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Future-Ready Teachers: ICT Knowledge in Light of NEP 2020 at RIE

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Abstract
National Education Policy 2020 (NEP 2020) is India's third Educational Policy, after National Policy on Education (NPE) 1968 and 1986, introduced after a span of almost three decades. In contemporary times, Information and Communication Technology (ICT) has taken centre stage in the field of Education, especially after Covid-19. The Study was conducted to check the Knowledge of ICT, taking into consideration, some of the key initiatives mentioned in NEP 2020, namely Content Creation and Blended Learning. The objective of the Study was to study the influence of Gender, Availability of Laptop, Hours spent and their various interactions on the Knowledge of ICT of Students. The sample consisted of 55 Students, belonging to Bachelor of Education (B.Ed.) course, also called Student Teachers or Teacher-Trainees, of the Regional Institute of Education Ajmer (R.I.E., Ajmer), selected through the Random Sampling Technique. The survey Method was used by the researcher. The tool that the researcher used for data collection was a non-standardised self-made test, administered to the students online (via Google Form). The data were analysed with the help of 'Three Way ANOVA' statistical technique. Knowledge of ICT of Student-Teachers was found to be independent of Gender, Availability of Laptop, Hours Spent using digital devices and various interactions among them.

Keywords: National Education Policy 2020 (NEP 2020); B.Ed. Students; Information and Communication Technology (ICT); Regional Institute of Education (R.I.E.); Three Way ANOVA

Introduction

With the introduction of National Education Policy (NEP) 2020 after a span of almost three decades, and the global health emergency Covid-19, there has been again a shift in the prime focus of Education on to Information and Communication Technology (ICT), in contemporary times. ICT has been the talk of the town, especially when NEPs or NPEs are concerned, from way back in 1986. It was in the National Policy on Education (NPE) 1986 that a new dawn took place in the educational field when the Indian Government focused on introducing the 'computer' in the field of education. At that time, it was dealt with suspicion and confusion but now the times have changed, and ICT has become one of the forerunners of the educational system in India, especially after Covid-19. It is not an exaggeration that today we can't think of education without ICT. Thus, the new National Education Policy focuses on some of the dimensions of ICT, including Content Creation, Blended Learning, Virtual Labs, etc., mentioned on Page Number 59 of the NEP 2020 24.4(d). In this research study, the researcher took into consideration some of the dimensions like the Basics of ICT, Content Creation, and Blended Learning. The test was constructed keeping in mind these three dimensions and 10 Items for each dimension were assigned in the self-made test which was

used to assess the knowledge of ICT of B.Ed. students. The need to check the knowledge of ICT in relation to NEP2020 can be understood by the fact that today's educational organisations and hubs are slowly moving towards digitising education and making an evergreen option of online availability of content, to anyone and everyone, irrespective of their demographic differences. It was also important to understand whether this knowledge of ICT was influenced by gender, laptop availability, hours spent or various interactions among them.

NPE 1968 talked about Free and Compulsory Education, Equalisation of Educational Opportunity and many other important things, but ICT was not one of its agenda. NPE 1986, was the first NEP that talked about Educational Technology (ET). This was the start of a new era in the field of education. The three guiding principles of NEP 2020 are Access, Quality, and Equity, which can only be achieved if ICT is rightly incorporated into the education system. For the smooth integration of ICT in the field of education, one of the most important stakeholders of this field i.e. literate and aware student-teachers are needed, that should be up to date with the various initiatives taken by the government, online portals launched, key initiatives involving ICT in the latest NEP and many more; and thus, the researcher has taken sample from the B.Ed. Students only.

Review of related literature

Computer-aided instruction has been shown to be more effective than traditional learning methods in improving students' performance (Barrow et al., 2022), even during after-school programs (Muralidharan et al. 2019).

A digital repository helps to manage and capture the intellectual assets of the institutions (Heradio, Torre & Dormido, 2016). According to Blank (2012), until the Internet arrived, content creation and distribution was always an expensive, difficult process.

One of the top focuses of education policy over the past ten years has been to invest in ICT infrastructure for educational institutions. Despite the attention, there is still debate on the efficacy and efficiency of ICT (Witte & Rogge, 2014).

