

# Use of Information Communication Technology (ICT) in Library and Information Science Education and Research: A Study of Central Universities in Uttar Pradesh

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## ABSTRACT

With the advent of advanced technology, ICT has revolutionised the way academics perform their work, helping them to deal with larger datasets and improve the outcomes of their investigations. The main objective of this study article is to obtain a better understanding of how ICT can be used in LIS education and research. For the study, a survey design was used. Out of 303 students and research scholars from BBAU, BHU, and AMU, 179 respondents were chosen using Raosoft (Sample size calculator). The questionnaire was the only data collection tool used in both online and offline modes. Microsoft Excel was used to analyse the responses. The study's findings showed that most students and research scholars use ICT tools in their education and research work. This study also focuses on integration regarding the use of information and communication technology, as well as what may improve the status of the education and research sectors by using ICT and how ICT can help in stress reduction in various aspects among students and research scholars. Students and research scholars would benefit from the study because it would contribute to scholarly research and fill a gap in the literature on the use of information and communication technologies.

**Keywords:** Information communication technology; Education; Research activities; Central universities; LIS students & research scholars

## 1. INTRODUCTION

In the twenty-first century, India's development of library information science education and research has greatly improved. Many universities offer this programme in both regular and distance learning modes<sup>1</sup>. ICT has transformed traditional learning and research methods into a more modern and interactive environment<sup>2</sup>. In recent years, using ICT in LIS education and research has increased. ICT applications have been developed to meet the various needs of students and researchers because of these new technologies. Distributed computing resources are used in research to give researchers access to large data sets, large-scale computer resources, and high-performance computing (HPC) analysis, modelling, and visualisation<sup>3</sup>. Most LIS courses offered by Indian universities now have an ICT component for LIS discipline advancement. The ICT courses taught are appropriate for LIS departments in Indian universities since they cover early advancement techniques in addition to other ICT skills and training for LIS students' entry into the workforce, including web 2.0, podcasting/vodcasting, artificial intelligence, and media technology, among other topics<sup>4</sup>. This study examines the use of ICT at the undergraduate, postgraduate, and doctoral levels. This study reveals that the respondents used several ICT tools and techniques for their research and educational activities since they facilitate faster and more efficient access to information and contribute to the growth of professional

competency in both students and researchers. The study also highlights a variety of issues and barriers that stop students and researchers from utilising ICT, such as a lack of ICT-related skills, poor internet connectivity, physical and mental stress, and a reliance on electricity.

In Uttar Pradesh, four central universities have been approved by the UGC. In this study, the researcher has chosen three central universities in Uttar Pradesh that offer programmes in library and information science for the current project, i.e., Babasaheb Bhimrao Ambedkar University, Aligarh Muslim University, and Banaras Hindu University, by using a survey-based questionnaire. These three universities were founded in the corresponding years 1996, 1958, and 1942.

## 2. LITERATURE REVIEW

This section provides a summary of past studies' conclusions regarding the use of ICT in higher education and its effects on researchers' and students' performance. The efficiency of ICT in education and its significance for high-quality education were discussed by Minamatov and Nasirdinova (2022)<sup>5</sup>. The study also stated that ICT has a specific place as an object that strengthens the ability of teachers and students to explain and understand the lesson. Al-Mamary (2022)<sup>6</sup> From the perspective of Yemeni teachers, this study looked at the factors that influence the usage of ICT in the classroom. The researchers used the questionnaire to obtain primary data and then used SmartPLS software to analyse it. The study found that the ease of access to ICT infrastructure, the availability of technical support, the availability of time,

