasivarao & Subbaiah (2022).

## 9. Conclusion

The District Institute of Education and Training (DIET) Changlang being the first teacher education institution in Arunachal Pradesh has all the basic infrastructural capacity required to impart ICT-based education to the pre-service teachers. However, there is a need to have wi-fi services in the institute so that pre-service teachers can avail online-based innovative study materials to enhance their learning. The participants' attitudes toward ICT were generally positive as the majority of the pre-service teachers (N=24) have shown Average Positive Attitudes towards ICT. The overall positive attitude toward ICT may be attributed to the availability of computers and ICT facilities offered to pre-service teachers in the institution.

Thus, for teacher education institutions to become the powerhouse for the production of competent and skilful human resources, it is pertinent that such institute increases their capacity in terms of internet services, human resources, and extension services to help pre-service teachers become digitally versatile teachers.

## 10. Educational Implications

- 10.1. Keeping in mind the positive attitude of pre-service teachers towards ICT, the institute can engage the pupil-teacher to develop and incorporate ICT-based teaching-learning materials in their practice teaching.
- 10.2. The institute can install free Wi-Fi access for its learners so they can incorporate online resources with classroom learning.
- 10.3. Awareness of modern concepts like digital pedagogy can be introduced to pre-service teachers.
- 10.4. Conducting workshops on innovative approaches to technology in education can strengthen the attitude of pre-service teachers as well as upskill them for future teaching jobs.

## 11. Acknowledgement

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## References

1. Akturk, A. O., Izci, K., Caliskan, G., & Sahin, I. (2015). Analyzing Preservice Teachers' Attitudes towards Technology. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 9(12).
2. Dixit, M., & Kaur, M. (2015). Attitude of Teachers Trainees towards ICT Teaching Kaur. *International Journal of Pure and Applied Researches*, 1(1).

3. Gaurav, K., Suleman, T. S., Lakshmi, R., & Kumar, A. (2018). Introduction Student Teachers' Attitude towards use of ICT in Teaching & Learning. *International Journal of Research and Analytical Reviews*, 5(4). <http://ijrar.com/>
4. Keyang, A. (2020). 'Problems and Development of Teacher Education In Arunachal Pradesh'. *International Journal of Research and Analytical Reviews*, 7(2), 305–310. <http://ijrar.com/>
5. Mulay, S. D., Tawade, S., & Uplane, M. (2017). Student Teacher's Attitude towards using ICT in Teaching. *Scholarly Research Journal for Interdisciplinary Studies*, 4(30), 4741–4746. [www.srjis.com](http://www.srjis.com)
6. Sambasivarao, R., & Subbaiah, G. L. (2022). 'ICT Education for Prospective Teachers- Attitudes of Teacher Educators and prospective Teachers'. *International Journal of Creative Research Thoughts*, 10(2), 925–935. <https://doi.org/10.1729/Journal.31016>
7. Sankar, C. S. (2015). Prospective Teachers' Perception on ICT in Teacher Education. *International Journal of Computer Applications*, 975–8887.
8. Sekar, A., & Lawrence, A. (2015). Attitude of B.Ed. students towards Information and Communication Technology (ICT). *International Journal of Applied Research*, 1(8), 785–787. [www.allresearchjournal.com](http://www.allresearchjournal.com)
9. Sindhwani, A. (2021). ATTITUDE TOWARDS ICT USAGE IN EDUCATION: A STUDY OF PROSPECTIVE TEACHERS OF HARYANA. *International Journal of Creative Research Thoughts*, 9(5), 582–588. [www.ijcrt.org](http://www.ijcrt.org)
10. Victor, S. R. (2013). Teacher-Trainees Attitude towards ICT. *Journal of Education and Practice*, 4(19). [www.iiste.org](http://www.iiste.org)
11. Yusuf, M. O., & Balogun, M. R. (2011). Student-Teachers' Competence and Attitude towards Information and Communication Technology: A Case Study in a Nigerian University. *CONTEMPORARY EDUCATIONAL TECHNOLOGY*, 2(1), 18–36.