Using Computers at home has been shown to increase high school graduation rates (Fairlie et al. 2012). Several studies found no effect of ICTs on student performance. For example, Angrist and Lavy (2002) found no evidence that increasing computer usage in primary school changed students' test scores.

According to NCF 2005, "Information and Communication Technology (ICT) is an important tool for bridging social divides and should be used in such a way that it becomes an opportunity equaliser by providing information, communication and computing resources in remote areas."

According to NEP 2020, "There is a need to invest in the creation of open, interoperable, evolvable, public digital infrastructure in the education sector that can be used by multiple platforms and point solutions, to solve for India's scale, diversity, complexity and device penetration. This will ensure that the technology-based solutions do not become outdated with the rapid advances in technology."

Rationale for conducting this study

The Rationale for conducting this small research study was that very few to almost negligible studies have been conducted related to the Knowledge of ICT of B.Ed. Students and almost no studies have been conducted that are related to assessing the knowledge of ICT of B.Ed. Students, "keeping in mind the dimensions mentioned in NEP 2020."

Statement of the Research Problem

The Research Problem was worded as given below:

Future-Ready Teachers: ICT Knowledge in Light of NEP 2020 at RIE

Objectives of the Study

1. To study the influence of Gender on Knowledge of ICT of Students.
2. To study the influence of Laptop Availability on Knowledge of ICT of Students.
3. To study the influence of Hours spent on Knowledge of ICT of Students.
4. To study the influence of interaction between Gender and Laptop Availability on Knowledge of ICT of Students
5. To study the influence of interaction between Gender and Hours spent on Knowledge of ICT of Students
6. To study the influence of interaction between Laptop Availability and Hours spent on Knowledge of ICT of Students.
7. To study the influence of interaction among Gender, Laptop Availability and Hours spent on Knowledge of ICT of Students.
8. To study the percentage of correct and incorrect responses for every item of the test.

Hypotheses

1. There is no significant influence of Gender on Knowledge of ICT of Students.
2. There is no significant influence of Laptop Availability on Knowledge of ICT of Students.
3. There is no significant influence of Hours spent on Knowledge of ICT of Students.
4. There is no significant influence of interaction between Gender and Laptop Availability on Knowledge of ICT of Students
5. There is no significant influence of interaction between Gender and Hours spent on Knowledge of ICT of Students
6. There is no significant influence of interaction between Laptop Availability and Hours spent on Knowledge of ICT of Students.
7. There is no significant influence of interaction among Gender, Laptop Availability and Hours spent on Knowledge of ICT of Students.

Operational Definition of the Key Terms

Knowledge of ICT

Knowledge of ICT refers to the Total number of questions answered correctly by the student-teachers in the three domains i.e. Basics of ICT, Content creation and Blended Learning, taken together. The better the score, the better will be the Knowledge in that particular domain and overall.

Knowledge of Basics of ICT

Knowledge of Basics of ICT refers to the questions answered correctly by the student-teachers related to the 'Basics of ICT' domain.

Knowledge of Content Creation

Knowledge of Content Creation refers to the questions answered correctly by the student-teachers related to the 'Content Creation' domain.

Knowledge of Blended Learning

Knowledge of Blended Learning is assessed by the number of questions answered correctly by the student-teachers related to the domain of 'Blended Learning'.

Gender

It has two levels in this study and refers to 'Male' or 'Female'.

Laptop Availability

It has two levels in this study and refers to 'Yes' or 'No'. 'Yes' means that a student-teacher possesses a laptop and 'No' means that a student-teacher does not possess a laptop.

Hours spent

It has three levels in this study, i.e., Two hours, Four Hours & Six Hours; and refers to the number of hours spent by a B.Ed. Student/student-teacher/teacher-trainee, using a laptop, phone, or tablet, S/He possesses in a day.

Methodology

The 'Descriptive Survey Research' was used in the present study. The process of description employed in the given study involves population, sampling procedure, tool for collecting data, analysis of data, tabulation of data and finally the interpretation of the data that was gathered, analysed and then tabulated.