and training in technology use all influenced teachers' use of technology in Yemen. The increase in higher education is considered a crucial determinant for improving green growth, according to Li, Shaikh, and Ullah (2022)<sup>7</sup>. Furthermore, ICT development is the primary driver of green growth. The impact of ICTs in the university context has been studied for decades, as they are not only tools in and of themselves but also generate a new social space and, as a result, a new educational space known as virtual education or online learning (OL), according to Galarce-Miranda, Gormaz-Lobos, and Hortsch (2022)<sup>8</sup>. Specifically, OL has been given as an option in the historical context of the COVID-19 pandemic, which has thrown societal structures and educational institutions into disarray. This research used an in-depth theoretical review to create an instrument to measure students' perceptions about the use of ICTs and educational technologies during the COVID-19 pandemic. Deshpande and Shesh's (2021)<sup>9</sup> research found that as ICT becomes more widely available, teachers have a great opportunity to transform their teaching methods. The factors that influence the use of ICT in education were investigated in depth in this essay. Hasin and Nasir (2021)<sup>10</sup> covered three topics in this study: quality improvement, autonomy and

consisting of LIS students (N = 133) and research scholars (N = 46). Saunders *et al.*<sup>12</sup> suggested using a minimum sample size of 170 for a population of 303. However, the researcher used a sample size of 179 for this study to account for non-responses. Also used Raosoft software sample size calculator to calculate the overall sample size (n), and with a confidence level of 95 % & 5 % margin of error, the sample was chosen for the sample size accuracy<sup>13</sup>. In this study, multistage and simple random sampling were adopted for taking the sample size of the students and research scholars.

## 5. METHODOLOGY

The population of this study included all the Library and Information Science Students (N = 216) and Research Scholars (N = 87) spread across the four central universities in Uttar Pradesh, India. The specific population distribution of this study, showing the number of LIS students and research scholars in each of the central universities, as displayed in Table 1. Within the total population of the universities chosen for the study, the B.L.I.Sc., M.L.I.Sc., M.Phil., and Ph.D. were the target groups.

**Table 1. Population distribution of the study**

Name of university	Population		Sample size	
	Students	Research scholars	Students	Research scholars
Babasaheb Bhimrao Ambedkar University (BBAU)	85	31	61	21
Aligarh Muslim University (AMU)	85	25	35	15
Banaras Hindu University (BHU)	46	31	37	10
Total	216	87	133	46
	303		179	

accountability for schools and universities, and value-based education. A study was conducted to determine the information technology-related issues faced by students and teachers in rural secondary schools, as well as how ICT is used in the teaching and learning process. The study also found that, despite a lack of facilities and knowledge, most respondents viewed the use of ICT positively. Zafar (2019)<sup>11</sup> attempted to analyse the function, difficulties, and effects of ICTs and how they are assisting students, teachers, and end users, as well as the possibility for future growth and development.

## 3. OBJECTIVES

- To examine the availability and accessibility of ICT infrastructure in Central Universities
- To investigate the use of ICT tools for education and research by LIS students and Research scholars
- To explore the ICT competency level of LIS students and Research scholars of Central Universities
- To analyse the possible impact of ICT on education and research in Central Universities
- To determine the Issues & Challenges in using ICT services by LIS Students and Research Scholars.

## 4. SAMPLE SIZE AND SAMPLE TECHNIQUE

This study's sample comprised 179 respondents,

### 5.1 Population distribution of the study showing total number of LIS students and research scholars in central universities

For this study, an online questionnaire was created using google form and distributed to BLIS, MLIS, M.Phil., Ph.D. students and research scholars of department of library and information science Babasaheb Bhimrao Ambedkar University (BBAU), Aligarh Muslim University (AMU) and Banaras Hindu University (BHU). Total 179 questionnaires were received from the 303 that were distributed. Email and WhatsApp chat follow-ups were also made. Microsoft Excel was used to organise, tabulate, and appropriately analyse the responses that were given by the research scholars and students. Mean ( $\mu$ ) and Standard Deviation ( $\sigma$ ) were also used to analyse the data. The results were shown with the use of tables and other figures.

$$\text{Formula of Standard Deviation } \sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

where SD ( $\sigma$ ) = population standard deviation

N = population size

xi = each value from the population

$\mu$  = population mean (The ratio of between the sum of all observations in the dataset to the total number of observations is called the mean.)

**Table 2. Central universities of Uttar Pradesh that offered LIS education**

Name of the Central Universities	Yes	No
Aligarh Muslim University, Aligarh, U.P.	✓	
Babasaheb Bhimrao Ambedkar University, Lucknow, U.P.	✓	
Banaras Hindu University, Varanasi, U.P.	✓	
University of Allahabad, U.P.		✓

## 6. DATA ANALYSIS AND INTERPRETATION

According to the Table 2, there are four central universities in UP, of which three universities offer library science courses but not offered at Allahabad University.

It is observed from Fig. 1, which presents the summary of the distribution of respondents by educational qualifications of the selected universities. Out of the total respondents, most of the respondents were 133 (74.30 %) students and 46 (25.69 %) research scholars.

Figure 2 shows gender-specific responses from central universities in Uttar Pradesh of Library and Information Science students and research scholars. It was observed that out of the total responses, 118 (66 %) were male and 61 (34 %) were female.

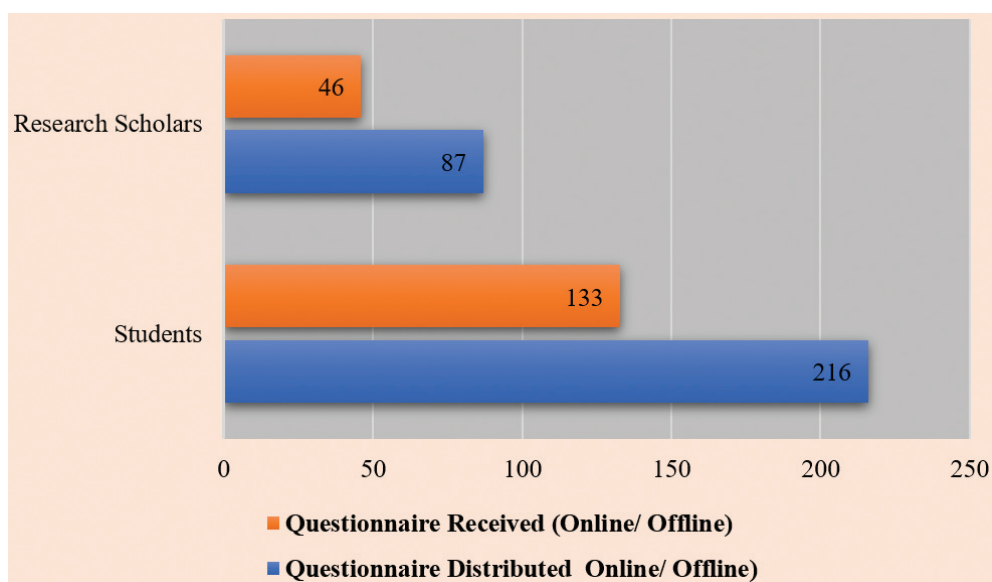


Figure 1. Status of respondents.