Population of the Study

The population of the study included all the students of the B.Ed. of the Regional Institute of Education (R.I.E.).

Sample of the Study

The sample was selected using the Simple Random Sampling Technique, a Probability Sampling Technique. There were 33 Female and 22 Male respondents from a total of 55 B.Ed. Students selected for the sample. In the given study, the researchers did not visit students personally due to COVID-19 restrictions; 55 Students pursuing B.Ed. course from R.I.E., Ajmer filled out the Google Form that was shared to them via Institutional E-mail ID that was provided to them by the institute.

Procedure & Tool used for Data Collection

To assess the Knowledge of ICT of Students of B.Ed. i.e. Student-teachers a.k.a. Teacher-trainees, a self-constructed, non-standardised Test was used by the researcher for data collection. The test included 30 items, in which 10 items belonged to each domain, i.e., Knowledge of Basics of ICT, Knowledge of Content Creation and Knowledge of Blended Learning. The test was administered online via a 'Google-Form' to the subjects with the help of an Institutional e-mail ID. The subjects were informed about the study and also its objective by the researcher. After getting responses from the participants the scoring was done and the data was tabulated in Microsoft Excel by the researcher. Then, the data were analysed with the help of the 'Three Way ANOVA' statistical technique through Statistical Package for Social Sciences (SPSS) software.

Delimitation

1. The study was delimited to B.Ed. course only.
2. The study was delimited to R.I.E., Ajmer only.

Validity

To ensure the validity of the test, the researcher used the 'Face Validity' method. The experts from the fields concerned evaluated the face validity.

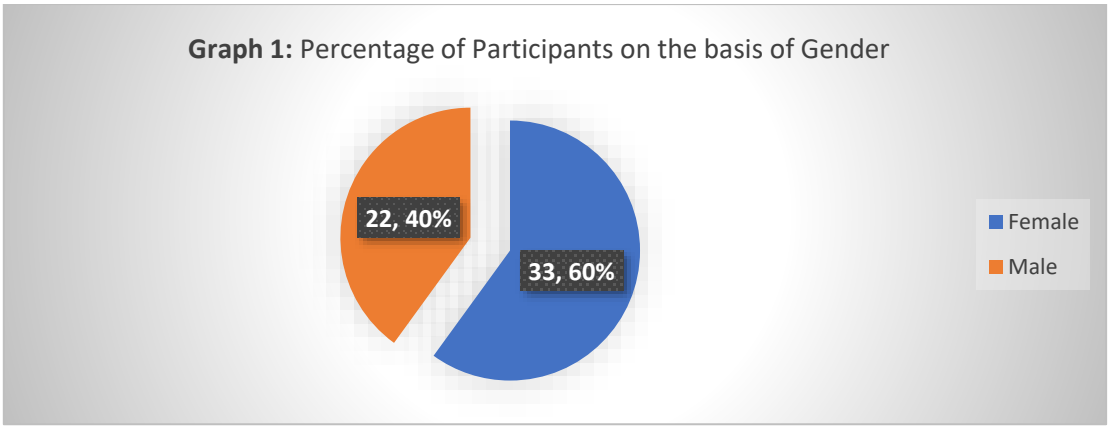
Reliability

The reliability of the test was calculated through Cronbach Alpha Method and was found to be 0.693. This level of reliability may be deemed sufficient for the scale that is being used for descriptive research. For more robust or confirmatory studies, a value closer to or above 0.7 is usually preferred.