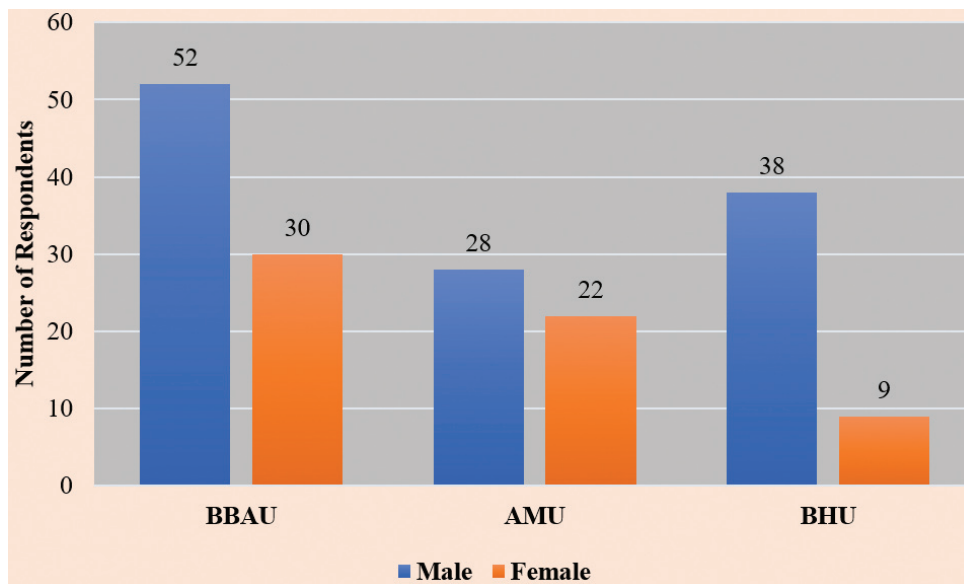


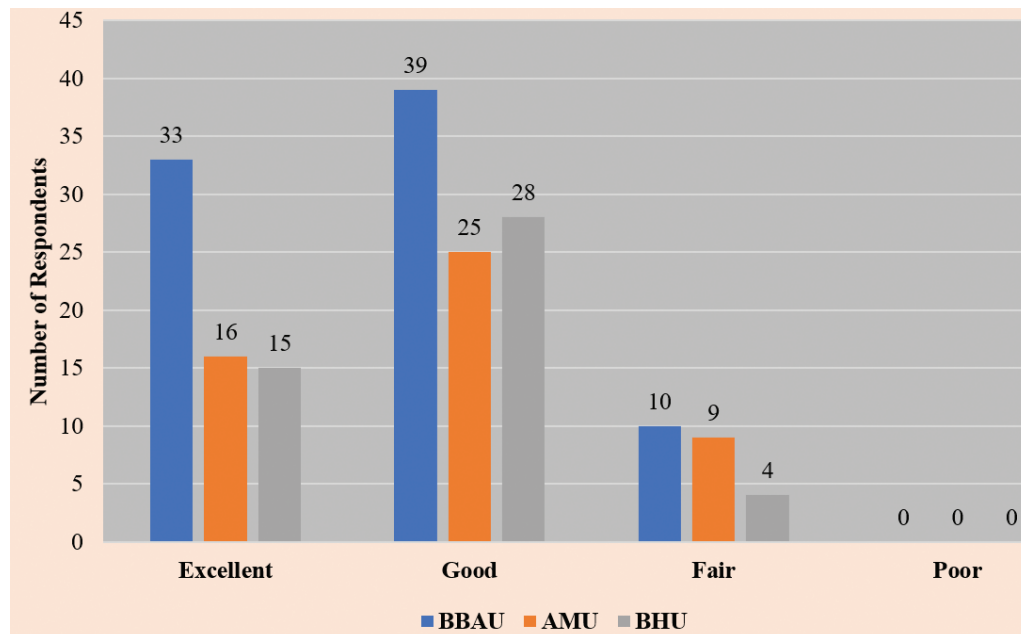
Figure 2. University and gender-wise distribution of respondents.

**Table 3. Availability and accessibility of ICT infrastructure in Central Universities of Uttar Pradesh**

Statement	BBAU			AMU			BHU			Sum $\Sigma$	(%)	Count N=9	
	Yes (%)	No (%)	Don't Know (%)	Yes (%)	No (%)	Don't Know (%)	Yes (%)	No	Don't Know			Mean ( $\mu$ )	SD ( $\sigma$ )
Availability and accessibility of computers	59 (32.96)	3 (1.67)	20 (11.17)	46 (25.69)	1 (0.55)	3 (1.67)	47 (26.25)	0	0	179	100	19.88	22.76
Computers are connected to the network of the university	60 (33.51)	6 (3.35)	16 (8.93)	48 (26.81)	1 (0.55)	1 (0.55)	47 (26.25)	0	0	179	100	19.88	23.20
Availability and accessibility of internet connectivity	63 (35.19)	5 (2.79)	14 (7.82)	49 (27.37)	1 (0.55)	0	47 (26.25)	0	0	179	100	19.88	24.13

**Table 4. Usage of ICT tools helps in education and research**

Name of Universities	Frequency				Sum $\Sigma$	(%)	Count N= 4	
	Students		Research scholars				<i>Mean</i> ( $\mu$ )	<i>SD</i> ( $\sigma$ )
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>				
BBAU	61	0	21	0	82	45.81	20.5	24.90
AMU	36	0	14	0	50	27.93	12.5	14.72
BHU	35	2	10	0	47	26.25	11.75	13.04
Total					179	100		

**Figure 3. ICT competency level of students and research scholars.**

In Table 3 demonstrates the availability and accessibility of ICT infrastructure in Uttar Pradesh's central universities, namely BBAU, AMU, and BHU. The mean score ( $\mu$ ) of all the statements is same i.e., 19.88 and the standard deviation ( $\sigma$ ) of all the statements is 22.76, 23.20 and 24.13, respectively.

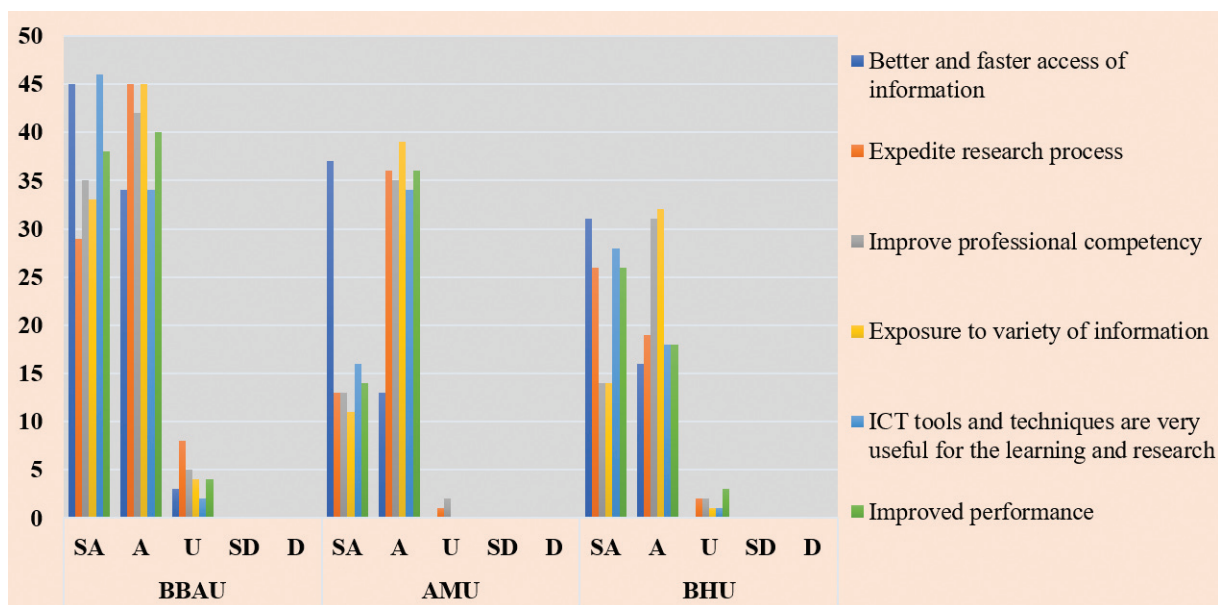
It is important to understand how the usage of ICT tools helps in education and research among students and research scholars. Table 4 indicates that the grand mean score ( $\mu$ ) of selected universities, i.e., Babasaheb Bhimrao Ambedkar University (mean=20.5), Aligarh Muslim University

(mean=12.5), and Banaras Hindu University (mean=11.75) respectively. Similarly, the standard deviation ( $\sigma$ ) of universities was 24.90, 14.72 and 13.04 respectively, which is indicated that the SD of BBAU perspective is greater than other universities perspectives.