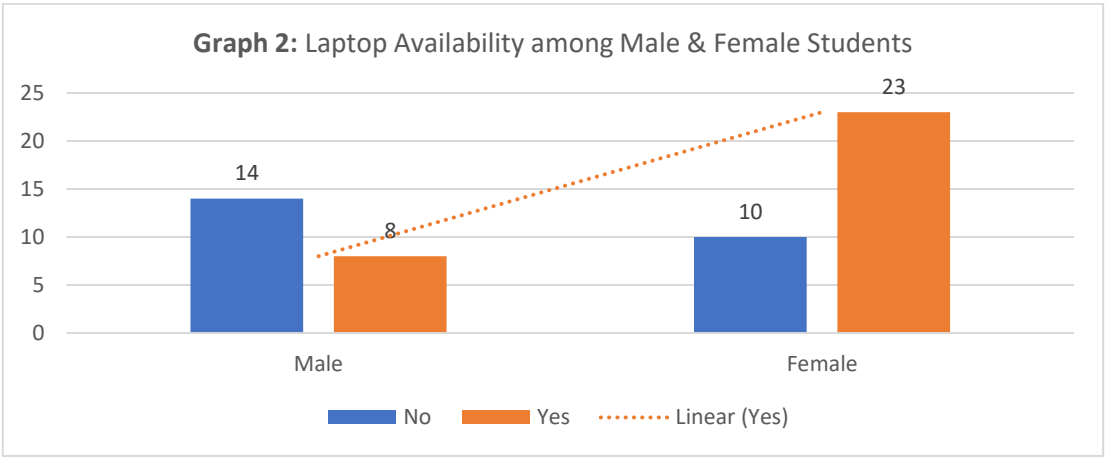
Statistical Techniques Used

To analyse the data, the researcher used Percentages, Descriptive Statistics and Three Way ANOVA. The data was tabulated in Microsoft (MS) Excel and then analysed with the help of SPSS Software.

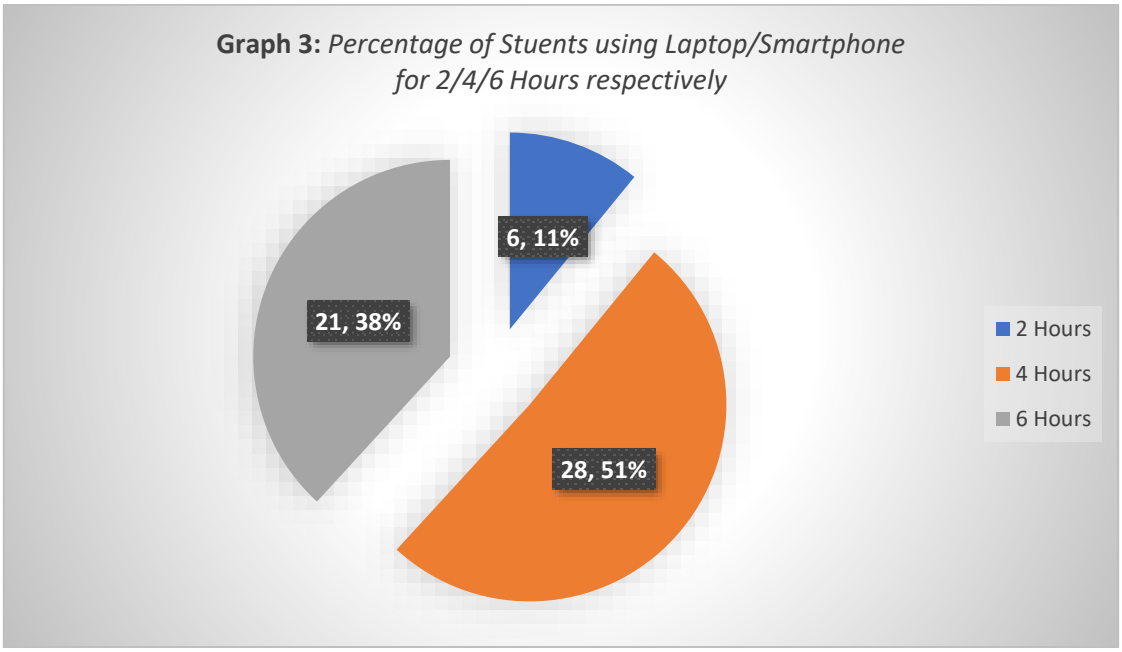
Data Analysis and Interpretation



From Graph 1, we can infer that the Research Study comprised more Female respondents in comparison to Male respondents. 60% of respondents were Female Students.



From Graph 2, we can infer that the Availability of Laptops is more common among Female Students compared to Male Students. 23 out of 31 Students who possess a laptop are Females i.e. % of those having laptops are Female. There is a clear trend when we talk about the availability of laptops among Students of B.Ed. of R.I.E., NCERT, Ajmer when we move from Male to Female Students of B.Ed.