Figure 3 shows the response of students and research scholars regarding the ICT competency level of LIS students and research scholars. It is revealed from Figure 3 that most of the respondents 92 (51.39 %) are good, 64 (35.75 %) are excellent, and 23 (12.84 %) are fair in ICT competency level in BBAU, AMU, and BHU, respectively.

Figure 4 depicts the impact of ICT on education and research work. Highest number of students and research scholars of all universities strongly agree, agree and minimum number of students and research scholars of all universities are undecided.

is commonly denoted as  $\sigma$ , is a measure of the variance, or spread, between values in a data collection (which refers to the degree to which a distribution is stretched or compressed). Data points tend to be closer to the mean when the standard deviation is lower (or expected value)  $\mu$ . The study shows that out of 4 central universities in Uttar Pradesh, only three universities offer library science courses. Datta and Das<sup>14</sup> discussed the postgraduate LIS programmes offered by Indian universities and colleges in both regular and distant learning mode. The findings demonstrates that LIS students and researchers have a positive attitude towards the use of ICT tools for their research and education. Most LIS students and researchers have a positive outlook on the accessibility and availability of ICT infrastructure. The respondents said that their universities' networks are connected to computers, and that computers and Internet connectivity are available



(SA- Strongly Agree, A- Agree, UD- Undecided, SD- Strongly Disagree, D- Disagree)

Figure 4. Impact of ICT on education and research.

Annexure I indicates that, issues & challenges faced by the students and research scholars of BBAU, AMU and BHU while using ICT services in their education and research work. As shown in Annexure I; the mean score ( $\mu$ ) of all the statements is same i.e., 35.8 of selected universities. Similarly, the standard deviation ( $\sigma$ ) of all the statements is 36.32, 34.70, 25.27, 15.01, 22.99, and 18.77 respectively, which indicates that the main challenge facing by the students and research scholars confront is the unavailability of internet connectivity to their computers, as well as a low bandwidth or speed perspective. Too difficult to integrate in ICT use into curriculum are also among the major problem in almost all the universities. Other challenges such as mental or physical strain, lack of skills to use ICT based services and dependent on electricity are however not a major issue in using ICT services.

## 7. DISCUSSION

In Table 3, Table 4, and Annexure I; the standard deviation

and easily accessible. The study also showed that the use of ICT has benefited both students' and researchers' learning activities. Some of the effects included better and quicker access to information, greater professional competency and performance, and the great value of ICT tools and techniques for learning and research. Most research scholars and students in the LIS field have good and advanced levels of proficiency with ICT applications. The study also identified several problems and obstacles that prevent students and researchers from using ICT effectively. At all three universities, students and research scholars identified slow and unreliable Internet connectivity as the main issue or challenge. Most respondents in universities stated that their biggest concern was the slow bandwidth or speed. Other difficulties were exhaustion on a mental or physical level, inability to access ICT-based services, and dependency on electricity; In terms of knowledge of the various ICT tools, it seems that students and research scholars of all the universities are aware of them.



In comparison with similar work done by Oulmaati, K., Ezzahri, S., & Samadi, K. (2017)<sup>15</sup> at Abdelmalek Essaadi University, Morocco, students face similar issues with the use of ICT in the learning process and another work done by Ankamah, S. (2019)<sup>16</sup> in Ghana, postgraduate students mostly access ICT facilities at their institution libraries.

## 8. CONCLUSION

Technology has an impact on all aspect of our lives, including education and research. It is a component of the curriculum, a method of providing instruction, and a tool for enhancing the learning and research process. The most important outcomes from this objective demonstrated that most students and research scholars use information communication technology services regularly in their study and research work. The study found that respondents use various ICT tools and technologies in their education and research work as it is helpful in better and faster access of information and helps the students and research scholars to improve professional competency. The study also identified several problems and obstacles that prevent students and researchers from using ICT, including a lack of skills to use ICT based services, poor internet access, dependency on electricity and physical and mental strain.

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He has processed the data for this study.

## Annexure I

## Issues &amp; challenges in using ICT services

Statement	Frequency	BBAU (%)	AMU (%)	BHU (%)	Sum $\Sigma$ (%)	Count N= 5	
						Mean ( $\mu$ )	SD ( $\sigma$ )
Unavailability of internet connectivity to the computers	Always	7 (3.91)	2 (1.11)	3 (1.67)	12 (6.70)	35.8	36.32
	Very Often	15 (8.37)	11 (6.14)	8 (4.46)	34 (18.99)		
	Sometime	47 (26.25)	27 (15.08)	31 (17.31)	105 (58.65)		
	Rarely	11 (6.14)	10 (5.58)	5 (2.79)	26 (14.52)		
	Never	2 (1.11)	0	0	2 (1.11)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		
Low bandwidth or speed	Always	10 (5.58)	3 (1.67)	6 (3.35)	19 (10.61)	35.8	34.70
	Very Often	17 (9.49)	9 (5.05)	10 (5.58)	36 (20.11)		
	Sometime	44 (24.58)	30 (16.75)	28 (15.64)	102 (56.98)		
	Rarely	9 (5.05)	8 (4.46)	2 (1.11)	19 (10.61)		
	Never	2 (1.11)	0	1 (0.55)	3 (1.67)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		
Too difficult to integrate in ICT use into curriculum	Always	8 (4.46)	4 (2.23)	3 (1.67)	15 (8.37)	35.8	25.27
	Very Often	14 (7.82)	8 (4.46)	10 (5.58)	32 (17.87)		
	Sometime	36 (20.11)	20 (11.17)	29 (16.20)	85 (47.48)		
	Rarely	11 (6.14)	12 (6.70)	4 (2.23)	27 (15.08)		
	Never	13 (7.26)	6 (3.35)	1 (0.55)	20 (11.17)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		
Dependent on Electricity	Always	12 (6.70)	24 (13.40)	4 (2.23)	40 (22.34)	35.8	15.01
	Very Often	19 (10.61)	14 (7.82)	21 (11.73)	54 (30.16)		
	Sometime	26 (14.52)	3 (1.67)	14 (7.82)	43 (24.02)		
	Rarely	18 (10.05)	8 (4.46)	7 (3.91)	33 (18.43)		
	Never	7 (3.91)	1 (0.55)	1 (0.55)	9 (5.05)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		
Mental or physical strain	Always	10 (5.58)	2 (1.11)	4 (2.23)	16 (8.93)	35.8	22.99
	Very Often	19 (10.61)	21 (11.73)	21 (11.73)	61 (34.07)		
	Sometime	35 (19.55)	17 (9.49)	14 (7.82)	66 (36.87)		
	Rarely	10 (5.58)	7 (3.91)	7 (3.91)	24 (13.40)		
	Never	8 (4.46)	3 (1.67)	1 (0.55)	12 (6.70)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		
Lack of skills to use ICT based services	Always	8 (4.46)	6 (3.35)	7 (3.91)	21 (11.73)	35.8	18.77
	Very Often	13 (7.26)	8 (4.46)	4 (2.23)	25 (13.96)		
	Sometime	35 (19.55)	21 (11.73)	14 (7.82)	70 (39.10)		
	Rarely	13 (7.26)	10 (5.58)	19 (10.61)	42 (23.46)		
	Never	13 (7.26)	5 (2.79)	3 (1.67)	21 (11.73)		
	Total	82 (45.81)	50 (27.93)	47 (26.25)	179 (100)		