About 89% of Students spent four or more hours using their laptop/smartphone. About 51% of the students spend one sixth of their day using laptop/smartphone while 38% of the students spend about one fourth of the day for the same purpose.

Table 1: Interaction between Gender and Availability of Laptop -wise N
'Gender * Availability of Laptop' Crosstabulation

		Availability of Laptop		Total
		Yes	No	
Gender	Female	23	10	33
	Male	8	14	22
Total		31	24	55

Table 2: Interaction between Gender and Hours Spent-wise N
Gender * Hours Spent Crosstabulation

		Hours Spent			Total
		2 hours	4 hours	6 hours	
Gender	Female	4	16	13	33
	Male	2	12	8	22
Total		6	28	21	55

Table 3: Availability of Laptop & Hours Spent-wise Cross Tabulation Data
AvailabilityofLaptop * Hours Spent Crosstabulation

		Hours Spent			Total
		2 hours	4 hours	6 hours	
Availability of Laptop	Yes	3	13	15	31
	No	3	15	6	24
Total		6	28	21	55

INFLUENCE OF GENDER, LAPTOP AVAILABILITY, HOURS SPENT AND VARIOUS INTERACTIONS AMONG THEM ON KNOWLEDGE OF ICT OF B.Ed. STUDENTS/ STUDENT-TEACHERS/ TEACHER-TRAINEES

The Objective was to study the influence of Gender, Laptop Availability, Hours spent and various interactions among them on Knowledge of ICT of Students of B.Ed. There were two levels of Gender, namely, Male and Female; while Available and Unavailable were the two levels of Laptop Availability; two hours, four hours and six hours were the three levels of 'Hours spent using ICT' in a day. Thus, the data were analysed with the help of Three Way ANOVA or 2 X 2 X 3 Factorial Design ANOVA; and the results are given in Table 1, shown below.

Table 1: Summary of Three-Way ANOVA of Knowledge of ICT of Students

Source of Variance	df	SS	MSS	F-value	Significant	Remark
Gender (A)	1	1.635	1.635	.615	.437	ns
Laptop Availability (B)	1	.042	.042	.016	.901	ns
Hours spent (C)	2	11.475	5.737	2.156	.128	ns
A X B	1	2.518	2.518	.946	.336	ns
A X C	2	1.645	.822	.309	.736	ns
B X C	2	4.755	2.377	.893	.417	ns
A X B X C	1	.392	.392	.147	.703	ns
Error	44	117.089	2.661			
Total	55	2307.000				
Corrected Total	54	142.909				

ns = Not Significant

1. Influence of Gender on Knowledge of ICT of Students

From Table 1, it is evident that the F-value for Gender is .615 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Male and Female Students. So, there is no significant influence of Gender on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of Gender on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of Gender of students.

2. Influence of Laptop Availability on Knowledge of ICT of Students

From Table 1, it is evident that the F-value for Laptop Availability is .016 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Students, having or

not having a laptop. So, there is no significant influence of Laptop Availability on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of Laptop Availability on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of Laptop Availability of students.

3. **Influence of Hours spent on Knowledge of ICT of Students**

From Table 1, it is evident that the F-value for Hours spent is 2.156 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Students, spending Two, Four or Six hours using laptops or smartphones. So, there is no significant influence of Hours spent on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of Hours spent on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of Hours spent by the students using their smartphones/laptops/tablets.

4. **Influence of interaction between Gender and Laptop Availability on Knowledge of ICT of Students**

From Table 1, it is evident that the F-value for interaction between Gender and Laptop Availability is .946 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Male and Female Students having or not having a laptop. So, there is no significant influence of interaction between Gender and Laptop Availability on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of interaction between Gender and Laptop Availability on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of interaction between Gender and Laptop Availability of students.

5. **Influence of interaction between Gender and Hours spent on Knowledge of ICT of Students**

From Table 1, it is evident that the F-value for interaction between Gender and Hours spent is .309 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Male and Female Students spending two/four/six hours in using their smartphones/laptops/tablets. So, there is no significant influence of interaction between Gender and Hours spent on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of interaction between Gender and Hours spent on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of interaction between Gender and Hours spent of students.

6. **Influence of interaction between Laptop Availability and Hours spent on Knowledge of ICT of Students**

From Table 1, it is evident that the F-value for interaction between Laptop Availability and Hours spent is .893 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Students having or not having a laptop and spending two/four/six hours on using their smartphones/tablets. So, there is no significant influence of interaction between Laptop Availability and Hours spent on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of interaction between Laptop Availability and Hours spent on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of interaction between Laptop Availability and Hours spent of students.

7. **Influence of interaction among Gender, Laptop Availability and Hours spent on Knowledge of ICT of Students**

From Table 1, it is evident that the F-value for interaction among Gender, Laptop Availability and Hours spent is .147 which is not Significant. It shows that there is no significant difference between mean scores of Knowledge of ICT of Male and Female Students having or not having a laptop and spending

two/four/six hours on using their smartphones/tablets. So, there is no significant influence of interaction among Gender, Laptop Availability and Hours spent on Knowledge of ICT of Students. Thus, the null hypothesis that there is no significant influence of interaction among Gender, Laptop Availability and Hours spent on Knowledge of ICT of Students is Not Rejected. It may be said that Knowledge of ICT was found to be independent of interaction among Gender, Laptop Availability and Hours spent of students.

Findings

1. Knowledge of ICT was found to be independent of Gender of students.
2. Knowledge of ICT was found to be independent of Laptop Availability of students.
3. Knowledge of ICT was found to be independent of Hours spent by the students.
4. Knowledge of ICT was found to be independent of interaction between Gender and Laptop Availability of students.
5. Knowledge of ICT was found to be independent of interaction between Gender and Hours spent of students.
6. Knowledge of ICT was found to be independent of interaction between Laptop Availability and Hours spent of students.
7. Knowledge of ICT was found to be independent of interaction among Gender, Laptop Availability and Hours spent of students.

Discussion

From the first finding, we can find out that there was no significant influence of gender on the knowledge of ICT of students and thus we can say that statistically, the knowledge of ICT of Male and Female B.Ed. Students are almost similar, neither Male nor Female is significantly better than the other.

There is an interesting conclusion that can be drawn from the second finding, i.e., "Knowledge of ICT was found to be independent of Laptop Availability of students", is that there is no significant influence of Laptop availability on the Knowledge of ICT of B.Ed. Students. We can conclude on the basis of this study, that owning a laptop does not improve the knowledge of ICT of students, it is the time where students spent using the laptop that affects their knowledge. So, instead of just providing laptops and tablets to the students, the government needs to make sure that the time spent on laptops by the students is for a constructive purpose rather than just a time dawdle.

From the third finding, we can infer that the number of hours spent by the student using smartphones/laptops/ tablets does not affect their knowledge of ICT significantly. Hence, once again we need to make sure that the time spent on smartphones/ laptops/ tablets by the students is for a constructive purpose rather than being just a time waste.

From the fourth finding, we can infer that 'Knowledge of ICT' does not depend on the availability and gender when the interaction between these two variables is considered. Similarly, the fifth finding shows us that the 'Knowledge of ICT' does not depend on gender and hours spent when the interaction between these two variables is considered.

From the sixth and seventh findings, it looks a bit concerning that the student (whether a male or a female) who possesses a smartphone/ laptop/ tablet and spends hours using it has the same 'Knowledge of ICT' when compared to a student who does not possess any digital device and spends a few hours. So, what is the use of providing the students with the digital infrastructure they need when they are not themselves interested in improving their skill set? We must understand that we are not talking about ordinary students

but about students pursuing professional teaching courses, who are going to mold the upcoming generations in schools, in the future, and if the Guru is not perfect, how can we expect the same from the students? We know that the quality of research depends on the quality of data collected. Similarly, the quality of a student, in most cases, depends on the quality of teachers who teach them.

Suggestions for future researchers

1. A much larger and representative sample should be considered so that the findings can be generalised.
2. A standardised tool should be administered so that the findings of the research can be of the best quality (reliable, valid & universal).

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